



$$J = \frac{1}{2}$$

τ discovery paper was PERL 75. $e^+e^- \rightarrow \tau^+\tau^-$ cross-section threshold behavior and magnitude are consistent with pointlike spin-1/2 Dirac particle. BRANDELIK 78 ruled out pointlike spin-0 or spin-1 particle. FELDMAN 78 ruled out $J = 3/2$. KIRKBY 79 also ruled out $J=\text{integer}$, $J = 3/2$.

τ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1776.90 ± 0.20 OUR AVERAGE				
1776.81 ^{+0.25} _{-0.23} ± 0.15	81	ANASHIN	07	KEDR 6.7 pb ⁻¹ , $E_{\text{cm}}^{ee} = 3.54\text{--}3.78\text{ GeV}$
1775.1 ± 1.6 ± 1.0	13.3k	¹ ABBIENDI	00A	OPAL 1990–1995 LEP runs
1778.2 ± 0.8 ± 1.2		ANASTASSOV	97	CLEO $E_{\text{cm}}^{ee} = 10.6\text{ GeV}$
1776.96 ^{+0.18} _{-0.21} ^{+0.25} _{-0.17}	65	² BAI	96	BES $E_{\text{cm}}^{ee} = 3.54\text{--}3.57\text{ GeV}$
1776.3 ± 2.4 ± 1.4	11k	³ ALBRECHT	92M	ARG $E_{\text{cm}}^{ee} = 9.4\text{--}10.6\text{ GeV}$
1783 ⁺³ ₋₄	692	⁴ BACINO	78B	DLCO $E_{\text{cm}}^{ee} = 3.1\text{--}7.4\text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1777.8 ± 0.7 ± 1.7	35k	⁵ BALEST	93	CLEO Repl. by ANASTASSOV 97
1776.9 ^{+0.4} _{-0.5} ± 0.2	14	⁶ BAI	92	BES Repl. by BAI 96

¹ ABBIENDI 00A fit τ pseudomass spectrum in $\tau \rightarrow \pi^\pm \leq 2\pi^0 \nu_\tau$ and $\tau \rightarrow \pi^\pm \pi^+ \pi^- \leq 1\pi^0 \nu_\tau$ decays. Result assumes $m_{\nu_\tau} = 0$.

² BAI 96 fit $\sigma(e^+e^- \rightarrow \tau^+\tau^-)$ at different energies near threshold.

³ ALBRECHT 92M fit τ pseudomass spectrum in $\tau^- \rightarrow 2\pi^- \pi^+ \nu_\tau$ decays. Result assumes $m_{\nu_\tau} = 0$.

⁴ BACINO 78B value comes from $e^\pm X^\mp$ threshold. Published mass 1782 MeV increased by 1 MeV using the high precision $\psi(2S)$ mass measurement of ZHOLENTZ 80 to eliminate the absolute SPEAR energy calibration uncertainty.

⁵ BALEST 93 fit spectra of minimum kinematically allowed τ mass in events of the type $e^+e^- \rightarrow \tau^+\tau^- \rightarrow (\pi^+ n\pi^0 \nu_\tau)(\pi^- m\pi^0 \nu_\tau)$ $n \leq 2, m \leq 2, 1 \leq n+m \leq 3$. If $m_{\nu_\tau} \neq 0$, result increases by $(m_{\nu_\tau}^2/1100\text{ MeV})$.

⁶ BAI 92 fit $\sigma(e^+e^- \rightarrow \tau^+\tau^-)$ near threshold using $e\mu$ events.

$$(m_{\tau^+} - m_{\tau^-})/m_{\text{average}}$$

A test of *CPT* invariance.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 3.0 × 10⁻³	90	ABBIENDI	00A	OPAL 1990–1995 LEP runs

τ MEAN LIFE

<u>VALUE (10^{-15} s)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
290.6\pm 1.0	OUR AVERAGE			
290.9 \pm 1.4 \pm 1.0		ABDALLAH	04T DLPH	1991-1995 LEP runs
293.2 \pm 2.0 \pm 1.5		ACCIARRI	00B L3	1991-1995 LEP runs
290.1 \pm 1.5 \pm 1.1		BARATE	97R ALEP	1989-1994 LEP runs
289.2 \pm 1.7 \pm 1.2		ALEXANDER	96E OPAL	1990-1994 LEP runs
289.0 \pm 2.8 \pm 4.0	57.4k	BALEST	96 CLEO	$E_{cm}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
291.2 \pm 2.0 \pm 1.2		BARATE	97I ALEP	Repl. by BARATE 97R
291.4 \pm 3.0		ABREU	96B DLPH	Repl. by ABDAL- LAH 04T
290.1 \pm 4.0	34k	ACCIARRI	96K L3	Repl. by ACCIARRI 00B
297 \pm 9 \pm 5	1671	ABE	95Y SLD	1992-1993 SLC runs
304 \pm 14 \pm 7	4100	BATTLE	92 CLEO	$E_{cm}^{ee} = 10.6$ GeV
301 \pm 29	3780	KLEINWORT	89 JADE	$E_{cm}^{ee} = 35-46$ GeV
288 \pm 16 \pm 17	807	AMIDEI	88 MRK2	$E_{cm}^{ee} = 29$ GeV
306 \pm 20 \pm 14	695	BRAUNSCH...	88C TASS	$E_{cm}^{ee} = 36$ GeV
299 \pm 15 \pm 10	1311	ABACHI	87C HRS	$E_{cm}^{ee} = 29$ GeV
295 \pm 14 \pm 11	5696	ALBRECHT	87P ARG	$E_{cm}^{ee} = 9.3-10.6$ GeV
309 \pm 17 \pm 7	3788	BAND	87B MAC	$E_{cm}^{ee} = 29$ GeV
325 \pm 14 \pm 18	8470	BEBEK	87C CLEO	$E_{cm}^{ee} = 10.5$ GeV
460 \pm 190	102	FELDMAN	82 MRK2	$E_{cm}^{ee} = 29$ GeV

τ MAGNETIC MOMENT ANOMALY

The q^2 dependence is expected to be small providing no thresholds are nearby.

$$\mu_{\tau}/(e\hbar/2m_{\tau})-1 = (g_{\tau}-2)/2$$

For a theoretical calculation $[(g_{\tau}-2)/2 = 117\,721(5) \times 10^{-8}]$, see EIDELMAN 07.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
> -0.052 and < 0.013 (CL = 95%) OUR LIMIT				
> -0.052 and < 0.013	95	⁷ ABDALLAH	04K DLPH	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.107	95	⁸ ACHARD	04G L3	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
> -0.007 and < 0.005	95	⁹ GONZALEZ-S..00	RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ and $W \rightarrow \tau\nu_{\tau}$
> -0.052 and < 0.058	95	¹⁰ ACCIARRI	98E L3	1991-1995 LEP runs
> -0.068 and < 0.065	95	¹¹ ACKERSTAFF	98N OPAL	1990-1995 LEP runs
> -0.004 and < 0.006	95	¹² ESCRIBANO	97 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
<0.01	95	¹³ ESCRIBANO	93 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
<0.12	90	GRIFOLS	91 RVUE	$Z \rightarrow \tau\tau\gamma$ at LEP
<0.023	95	¹⁴ SILVERMAN	83 RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ at PETRA

- ⁷ ABDALLAH 04K limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 183 and 208 GeV. In addition to the limits, the authors also quote a value of -0.018 ± 0.017 .
- ⁸ ACHARD 04G limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 189 and 206 GeV, and is on the absolute value of the magnetic moment anomaly.
- ⁹ GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.
- ¹⁰ ACCIARRI 98E use $Z \rightarrow \tau^+\tau^-\gamma$ events. In addition to the limits, the authors also quote a value of $0.004 \pm 0.027 \pm 0.023$.
- ¹¹ ACKERSTAFF 98N use $Z \rightarrow \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ 's having p^2 ranging from m_τ^2 to $(M_Z - m_\tau)^2$.
- ¹² ESCRIBANO 97 use preliminary experimental results.
- ¹³ ESCRIBANO 93 limit derived from $\Gamma(Z \rightarrow \tau^+\tau^-)$, and is on the absolute value of the magnetic moment anomaly.
- ¹⁴ SILVERMAN 83 limit is derived from $e^+e^- \rightarrow \tau^+\tau^-$ total cross-section measurements for q^2 up to $(37 \text{ GeV})^2$.

τ ELECTRIC DIPOLE MOMENT (d_τ)

A nonzero value is forbidden by both T invariance and P invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(d_τ)

VALUE ($10^{-16} e\text{cm}$)	CL%	DOCUMENT ID	TECN	COMMENT
– 0.22 to 0.45	95	15 INAMI	03 BELL	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< 3.7	95	¹⁶ ABDALLAH	04K DLPH	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
< 11.4	95	¹⁷ ACHARD	04G L3	$e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ at LEP2
< 4.6	95	¹⁸ ALBRECHT	00 ARG	$E_{\text{cm}}^{ee} = 10.4 \text{ GeV}$
> –3.1 and < 3.1	95	ACCIARRI	98E L3	1991–1995 LEP runs
> –3.8 and < 3.6	95	¹⁹ ACKERSTAFF	98N OPAL	1990–1995 LEP runs
< 0.11	95	^{20,21} ESCRIBANO	97 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
< 0.5	95	²² ESCRIBANO	93 RVUE	$Z \rightarrow \tau^+\tau^-$ at LEP
< 7	90	GRIFOLS	91 RVUE	$Z \rightarrow \tau\tau\gamma$ at LEP
< 1.6	90	DELAGUILA	90 RVUE	$e^+e^- \rightarrow \tau^+\tau^-$ $E_{\text{cm}}^{ee} = 35 \text{ GeV}$

- ¹⁵ INAMI 03 use $e^+e^- \rightarrow \tau^+\tau^-$ events.
- ¹⁶ ABDALLAH 04K limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 183 and 208 GeV and is on the absolute value of d_τ .
- ¹⁷ ACHARD 04G limit is derived from $e^+e^- \rightarrow e^+e^-\tau^+\tau^-$ total cross-section measurements at \sqrt{s} between 189 and 206 GeV, and is on the absolute value of d_τ .
- ¹⁸ ALBRECHT 00 use $e^+e^- \rightarrow \tau^+\tau^-$ events. Limit is on the absolute value of Re(d_τ).
- ¹⁹ ACKERSTAFF 98N use $Z \rightarrow \tau^+\tau^-\gamma$ events. The limit applies to an average of the form factor for off-shell τ 's having p^2 ranging from m_τ^2 to $(M_Z - m_\tau)^2$.

- ²⁰ ESCRIBANO 97 derive the relationship $|d_\tau| = \cot \theta_W |d_\tau^W|$ using effective Lagrangian methods, and use a conference result $|d_\tau^W| < 5.8 \times 10^{-18} \text{ e cm}$ at 95% CL (L. Silvestris, ICHEP96) to obtain this result.
- ²¹ ESCRIBANO 97 use preliminary experimental results.
- ²² ESCRIBANO 93 limit derived from $\Gamma(Z \rightarrow \tau^+ \tau^-)$, and is on the absolute value of the electric dipole moment.

$\text{Im}(d_\tau)$

VALUE (10^{-16} e cm)	CL%	DOCUMENT ID	TECN	COMMENT
-0.25 to 0.008	95	²³ INAMI 03	BELL	$E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
< 1.8	95	²⁴ ALBRECHT 00	ARG	$E_{\text{cm}}^{\text{ee}} = 10.4 \text{ GeV}$
²³ INAMI 03 use $e^+ e^- \rightarrow \tau^+ \tau^-$ events.				
²⁴ ALBRECHT 00 use $e^+ e^- \rightarrow \tau^+ \tau^-$ events. Limit is on the absolute value of $\text{Im}(d_\tau)$.				

τ WEAK DIPOLE MOMENT (d_τ^W)

A nonzero value is forbidden by CP invariance.

The q^2 dependence is expected to be small providing no thresholds are nearby.

$\text{Re}(d_\tau^W)$

VALUE (10^{-17} e cm)	CL%	DOCUMENT ID	TECN	COMMENT
<0.50	95	²⁵ HEISTER 03F	ALEP	1990–1995 LEP runs
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<3.0	90	²⁵ ACCIARRI 98C	L3	1991–1995 LEP runs
<0.56	95	ACKERSTAFF 97L	OPAL	1991–1995 LEP runs
<0.78	95	²⁶ AKERS 95F	OPAL	Repl. by ACKER-STAFF 97L
<1.5	95	²⁶ BUSKULIC 95C	ALEP	Repl. by HEISTER 03F
<7.0	95	²⁶ ACTON 92F	OPAL	$Z \rightarrow \tau^+ \tau^-$ at LEP
<3.7	95	²⁶ BUSKULIC 92J	ALEP	Repl. by BUSKULIC 95C

²⁵ Limit is on the absolute value of the real part of the weak dipole moment.

²⁶ Limit is on the absolute value of the real part of the weak dipole moment, and applies for $q^2 = m_Z^2$.

$\text{Im}(d_\tau^W)$

VALUE (10^{-17} e cm)	CL%	DOCUMENT ID	TECN	COMMENT
<1.1	95	²⁷ HEISTER 03F	ALEP	1990–1995 LEP runs
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<1.5	95	ACKERSTAFF 97L	OPAL	1991–1995 LEP runs
<4.5	95	²⁸ AKERS 95F	OPAL	Repl. by ACKER-STAFF 97L

²⁷ HEISTER 03F limit is on the absolute value of the imaginary part of the weak dipole moment.

²⁸ Limit is on the absolute value of the imaginary part of the weak dipole moment, and applies for $q^2 = m_Z^2$.

τ WEAK ANOMALOUS MAGNETIC DIPOLE MOMENT (α_τ^W)

Electroweak radiative corrections are expected to contribute at the 10^{-6} level. See BERNABEU 95.

The q^2 dependence is expected to be small providing no thresholds are nearby.

Re(α_τ^W)

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.1 \times 10^{-3}$	95	²⁹ HEISTER	03F ALEP	1990–1995 LEP runs
••• We do not use the following data for averages, fits, limits, etc. •••				
> -0.0024 and < 0.0025	95	³⁰ GONZALEZ-S..00	RVUE	$e^+ e^- \rightarrow \tau^+ \tau^-$ and $W \rightarrow \tau \nu_\tau$
$<4.5 \times 10^{-3}$	90	²⁹ ACCIARRI	98C L3	1991–1995 LEP runs
²⁹ Limit is on the absolute value of the real part of the weak anomalous magnetic dipole moment.				
³⁰ GONZALEZ-SPRINBERG 00 use data on tau lepton production at LEP1, SLC, and LEP2, and data from colliders and LEP2 to determine limits. Assume imaginary component is zero.				

Im(α_τ^W)

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.7 \times 10^{-3}$	95	³¹ HEISTER	03F ALEP	1990–1995 LEP runs
••• We do not use the following data for averages, fits, limits, etc. •••				
$<9.9 \times 10^{-3}$	90	³¹ ACCIARRI	98C L3	1991–1995 LEP runs
³¹ Limit is on the absolute value of the imaginary part of the weak anomalous magnetic dipole moment.				

τ^- DECAY MODES

τ^+ modes are charge conjugates of the modes below. “ h^\pm ” stands for π^\pm or K^\pm . “ ℓ ” stands for e or μ . “Neutrals” stands for γ 's and/or π^0 's.

Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Modes with one charged particle		
Γ_1 particle $^- \geq 0$ neutrals $\geq 0 K^0 \nu_\tau$ (“1-prong”)	(85.33±0.08) %	S=1.4
Γ_2 particle $^- \geq 0$ neutrals $\geq 0 K_L^0 \nu_\tau$	(84.69±0.09) %	S=1.4
Γ_3 $\mu^- \bar{\nu}_\mu \nu_\tau$	[a] (17.36±0.05) %	
Γ_4 $\mu^- \bar{\nu}_\mu \nu_\tau \gamma$	[b] (3.6 ±0.4) × 10 ⁻³	
Γ_5 $e^- \bar{\nu}_e \nu_\tau$	[a] (17.84±0.05) %	
Γ_6 $e^- \bar{\nu}_e \nu_\tau \gamma$	[b] (1.75±0.18) %	
Γ_7 $h^- \geq 0 K_L^0 \nu_\tau$	(12.14±0.07) %	S=1.1
Γ_8 $h^- \nu_\tau$	(11.59±0.06) %	S=1.1
Γ_9 $\pi^- \nu_\tau$	[a] (10.90±0.07) %	S=1.1
Γ_{10} $K^- \nu_\tau$	[a] (6.91±0.23) × 10 ⁻³	

Γ ₁₁	$h^- \geq 1 \text{ neutrals } \nu_\tau$		$(37.05 \pm 0.12) \%$	S=1.3
Γ ₁₂	$h^- \geq 1\pi^0 \nu_\tau$ (ex. K^0)		$(36.51 \pm 0.12) \%$	S=1.3
Γ ₁₃	$h^- \pi^0 \nu_\tau$		$(25.95 \pm 0.10) \%$	S=1.1
Γ ₁₄	$\pi^- \pi^0 \nu_\tau$	[a]	$(25.50 \pm 0.10) \%$	S=1.1
Γ ₁₅	$\pi^- \pi^0 \text{ non-}\rho(770) \nu_\tau$		$(3.0 \pm 3.2) \times 10^{-3}$	
Γ ₁₆	$K^- \pi^0 \nu_\tau$	[a]	$(4.52 \pm 0.27) \times 10^{-3}$	
Γ ₁₇	$h^- \geq 2\pi^0 \nu_\tau$		$(10.81 \pm 0.14) \%$	S=1.5
Γ ₁₈	$h^- 2\pi^0 \nu_\tau$		$(9.47 \pm 0.12) \%$	S=1.3
Γ ₁₉	$h^- 2\pi^0 \nu_\tau$ (ex. K^0)		$(9.31 \pm 0.12) \%$	S=1.3
Γ ₂₀	$\pi^- 2\pi^0 \nu_\tau$ (ex. K^0)	[a]	$(9.25 \pm 0.12) \%$	S=1.3
Γ ₂₁	$\pi^- 2\pi^0 \nu_\tau$ (ex. K^0),		$< 9 \times 10^{-3}$	CL=95%
Γ ₂₂	scalar		$< 7 \times 10^{-3}$	CL=95%
	vector			
Γ ₂₃	$K^- 2\pi^0 \nu_\tau$ (ex. K^0)	[a]	$(5.8 \pm 2.3) \times 10^{-4}$	
Γ ₂₄	$h^- \geq 3\pi^0 \nu_\tau$		$(1.33 \pm 0.07) \%$	S=1.1
Γ ₂₅	$h^- \geq 3\pi^0 \nu_\tau$ (ex. K^0)		$(1.25 \pm 0.07) \%$	S=1.1
Γ ₂₆	$h^- 3\pi^0 \nu_\tau$		$(1.17 \pm 0.08) \%$	S=1.1
Γ ₂₇	$\pi^- 3\pi^0 \nu_\tau$ (ex. K^0)	[a]	$(1.04 \pm 0.08) \%$	S=1.1
Γ ₂₈	$K^- 3\pi^0 \nu_\tau$ (ex. K^0, η)	[a]	$(4.2 \pm 2.1) \times 10^{-4}$	
Γ ₂₉	$h^- 4\pi^0 \nu_\tau$ (ex. K^0)		$(1.6 \pm 0.4) \times 10^{-3}$	
Γ ₃₀	$h^- 4\pi^0 \nu_\tau$ (ex. K^0, η)	[a]	$(1.0 \pm 0.4) \times 10^{-3}$	
Γ ₃₁	$K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau$		$(1.57 \pm 0.04) \%$	S=1.1
Γ ₃₂	$K^- \geq 1(\pi^0 \text{ or } K^0 \text{ or } \gamma) \nu_\tau$		$(8.78 \pm 0.33) \times 10^{-3}$	

Modes with K^0 's

Γ ₃₃	$K_S^0(\text{particles})^- \nu_\tau$		$(9.27 \pm 0.34) \times 10^{-3}$	S=1.1
Γ ₃₄	$h^- \bar{K}^0 \nu_\tau$		$(1.05 \pm 0.04) \%$	S=1.1
Γ ₃₅	$\pi^- \bar{K}^0 \nu_\tau$	[a]	$(9.0 \pm 0.4) \times 10^{-3}$	S=1.1
Γ ₃₆	$\pi^- \bar{K}^0(\text{non-}K^*(892)^-) \nu_\tau$		$< 1.7 \times 10^{-3}$	CL=95%
Γ ₃₇	$K^- K^0 \nu_\tau$	[a]	$(1.53 \pm 0.16) \times 10^{-3}$	
Γ ₃₈	$K^- K^0 \geq 0\pi^0 \nu_\tau$		$(3.07 \pm 0.24) \times 10^{-3}$	
Γ ₃₉	$h^- \bar{K}^0 \pi^0 \nu_\tau$		$(5.3 \pm 0.4) \times 10^{-3}$	
Γ ₄₀	$\pi^- \bar{K}^0 \pi^0 \nu_\tau$	[a]	$(3.8 \pm 0.4) \times 10^{-3}$	
Γ ₄₁	$\bar{K}^0 \rho^- \nu_\tau$		$(2.2 \pm 0.5) \times 10^{-3}$	
Γ ₄₂	$K^- K^0 \pi^0 \nu_\tau$	[a]	$(1.54 \pm 0.20) \times 10^{-3}$	
Γ ₄₃	$\pi^- \bar{K}^0 \geq 1\pi^0 \nu_\tau$		$(3.2 \pm 1.0) \times 10^{-3}$	
Γ ₄₄	$\pi^- \bar{K}^0 \pi^0 \pi^0 \nu_\tau$		$(2.6 \pm 2.4) \times 10^{-4}$	
Γ ₄₅	$K^- K^0 \pi^0 \pi^0 \nu_\tau$		$< 1.6 \times 10^{-4}$	CL=95%
Γ ₄₆	$\pi^- K^0 \bar{K}^0 \nu_\tau$		$(1.60 \pm 0.31) \times 10^{-3}$	S=1.2
Γ ₄₇	$\pi^- K_S^0 K_S^0 \nu_\tau$	[a]	$(2.4 \pm 0.5) \times 10^{-4}$	
Γ ₄₈	$\pi^- K_S^0 K_L^0 \nu_\tau$	[a]	$(1.12 \pm 0.30) \times 10^{-3}$	S=1.2
Γ ₄₉	$\pi^- K^0 \bar{K}^0 \pi^0 \nu_\tau$		$(3.1 \pm 2.3) \times 10^{-4}$	
Γ ₅₀	$\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau$		$< 2.0 \times 10^{-4}$	CL=95%

Γ_{51}	$\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau$	$(3.1 \pm 1.2) \times 10^{-4}$	
Γ_{52}	$K^0 h^+ h^- h^- \geq 0$ neutrals ν_τ	$< 1.7 \times 10^{-3}$	CL=95%
Γ_{53}	$K^0 h^+ h^- h^- \nu_\tau$	$(2.3 \pm 2.0) \times 10^{-4}$	

Modes with three charged particles

Γ_{54}	$h^- h^- h^+ \geq 0$ neutrals $\geq 0 K_L^0 \nu_\tau$	$(15.22 \pm 0.09) \%$	S=1.4
Γ_{55}	$h^- h^- h^+ \geq 0$ neutrals ν_τ (ex. $K_S^0 \rightarrow \pi^+ \pi^-$) ("3-prong")	$(14.59 \pm 0.08) \%$	S=1.4
Γ_{56}	$h^- h^- h^+ \nu_\tau$	$(9.87 \pm 0.08) \%$	S=1.3
Γ_{57}	$h^- h^- h^+ \nu_\tau$ (ex. K^0)	$(9.51 \pm 0.08) \%$	S=1.3
Γ_{58}	$h^- h^- h^+ \nu_\tau$ (ex. K^0, ω)	$(9.47 \pm 0.08) \%$	S=1.3
Γ_{59}	$\pi^- \pi^+ \pi^- \nu_\tau$	$(9.33 \pm 0.08) \%$	S=1.3
Γ_{60}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex. K^0)	$(9.02 \pm 0.08) \%$	S=1.3
Γ_{61}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex. K^0), non-axial vector	$< 2.4 \%$	CL=95%
Γ_{62}	$\pi^- \pi^+ \pi^- \nu_\tau$ (ex. K^0, ω)	[a] $(8.99 \pm 0.08) \%$	S=1.3
Γ_{63}	$h^- h^- h^+ \geq 1$ neutrals ν_τ	$(5.34 \pm 0.06) \%$	S=1.1
Γ_{64}	$h^- h^- h^+ \geq 1 \pi^0 \nu_\tau$ (ex. K^0)	$(5.06 \pm 0.06) \%$	S=1.1
Γ_{65}	$h^- h^- h^+ \pi^0 \nu_\tau$	$(4.73 \pm 0.07) \%$	S=1.2
Γ_{66}	$h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0)	$(4.55 \pm 0.06) \%$	S=1.2
Γ_{67}	$h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0, ω)	$(2.78 \pm 0.08) \%$	S=1.2
Γ_{68}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$	$(4.59 \pm 0.07) \%$	S=1.2
Γ_{69}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)	$(4.46 \pm 0.06) \%$	S=1.2
Γ_{70}	$\pi^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, ω)	[a] $(2.69 \pm 0.08) \%$	S=1.2
Γ_{71}	$h^- \rho \pi^0 \nu_\tau$		
Γ_{72}	$h^- \rho^+ h^- \nu_\tau$		
Γ_{73}	$h^- \rho^- h^+ \nu_\tau$		
Γ_{74}	$h^- h^- h^+ \geq 2 \pi^0 \nu_\tau$ (ex. K^0)	$(5.14 \pm 0.34) \times 10^{-3}$	S=1.1
Γ_{75}	$h^- h^- h^+ 2 \pi^0 \nu_\tau$	$(5.02 \pm 0.34) \times 10^{-3}$	S=1.1
Γ_{76}	$h^- h^- h^+ 2 \pi^0 \nu_\tau$ (ex. K^0)	$(4.92 \pm 0.34) \times 10^{-3}$	S=1.1
Γ_{77}	$h^- h^- h^+ 2 \pi^0 \nu_\tau$ (ex. K^0, ω, η)	[a] $(9 \pm 4) \times 10^{-4}$	
Γ_{78}	$h^- h^- h^+ 3 \pi^0 \nu_\tau$	[a] $(2.2 \pm 0.5) \times 10^{-4}$	
Γ_{79}	$K^- h^+ h^- \geq 0$ neutrals ν_τ	$(6.79 \pm 0.35) \times 10^{-3}$	S=1.3
Γ_{80}	$K^- h^+ \pi^- \nu_\tau$ (ex. K^0)	$(4.86 \pm 0.32) \times 10^{-3}$	S=1.4
Γ_{81}	$K^- h^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)	$(8.5 \pm 1.2) \times 10^{-4}$	
Γ_{82}	$K^- \pi^+ \pi^- \geq 0$ neutrals ν_τ	$(5.2 \pm 0.4) \times 10^{-3}$	S=1.5
Γ_{83}	$K^- \pi^+ \pi^- \geq 0 \pi^0 \nu_\tau$ (ex. K^0)	$(4.1 \pm 0.4) \times 10^{-3}$	S=1.5
Γ_{84}	$K^- \pi^+ \pi^- \nu_\tau$	$(3.9 \pm 0.4) \times 10^{-3}$	S=1.6
Γ_{85}	$K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0)	[a] $(3.33 \pm 0.35) \times 10^{-3}$	S=1.6
Γ_{86}	$K^- \rho^0 \nu_\tau \rightarrow$ $K^- \pi^+ \pi^- \nu_\tau$	$(1.6 \pm 0.6) \times 10^{-3}$	
Γ_{87}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$	$(1.32 \pm 0.14) \times 10^{-3}$	

Γ_{88}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0)		$(7.9 \pm 1.2) \times 10^{-4}$	
Γ_{89}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, η)	[a]	$(7.3 \pm 1.2) \times 10^{-4}$	
Γ_{90}	$K^- \pi^+ \pi^- \pi^0 \nu_\tau$ (ex. K^0, ω)		$(3.7 \pm 0.9) \times 10^{-4}$	
Γ_{91}	$K^- \pi^+ K^- \geq 0$ neut. ν_τ		$< 9 \times 10^{-4}$	CL=95%
Γ_{92}	$K^- K^+ \pi^- \geq 0$ neut. ν_τ		$(1.59 \pm 0.10) \times 10^{-3}$	S=1.4
Γ_{93}	$K^- K^+ \pi^- \nu_\tau$	[a]	$(1.53 \pm 0.10) \times 10^{-3}$	S=1.4
Γ_{94}	$K^- K^+ \pi^- \pi^0 \nu_\tau$	[a]	$(6.1 \pm 2.0) \times 10^{-5}$	S=1.1
Γ_{95}	$K^- K^+ K^- \geq 0$ neut. ν_τ		$< 2.1 \times 10^{-3}$	CL=95%
Γ_{96}	$K^- K^+ K^- \nu_\tau$		$< 3.7 \times 10^{-5}$	CL=90%
Γ_{97}	$K^- K^+ K^- \pi^0 \nu_\tau$		$< 4.8 \times 10^{-6}$	CL=90%
Γ_{98}	$\pi^- K^+ \pi^- \geq 0$ neut. ν_τ		$< 2.5 \times 10^{-3}$	CL=95%
Γ_{99}	$e^- e^- e^+ \bar{\nu}_e \nu_\tau$		$(2.8 \pm 1.5) \times 10^{-5}$	
Γ_{100}	$\mu^- e^- e^+ \bar{\nu}_\mu \nu_\tau$		$< 3.6 \times 10^{-5}$	CL=90%

Modes with five charged particles

Γ_{101}	$3h^- 2h^+ \geq 0$ neutrals ν_τ (ex. $K_S^0 \rightarrow \pi^- \pi^+$) ("5-prong")		$(1.02 \pm 0.04) \times 10^{-3}$	S=1.1
Γ_{102}	$3h^- 2h^+ \nu_\tau$ (ex. K^0)	[a]	$(8.38 \pm 0.35) \times 10^{-4}$	S=1.1
Γ_{103}	$3h^- 2h^+ \pi^0 \nu_\tau$ (ex. K^0)	[a]	$(1.78 \pm 0.27) \times 10^{-4}$	
Γ_{104}	$3h^- 2h^+ 2\pi^0 \nu_\tau$		$< 3.4 \times 10^{-6}$	CL=90%

Miscellaneous other allowed modes

Γ_{105}	$(5\pi)^- \nu_\tau$		$(7.6 \pm 0.5) \times 10^{-3}$	S=1.1
Γ_{106}	$4h^- 3h^+ \geq 0$ neutrals ν_τ ("7-prong")		$< 3.0 \times 10^{-7}$	CL=90%
Γ_{107}	$4h^- 3h^+ \nu_\tau$		$< 4.3 \times 10^{-7}$	CL=90%
Γ_{108}	$4h^- 3h^+ \pi^0 \nu_\tau$		$< 2.5 \times 10^{-7}$	CL=90%
Γ_{109}	$X^-(S=-1) \nu_\tau$		$(2.95 \pm 0.07) \%$	S=1.1
Γ_{110}	$K^*(892)^- \geq 0$ neutrals \geq $0K_L^0 \nu_\tau$		$(1.42 \pm 0.18) \%$	S=1.4
Γ_{111}	$K^*(892)^- \nu_\tau$		$(1.29 \pm 0.05) \%$	
Γ_{112}	$K^*(892)^0 K^- \geq 0$ neutrals ν_τ		$(3.2 \pm 1.4) \times 10^{-3}$	
Γ_{113}	$K^*(892)^0 K^- \nu_\tau$		$(2.1 \pm 0.4) \times 10^{-3}$	
Γ_{114}	$\bar{K}^*(892)^0 \pi^- \geq 0$ neutrals ν_τ		$(3.8 \pm 1.7) \times 10^{-3}$	
Γ_{115}	$\bar{K}^*(892)^0 \pi^- \nu_\tau$		$(2.2 \pm 0.5) \times 10^{-3}$	
Γ_{116}	$(\bar{K}^*(892)\pi)^- \nu_\tau \rightarrow$ $\pi^- \bar{K}^0 \pi^0 \nu_\tau$		$(1.0 \pm 0.4) \times 10^{-3}$	
Γ_{117}	$K_1(1270)^- \nu_\tau$		$(4.7 \pm 1.1) \times 10^{-3}$	
Γ_{118}	$K_1(1400)^- \nu_\tau$		$(1.7 \pm 2.6) \times 10^{-3}$	S=1.7
Γ_{119}	$K^*(1410)^- \nu_\tau$		$(1.5^{+1.4}_{-1.0}) \times 10^{-3}$	
Γ_{120}	$K_0^*(1430)^- \nu_\tau$		$< 5 \times 10^{-4}$	CL=95%
Γ_{121}	$K_2^*(1430)^- \nu_\tau$		$< 3 \times 10^{-3}$	CL=95%
Γ_{122}	$a_0(980)^- \geq 0$ neutrals ν_τ			

Γ_{123}	$\eta\pi^-\nu_\tau$		$< 1.4 \times 10^{-4}$	CL=95%
Γ_{124}	$\eta\pi^-\pi^0\nu_\tau$	[a]	$(1.77 \pm 0.24) \times 10^{-3}$	
Γ_{125}	$\eta\pi^-\pi^0\pi^0\nu_\tau$		$(1.5 \pm 0.5) \times 10^{-4}$	
Γ_{126}	$\eta K^-\nu_\tau$	[a]	$(2.7 \pm 0.6) \times 10^{-4}$	
Γ_{127}	$\eta K^*(892)^-\nu_\tau$		$(2.9 \pm 0.9) \times 10^{-4}$	
Γ_{128}	$\eta K^-\pi^0\nu_\tau$		$(1.8 \pm 0.9) \times 10^{-4}$	
Γ_{129}	$\eta\bar{K}^0\pi^-\nu_\tau$		$(2.2 \pm 0.7) \times 10^{-4}$	
Γ_{130}	$\eta\pi^+\pi^-\pi^- \geq 0$ neutrals ν_τ		$< 3 \times 10^{-3}$	CL=90%
Γ_{131}	$\eta\pi^-\pi^+\pi^-\nu_\tau$		$(2.3 \pm 0.5) \times 10^{-4}$	
Γ_{132}	$\eta a_1(1260)^-\nu_\tau \rightarrow \eta\pi^-\rho^0\nu_\tau$		$< 3.9 \times 10^{-4}$	CL=90%
Γ_{133}	$\eta\eta\pi^-\nu_\tau$		$< 1.1 \times 10^{-4}$	CL=95%
Γ_{134}	$\eta\eta\pi^-\pi^0\nu_\tau$		$< 2.0 \times 10^{-4}$	CL=95%
Γ_{135}	$\eta'(958)\pi^-\nu_\tau$		$< 7.4 \times 10^{-5}$	CL=90%
Γ_{136}	$\eta'(958)\pi^-\pi^0\nu_\tau$		$< 8.0 \times 10^{-5}$	CL=90%
Γ_{137}	$\phi\pi^-\nu_\tau$		$< 2.0 \times 10^{-4}$	CL=90%
Γ_{138}	$\phi K^-\nu_\tau$		$(4.0 \pm 0.4) \times 10^{-5}$	
Γ_{139}	$f_1(1285)\pi^-\nu_\tau$		$(4.1 \pm 0.8) \times 10^{-4}$	
Γ_{140}	$f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau$		$(1.3 \pm 0.4) \times 10^{-4}$	
Γ_{141}	$\pi(1300)^-\nu_\tau \rightarrow (\rho\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau$		$< 1.0 \times 10^{-4}$	CL=90%
Γ_{142}	$\pi(1300)^-\nu_\tau \rightarrow ((\pi\pi)_{S\text{-wave}}\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau$		$< 1.9 \times 10^{-4}$	CL=90%
Γ_{143}	$h^-\omega \geq 0$ neutrals ν_τ		$(2.39 \pm 0.09) \%$	S=1.2
Γ_{144}	$h^-\omega\nu_\tau$	[a]	$(1.99 \pm 0.08) \%$	S=1.2
Γ_{145}	$K^-\omega\nu_\tau$		$(4.1 \pm 0.9) \times 10^{-4}$	
Γ_{146}	$h^-\omega\pi^0\nu_\tau$	[a]	$(4.1 \pm 0.4) \times 10^{-3}$	
Γ_{147}	$h^-\omega 2\pi^0\nu_\tau$		$(1.4 \pm 0.5) \times 10^{-4}$	
Γ_{148}	$h^-\omega\nu_\tau$		$< 5.4 \times 10^{-7}$	CL=90%
Γ_{149}	$2h^-h^+\omega\nu_\tau$		$(1.20 \pm 0.22) \times 10^{-4}$	

Lepton Family number (*LF*), Lepton number (*L*), or Baryon number (*B*) violating modes

L means lepton number violation (e.g. $\tau^- \rightarrow e^+\pi^-\pi^-$). Following common usage, *LF* means lepton family violation *and not* lepton number violation (e.g. $\tau^- \rightarrow e^-\pi^+\pi^-$). *B* means baryon number violation.

Γ_{150}	$e^-\gamma$	<i>LF</i>	$< 1.1 \times 10^{-7}$	CL=90%
Γ_{151}	$\mu^-\gamma$	<i>LF</i>	$< 6.8 \times 10^{-8}$	CL=90%
Γ_{152}	$e^-\pi^0$	<i>LF</i>	$< 8.0 \times 10^{-8}$	CL=90%
Γ_{153}	$\mu^-\pi^0$	<i>LF</i>	$< 1.1 \times 10^{-7}$	CL=90%
Γ_{154}	$e^-K_S^0$	<i>LF</i>	$< 5.6 \times 10^{-8}$	CL=90%
Γ_{155}	$\mu^-K_S^0$	<i>LF</i>	$< 4.9 \times 10^{-8}$	CL=90%
Γ_{156}	$e^-\eta$	<i>LF</i>	$< 9.2 \times 10^{-8}$	CL=90%

Γ ₁₅₇	$\mu^- \eta$	LF	< 6.5	$\times 10^{-8}$	CL=90%
Γ ₁₅₈	$e^- \rho^0$	LF	< 6.5	$\times 10^{-7}$	CL=90%
Γ ₁₅₉	$\mu^- \rho^0$	LF	< 2.0	$\times 10^{-7}$	CL=90%
Γ ₁₆₀	$e^- K^*(892)^0$	LF	< 3.0	$\times 10^{-7}$	CL=90%
Γ ₁₆₁	$\mu^- K^*(892)^0$	LF	< 3.9	$\times 10^{-7}$	CL=90%
Γ ₁₆₂	$e^- \bar{K}^*(892)^0$	LF	< 4.0	$\times 10^{-7}$	CL=90%
Γ ₁₆₃	$\mu^- \bar{K}^*(892)^0$	LF	< 4.0	$\times 10^{-7}$	CL=90%
Γ ₁₆₄	$e^- \eta'(958)$	LF	< 1.6	$\times 10^{-7}$	CL=90%
Γ ₁₆₅	$\mu^- \eta'(958)$	LF	< 1.3	$\times 10^{-7}$	CL=90%
Γ ₁₆₆	$e^- \phi$	LF	< 7.3	$\times 10^{-7}$	CL=90%
Γ ₁₆₇	$\mu^- \phi$	LF	< 7.7	$\times 10^{-7}$	CL=90%
Γ ₁₆₈	$e^- e^+ e^-$	LF	< 2.0	$\times 10^{-7}$	CL=90%
Γ ₁₆₉	$e^- \mu^+ \mu^-$	LF	< 2.0	$\times 10^{-7}$	CL=90%
Γ ₁₇₀	$e^+ \mu^- \mu^-$	LF	< 1.3	$\times 10^{-7}$	CL=90%
Γ ₁₇₁	$\mu^- e^+ e^-$	LF	< 1.9	$\times 10^{-7}$	CL=90%
Γ ₁₇₂	$\mu^+ e^- e^-$	LF	< 1.1	$\times 10^{-7}$	CL=90%
Γ ₁₇₃	$\mu^- \mu^+ \mu^-$	LF	< 1.9	$\times 10^{-7}$	CL=90%
Γ ₁₇₄	$e^- \pi^+ \pi^-$	LF	< 1.2	$\times 10^{-7}$	CL=90%
Γ ₁₇₅	$e^+ \pi^- \pi^-$	L	< 2.0	$\times 10^{-7}$	CL=90%
Γ ₁₇₆	$\mu^- \pi^+ \pi^-$	LF	< 2.9	$\times 10^{-7}$	CL=90%
Γ ₁₇₇	$\mu^+ \pi^- \pi^-$	L	< 7	$\times 10^{-8}$	CL=90%
Γ ₁₇₈	$e^- \pi^+ K^-$	LF	< 3.2	$\times 10^{-7}$	CL=90%
Γ ₁₇₉	$e^- \pi^- K^+$	LF	< 1.6	$\times 10^{-7}$	CL=90%
Γ ₁₈₀	$e^+ \pi^- K^-$	L	< 1.8	$\times 10^{-7}$	CL=90%
Γ ₁₈₁	$e^- K_S^0 K_S^0$	LF	< 2.2	$\times 10^{-6}$	CL=90%
Γ ₁₈₂	$e^- K^+ K^-$	LF	< 1.4	$\times 10^{-7}$	CL=90%
Γ ₁₈₃	$e^+ K^- K^-$	L	< 1.5	$\times 10^{-7}$	CL=90%
Γ ₁₈₄	$\mu^- \pi^+ K^-$	LF	< 2.6	$\times 10^{-7}$	CL=90%
Γ ₁₈₅	$\mu^- \pi^- K^+$	LF	< 3.2	$\times 10^{-7}$	CL=90%
Γ ₁₈₆	$\mu^+ \pi^- K^-$	L	< 2.2	$\times 10^{-7}$	CL=90%
Γ ₁₈₇	$\mu^- K_S^0 K_S^0$	LF	< 3.4	$\times 10^{-6}$	CL=90%
Γ ₁₈₈	$\mu^- K^+ K^-$	LF	< 2.5	$\times 10^{-7}$	CL=90%
Γ ₁₈₉	$\mu^+ K^- K^-$	L	< 4.4	$\times 10^{-7}$	CL=90%
Γ ₁₉₀	$e^- \pi^0 \pi^0$	LF	< 6.5	$\times 10^{-6}$	CL=90%
Γ ₁₉₁	$\mu^- \pi^0 \pi^0$	LF	< 1.4	$\times 10^{-5}$	CL=90%
Γ ₁₉₂	$e^- \eta \eta$	LF	< 3.5	$\times 10^{-5}$	CL=90%
Γ ₁₉₃	$\mu^- \eta \eta$	LF	< 6.0	$\times 10^{-5}$	CL=90%
Γ ₁₉₄	$e^- \pi^0 \eta$	LF	< 2.4	$\times 10^{-5}$	CL=90%
Γ ₁₉₅	$\mu^- \pi^0 \eta$	LF	< 2.2	$\times 10^{-5}$	CL=90%
Γ ₁₉₆	$\bar{p} \gamma$	L,B	< 3.5	$\times 10^{-6}$	CL=90%
Γ ₁₉₇	$\bar{p} \pi^0$	L,B	< 1.5	$\times 10^{-5}$	CL=90%
Γ ₁₉₈	$\bar{p} 2\pi^0$	L,B	< 3.3	$\times 10^{-5}$	CL=90%
Γ ₁₉₉	$\bar{p} \eta$	L,B	< 8.9	$\times 10^{-6}$	CL=90%
Γ ₂₀₀	$\bar{p} \pi^0 \eta$	L,B	< 2.7	$\times 10^{-5}$	CL=90%

Γ_{201}	$\Lambda\pi^-$	L,B	< 7.2	$\times 10^{-8}$	CL=90%
Γ_{202}	$\bar{\Lambda}\pi^-$	L,B	< 1.4	$\times 10^{-7}$	CL=90%
Γ_{203}	e^- light boson	LF	< 2.7	$\times 10^{-3}$	CL=95%
Γ_{204}	μ^- light boson	LF	< 5	$\times 10^{-3}$	CL=95%

[a] Basis mode for the τ .

[b] See the Particle Listings below for the energy limits used in this measurement.

CONSTRAINED FIT INFORMATION

An overall fit to 64 branching ratios uses 125 measurements and one constraint to determine 31 parameters. The overall fit has a $\chi^2 = 77.5$ for 95 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_5	-14										
x_9	-3	-5									
x_{10}	0	2	-22								
x_{14}	-13	-12	-16	0							
x_{16}	0	1	-2	-3	-9						
x_{20}	-5	-10	-10	-5	-54	-4					
x_{23}	0	1	-1	-3	0	-20	-7				
x_{27}	-4	-5	-10	-1	-5	0	-14	-1			
x_{28}	0	0	0	-2	2	-18	-4	-15	-10		
x_{30}	-3	-3	-12	1	-12	-1	15	-1	-37	1	
x_{35}	-6	-4	-7	-2	0	-1	-12	-1	-5	0	
x_{37}	-2	-2	-1	-1	1	-11	-1	-9	0	-8	
x_{40}	-5	-3	-6	-2	0	2	-10	1	-7	1	
x_{42}	-1	-1	0	-2	1	-14	1	-11	0	-11	
x_{47}	0	0	-1	0	0	0	-1	0	0	0	
x_{48}	-3	-2	-4	-1	0	0	-7	0	-3	0	
x_{62}	-5	-2	3	0	8	1	-35	0	-22	1	
x_{70}	-3	-1	-6	4	-4	3	-7	1	-5	1	
x_{77}	1	-1	-2	-1	-6	0	8	-1	6	-1	
x_{78}	0	0	0	0	1	0	-1	0	0	0	
x_{85}	1	2	-2	-2	2	-2	-7	-2	-2	-2	
x_{89}	1	1	0	-1	2	-1	-2	0	-1	0	
x_{93}	-1	-1	1	1	1	1	-3	0	-3	1	
x_{94}	0	0	0	0	0	0	0	0	0	0	
x_{102}	0	-1	1	-2	-3	-1	6	0	4	0	
x_{103}	-1	-1	-1	0	-2	0	2	0	1	0	
x_{124}	-2	-1	-2	-1	1	-1	-7	-1	-1	-1	
x_{126}	0	0	0	0	0	-3	-1	-3	-1	-3	
x_{144}	-3	-2	-4	1	-2	0	-6	0	-4	0	
x_{146}	-1	-2	-4	-1	-7	-1	7	-1	7	-2	
	x_3	x_5	x_9	x_{10}	x_{14}	x_{16}	x_{20}	x_{23}	x_{27}	x_{28}	

x35	-1									
x37	0	-5								
x40	0	-13	-1							
x42	0	-2	-16	-19						
x47	0	-2	-1	-2	-1					
x48	-1	-18	-5	-14	-4	-3				
x62	-11	2	0	2	0	0	1			
x70	1	6	1	5	0	0	3	-9		
x77	5	-1	0	-1	0	0	-1	-7	-9	
x78	-1	-1	0	-1	0	0	0	-1	-1	-1
x85	-1	-5	0	-4	0	0	-3	-13	-1	0
x89	-1	-2	0	-2	0	0	-1	-3	-7	-1
x93	-1	1	0	1	0	0	1	17	-1	-1
x94	0	0	0	0	0	0	0	0	-1	0
x102	1	-2	0	-2	0	0	-1	-6	-3	2
x103	-1	0	0	0	0	0	0	-2	0	1
x124	-7	-3	0	-3	0	0	-2	1	2	-16
x126	0	0	-2	0	-2	0	0	0	0	0
x144	0	0	0	0	0	0	0	-5	-65	-4
x146	4	-4	0	-3	0	0	-2	-8	-12	-58
	x30	x35	x37	x40	x42	x47	x48	x62	x70	x77

x85	-1									
x89	-1	-3								
x93	0	-47	0							
x94	0	0	-2	0						
x102	0	-2	0	0	0					
x103	0	-1	0	0	0	-5				
x124	0	-3	-1	1	0	-1	0			
x126	0	0	-12	0	0	0	0	0		
x144	-1	-2	2	0	0	-2	0	0	0	
x146	-1	-2	-1	-1	0	2	1	-2	0	-6
	x78	x85	x89	x93	x94	x102	x103	x124	x126	x144

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τ^- BRANCHING RATIOS

$$\Gamma(\text{particle}^- \geq 0 \text{ neutrals} \geq 0 K^0 \nu_\tau \text{ ("1-prong")}) / \Gamma_{\text{total}} \quad \Gamma_1 / \Gamma$$

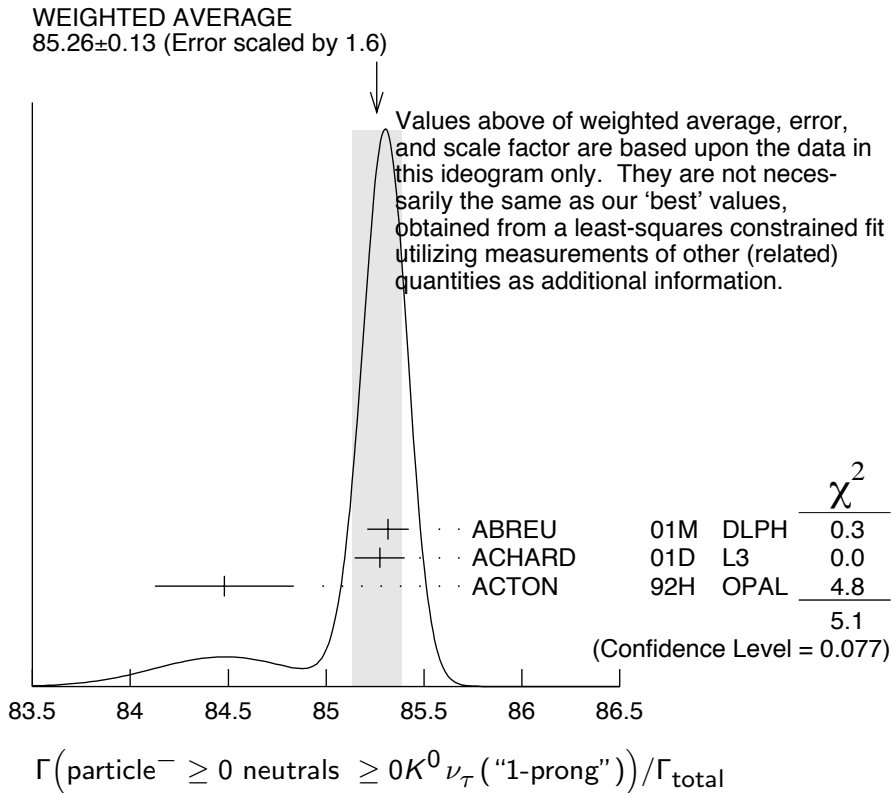
$$\Gamma_1 / \Gamma = (\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10} + \Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + \Gamma_{35} + \Gamma_{37} + \Gamma_{40} + \Gamma_{42} + 2\Gamma_{47} + \Gamma_{48} + 0.708\Gamma_{124} + 0.715\Gamma_{126} + 0.09\Gamma_{144} + 0.09\Gamma_{146}) / \Gamma$$

The charged particle here can be e , μ , or hadron. In many analyses, the sum of the topological branching fractions (1, 3, and 5 prongs) is constrained to be unity. Since the 5-prong fraction is very small, the measured 1-prong and 3-prong fractions are highly correlated and cannot be treated as independent quantities in our overall fit. We arbitrarily choose to use the 3-prong fraction in our fit, and leave the 1-prong fraction out. We do, however, use these 1-prong measurements in our average below. The measurements used only for the average are marked "avg," whereas "f&a" marks a result used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
85.33 ± 0.08	OUR FIT				Error includes scale factor of 1.4.
85.26 ± 0.13	OUR AVERAGE				Error includes scale factor of 1.6. See the ideogram below.
85.316 ± 0.093 ± 0.049	avg	78k	³² ABREU	01M DLPH	1992–1995 LEP runs
85.274 ± 0.105 ± 0.073	avg		³³ ACHARD	01D L3	1992–1995 LEP runs
84.48 ± 0.27 ± 0.23	avg		ACTON	92H OPAL	1990–1991 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
85.45 $\begin{matrix} +0.69 \\ -0.73 \end{matrix}$ ± 0.65			DECAMP	92C ALEP	Repl. by SCHAEEL 05C

³² The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau \rightarrow 3\text{-prong})$ and $B(\tau \rightarrow 5\text{-prong})$ are -0.98 and -0.08 respectively.

³³ The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau \rightarrow "3\text{-prong}")$ and $B(\tau \rightarrow "5\text{-prong}")$ are -0.978 and -0.082 respectively.



$$\Gamma(\text{particle}^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_2 / \Gamma$$

$$\Gamma_2 / \Gamma = (\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10} + \Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.6569\Gamma_{35} + 0.6569\Gamma_{37} + 0.6569\Gamma_{40} + 0.6569\Gamma_{42} + 1.0985\Gamma_{47} + 0.3139\Gamma_{48} + 0.708\Gamma_{124} + 0.715\Gamma_{126} + 0.09\Gamma_{144} + 0.09\Gamma_{146}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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84.69 ± 0.09 OUR FIT Error includes scale factor of 1.4.

85.1 ± 0.4 OUR AVERAGE

85.6 ± 0.6 ± 0.3	avg	3300	³⁴ ADEVA	91F L3	$E_{\text{cm}}^{ee} = 88.3\text{--}94.3 \text{ GeV}$
84.9 ± 0.4 ± 0.3	avg		BEHREND	89B CELL	$E_{\text{cm}}^{ee} = 14\text{--}47 \text{ GeV}$
84.7 ± 0.8 ± 0.6	avg		³⁵ AIHARA	87B TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
86.4 ± 0.3 ± 0.3			ABACHI	89B HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
87.1 ± 1.0 ± 0.7			³⁶ BURCHAT	87 MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
87.2 ± 0.5 ± 0.8			SCHMIDKE	86 MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
84.7 ± 1.1 $\begin{smallmatrix} +1.6 \\ -1.3 \end{smallmatrix}$		169	³⁷ ALTHOFF	85 TASS	$E_{\text{cm}}^{ee} = 34.5 \text{ GeV}$
86.1 ± 0.5 ± 0.9			BARTEL	85F JADE	$E_{\text{cm}}^{ee} = 34.6 \text{ GeV}$
87.8 ± 1.3 ± 3.9			³⁸ BERGER	85 PLUT	$E_{\text{cm}}^{ee} = 34.6 \text{ GeV}$
86.7 ± 0.3 ± 0.6			FERNANDEZ	85 MAC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

³⁴ Not independent of ADEVA 91F $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$ value.

³⁵ Not independent of AIHARA 87B $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma_{\text{total}}$, $\Gamma(e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$, and $\Gamma(h^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$ values.

³⁶ Not independent of SCHMIDKE 86 value (also not independent of BURCHAT 87 value for $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$).

³⁷ Not independent of ALTHOFF 85 $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma_{\text{total}}$, $\Gamma(e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$, $\Gamma(h^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$, and $\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$ values.

³⁸ Not independent of (1-prong + $0\pi^0$) and (1-prong + $\geq 1\pi^0$) values.

$$\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_3 / \Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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17.36 ± 0.05 OUR FIT

17.33 ± 0.05 OUR AVERAGE

17.319 ± 0.070 ± 0.032 f&a	54k	³⁹ SCHAEAL	05C ALEP	1991-1995 LEP runs
17.34 ± 0.09 ± 0.06 f&a	31.4k	ABBIENDI	03 OPAL	1990-1995 LEP runs
17.342 ± 0.110 ± 0.067 f&a	21.5k	⁴⁰ ACCIARRI	01F L3	1991-1995 LEP runs
17.325 ± 0.095 ± 0.077 f&a	27.7k	ABREU	99X DLPH	1991-1995 LEP runs
17.37 ± 0.08 ± 0.18 avg		⁴¹ ANASTASSOV	97 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

17.31 ±0.11 ±0.05	20.7k	BUSKULIC	96C	ALEP	Repl. by SCHAEL 05C
17.02 ±0.19 ±0.24	6586	ABREU	95T	DLPH	Repl. by ABREU 99x
17.36 ±0.27	7941	AKERS	95I	OPAL	Repl. by ABBI- ENDI 03
17.6 ±0.4 ±0.4	2148	ADRIANI	93M	L3	Repl. by ACCIA- RRI 01F
17.4 ±0.3 ±0.5		⁴² ALBRECHT	93G	ARG	$E_{cm}^{ee} = 9.4-10.6$ GeV
17.35 ±0.41 ±0.37		DECAMP	92C	ALEP	1989-1990 LEP runs
17.7 ±0.8 ±0.4	568	BEHREND	90	CELL	$E_{cm}^{ee} = 35$ GeV
17.4 ±1.0	2197	ADEVA	88	MRKJ	$E_{cm}^{ee} = 14-16$ GeV
17.7 ±1.2 ±0.7		AIHARA	87B	TPC	$E_{cm}^{ee} = 29$ GeV
18.3 ±0.9 ±0.8		BURCHAT	87	MRK2	$E_{cm}^{ee} = 29$ GeV
18.6 ±0.8 ±0.7	558	⁴³ BARTEL	86D	JADE	$E_{cm}^{ee} = 34.6$ GeV
12.9 ±1.7 ^{+0.7} _{-0.5}		ALTHOFF	85	TASS	$E_{cm}^{ee} = 34.5$ GeV
18.0 ±0.9 ±0.5	473	⁴³ ASH	85B	MAC	$E_{cm}^{ee} = 29$ GeV
18.0 ±1.0 ±0.6		⁴⁴ BALTRUSAIT..	85	MRK3	$E_{cm}^{ee} = 3.77$ GeV
19.4 ±1.6 ±1.7	153	BERGER	85	PLUT	$E_{cm}^{ee} = 34.6$ GeV
17.6 ±2.6 ±2.1	47	BEHREND	83C	CELL	$E_{cm}^{ee} = 34$ GeV
17.8 ±2.0 ±1.8		BERGER	81B	PLUT	$E_{cm}^{ee} = 9-32$ GeV

³⁹ See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

⁴⁰ The correlation coefficient between this measurement and the ACCIARRI 01F measurement of $B(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)$ is 0.08.

⁴¹ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(e\bar{\nu}_e\nu_\tau)$, $B(\mu\bar{\nu}_\mu\nu_\tau)/B(e\bar{\nu}_e\nu_\tau)$, $B(h^-\nu_\tau)$, and $B(h^-\nu_\tau)/B(e\bar{\nu}_e\nu_\tau)$ are 0.50, 0.58, 0.50, and 0.08 respectively.

⁴² Not independent of ALBRECHT 92D $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau)/\Gamma(e^-\bar{\nu}_e\nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau) \times \Gamma(e^-\bar{\nu}_e\nu_\tau)/\Gamma_{total}^2$ values.

⁴³ Modified using $B(e^-\bar{\nu}_e\nu_\tau)/B(\text{"1 prong"})$ and $B(\text{"1 prong"}) = 0.855$.

⁴⁴ Error correlated with BALTRUSAITIS 85 $e\nu\bar{\nu}$ value.

$\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total}$ Γ_4/Γ

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.361±0.016±0.035		⁴⁵ BERGFELD 00	CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.30 ±0.04 ±0.05	116	⁴⁶ ALEXANDER	96S	OPAL	1991-1994 LEP runs
0.23 ±0.10	10	⁴⁷ WU	90	MRK2	$E_{cm}^{ee} = 29$ GeV

⁴⁵ BERGFELD 00 impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma^* > 10$ MeV. For $E_\gamma^* > 20$ MeV, they quote $(3.04 \pm 0.14 \pm 0.30) \times 10^{-3}$.

⁴⁶ ALEXANDER 96S impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma > 20$ MeV.

⁴⁷ WU 90 reports $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau\gamma)/\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau) = 0.013 \pm 0.006$, which is converted to $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total}$ using $\Gamma(\mu^-\bar{\nu}_\mu\nu_\tau\gamma)/\Gamma_{total} = 17.35\%$. Requirements on detected γ 's correspond to a τ rest frame energy cutoff $E_\gamma > 37$ MeV.

$\Gamma(e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$

Γ_5 / Γ

To minimize the effect of experiments with large systematic errors, we exclude experiments which together would contribute 5% of the weight in the average.

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
17.84 ± 0.05	OUR FIT			
17.82 ± 0.05	OUR AVERAGE			
17.837 ± 0.072 ± 0.036	56k	48 SCHAEL	05C ALEP	1991-1995 LEP runs
17.806 ± 0.104 ± 0.076	24.7k	49 ACCIARRI	01F L3	1991-1995 LEP runs
17.81 ± 0.09 ± 0.06	33.1k	ABBIENDI	99H OPAL	1991-1995 LEP runs
17.877 ± 0.109 ± 0.110	23.3k	ABREU	99X DLPH	1991-1995 LEP runs
17.76 ± 0.06 ± 0.17		50 ANASTASSOV	97 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
17.78 ± 0.10 ± 0.09	25.3k	ALEXANDER	96D OPAL	Repl. by ABBI- ENDI 99H
17.79 ± 0.12 ± 0.06	20.6k	BUSKULIC	96C ALEP	Repl. by SCHAEL 05C
17.51 ± 0.23 ± 0.31	5059	ABREU	95T DLPH	Repl. by ABREU 99X
17.9 ± 0.4 ± 0.4	2892	ADRIANI	93M L3	Repl. by ACCIARRI 01F
17.5 ± 0.3 ± 0.5		51 ALBRECHT	93G ARG	$E_{\text{cm}}^{ee} = 9.4-10.6$ GeV
17.97 ± 0.14 ± 0.23	3970	AKERIB	92 CLEO	Repl. by ANAS- TASSOV 97
19.1 ± 0.4 ± 0.6	2960	52 AMMAR	92 CLEO	$E_{\text{cm}}^{ee} = 10.5-10.9$ GeV
18.09 ± 0.45 ± 0.45		DECAMP	92C ALEP	Repl. by SCHAEL 05C
17.0 ± 0.5 ± 0.6	1.7k	ABACHI	90 HRS	$E_{\text{cm}}^{ee} = 29$ GeV
18.4 ± 0.8 ± 0.4	644	BEHREND	90 CELL	$E_{\text{cm}}^{ee} = 35$ GeV
16.3 ± 0.3 ± 3.2		JANSSEN	89 CBAL	$E_{\text{cm}}^{ee} = 9.4-10.6$ GeV
18.4 ± 1.2 ± 1.0		AIHARA	87B TPC	$E_{\text{cm}}^{ee} = 29$ GeV
19.1 ± 0.8 ± 1.1		BURCHAT	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
16.8 ± 0.7 ± 0.9	515	52 BARTEL	86D JADE	$E_{\text{cm}}^{ee} = 34.6$ GeV
20.4 ± 3.0 +1.4 -0.9		ALTHOFF	85 TASS	$E_{\text{cm}}^{ee} = 34.5$ GeV
17.8 ± 0.9 ± 0.6	390	52 ASH	85B MAC	$E_{\text{cm}}^{ee} = 29$ GeV
18.2 ± 0.7 ± 0.5		53 BALTRUSAIT..	85 MRK3	$E_{\text{cm}}^{ee} = 3.77$ GeV
13.0 ± 1.9 ± 2.9		BERGER	85 PLUT	$E_{\text{cm}}^{ee} = 34.6$ GeV
18.3 ± 2.4 ± 1.9	60	BEHREND	83C CELL	$E_{\text{cm}}^{ee} = 34$ GeV
16.0 ± 1.3	459	54 BACINO	78B DLCO	$E_{\text{cm}}^{ee} = 3.1-7.4$ GeV

⁴⁸ Correlation matrix for SCHAEL 05C branching fractions, in percent:

- (1) $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow \pi^- \nu_\tau) / \Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$
- (5) $\Gamma(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (6) $\Gamma(\tau^- \rightarrow \pi^- 3\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (7) $\Gamma(\tau^- \rightarrow h^- 4\pi^0 \nu_\tau (\text{ex. } K^0, \eta)) / \Gamma_{\text{total}}$
- (8) $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$
- (9) $\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (10) $\Gamma(\tau^- \rightarrow h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (11) $\Gamma(\tau^- \rightarrow h^- h^- h^+ 3\pi^0 \nu_\tau) / \Gamma_{\text{total}}$
- (12) $\Gamma(\tau^- \rightarrow 3h^- 2h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$

$$(13) \Gamma(\tau^- \rightarrow 3h^- 2h^+ \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(2)	-20											
(3)	-9	-6										
(4)	-16	-12	2									
(5)	-5	-5	-17	-37								
(6)	0	-4	-15	2	-27							
(7)	-2	-4	-24	-15	20	-47						
(8)	-14	-9	15	-5	-17	-14	-8					
(9)	-13	-12	-25	-30	4	-2	16	-15				
(10)	0	-2	-23	-14	4	10	13	-6	-17			
(11)	1	0	-5	1	4	6	0	-9	-2	-11		
(12)	0	1	9	4	-8	-4	-6	9	-5	-4	-2	
(13)	1	-4	-3	-5	3	2	-4	-3	-1	4	1	-24

⁴⁹ The correlation coefficient between this measurement and the ACCIARRI 01F measurement of $B(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau)$ is 0.08.

⁵⁰ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(\mu \bar{\nu}_\mu \nu_\tau)/B(e \bar{\nu}_e \nu_\tau)$, $B(h^- \nu_\tau)$, and $B(h^- \nu_\tau)/B(e \bar{\nu}_e \nu_\tau)$ are 0.50, -0.42, 0.48, and -0.39 respectively.

⁵¹ Not independent of ALBRECHT 92D $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ and ALBRECHT 93G $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) \times \Gamma(e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}^2$ values.

⁵² Modified using $B(e^- \bar{\nu}_e \nu_\tau)/B(\text{"1 prong"})$ and $B(\text{"1 prong"})$, = 0.855.

⁵³ Error correlated with BALTRUSAITIS 85 $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$.

⁵⁴ BACINO 78B value comes from fit to events with e^\pm and one other nonelectron charged prong.

$\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ Γ_3/Γ_5

Standard Model prediction including mass effects is 0.9726.

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE		DOCUMENT ID	TECN	COMMENT
0.973 ± 0.004	OUR FIT			
0.978 ± 0.011	OUR AVERAGE			
0.9777 ± 0.0063 ± 0.0087	f&a	⁵⁵ ANASTASSOV 97	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6$ GeV
0.997 ± 0.035 ± 0.040	f&a	ALBRECHT 92D	ARG	$E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6$ GeV

⁵⁵ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(e \bar{\nu}_e \nu_\tau)$, $B(h^- \nu_\tau)$, and $B(h^- \nu_\tau)/B(e \bar{\nu}_e \nu_\tau)$ are 0.58, -0.42, 0.07, and 0.45 respectively.

$\Gamma(e^- \bar{\nu}_e \nu_\tau \gamma)/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE (%)		DOCUMENT ID	TECN	COMMENT
1.75 ± 0.06 ± 0.17		⁵⁶ BERGFELD 00	CLEO	$E_{\text{cm}}^{\text{ee}} = 10.6$ GeV

⁵⁶ BERGFELD 00 impose requirements on detected γ 's corresponding to a τ -rest-frame energy cutoff $E_\gamma^* > 10$ MeV.

$$\Gamma(h^- \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_7 / \Gamma$$

$$\Gamma_7 / \Gamma = (\Gamma_9 + \Gamma_{10} + \frac{1}{2}\Gamma_{35} + \frac{1}{2}\Gamma_{37} + \Gamma_{47}) / \Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
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12.14 ± 0.07 OUR FIT Error includes scale factor of 1.1.

12.2 ± 0.4 OUR AVERAGE

12.47 ± 0.26 ± 0.43	f&a	2967	57 ACCIARRI	95 L3	1992 LEP run
12.4 ± 0.7 ± 0.7	f&a	283	58 ABREU	92N DLPH	1990 LEP run
12.1 ± 0.7 ± 0.5	f&a	309	ALEXANDER	91D OPAL	1990 LEP run
11.3 ± 0.5 ± 0.8	avg	798	59 FORD	87 MAC	$E_{\text{cm}}^{ee} = 29$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
12.44 ± 0.11 ± 0.11		15k	60 BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C
11.7 ± 0.6 ± 0.8			61 ALBRECHT	92D ARG	$E_{\text{cm}}^{ee} = 9.4-10.6$ GeV
12.98 ± 0.44 ± 0.33			62 DECAMP	92C ALEP	Repl. by SCHAEEL 05C
12.3 ± 0.9 ± 0.5		1338	BEHREND	90 CELL	$E_{\text{cm}}^{ee} = 35$ GeV
11.1 ± 1.1 ± 1.4			63 BURCHAT	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
12.3 ± 0.6 ± 1.1		328	64 BARTEL	86D JADE	$E_{\text{cm}}^{ee} = 34.6$ GeV
13.0 ± 2.0 ± 4.0			BERGER	85 PLUT	$E_{\text{cm}}^{ee} = 34.6$ GeV
11.2 ± 1.7 ± 1.2		34	65 BEHREND	83C CELL	$E_{\text{cm}}^{ee} = 34$ GeV

⁵⁷ ACCIARRI 95 with 0.65% added to remove their correction for $\pi^- K_L^0$ backgrounds.

⁵⁸ ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

⁵⁹ FORD 87 result for $B(\pi^- \nu_\tau)$ with 0.67% added to remove their K^- correction and adjusted for 1992 B(“1 prong”).

⁶⁰ BUSKULIC 96 quote $11.78 \pm 0.11 \pm 0.13$ We add 0.66 to undo their correction for unseen K_L^0 and modify the systematic error accordingly.

⁶¹ Not independent of ALBRECHT 92D $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) / \Gamma(e^- \bar{\nu}_e \nu_\tau)$, $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) \times \Gamma(e^- \bar{\nu}_e \nu_\tau)$, and $\Gamma(h^- \geq 0 K_L^0 \nu_\tau) / \Gamma(e^- \bar{\nu}_e \nu_\tau)$ values.

⁶² DECAMP 92C quote $B(h^- \geq 0 K_L^0 \geq 0 (K_S^0 \rightarrow \pi^+ \pi^-) \nu_\tau) = 13.32 \pm 0.44 \pm 0.33$. We subtract 0.35 to correct for their inclusion of the K_S^0 decays.

⁶³ BURCHAT 87 with 1.1% added to remove their correction for K^- and $K^*(892)^-$ backgrounds.

⁶⁴ BARTEL 86D result for $B(\pi^- \nu_\tau)$ with 0.59% added to remove their K^- correction and adjusted for 1992 B(“1 prong”).

⁶⁵ BEHREND 83C quote $B(\pi^- \nu_\tau) = 9.9 \pm 1.7 \pm 1.3$ after subtracting 1.3 ± 0.5 to correct for $B(K^- \nu_\tau)$.

$$\Gamma(h^- \nu_\tau) / \Gamma_{\text{total}}$$

$$\Gamma_8 / \Gamma = (\Gamma_9 + \Gamma_{10}) / \Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

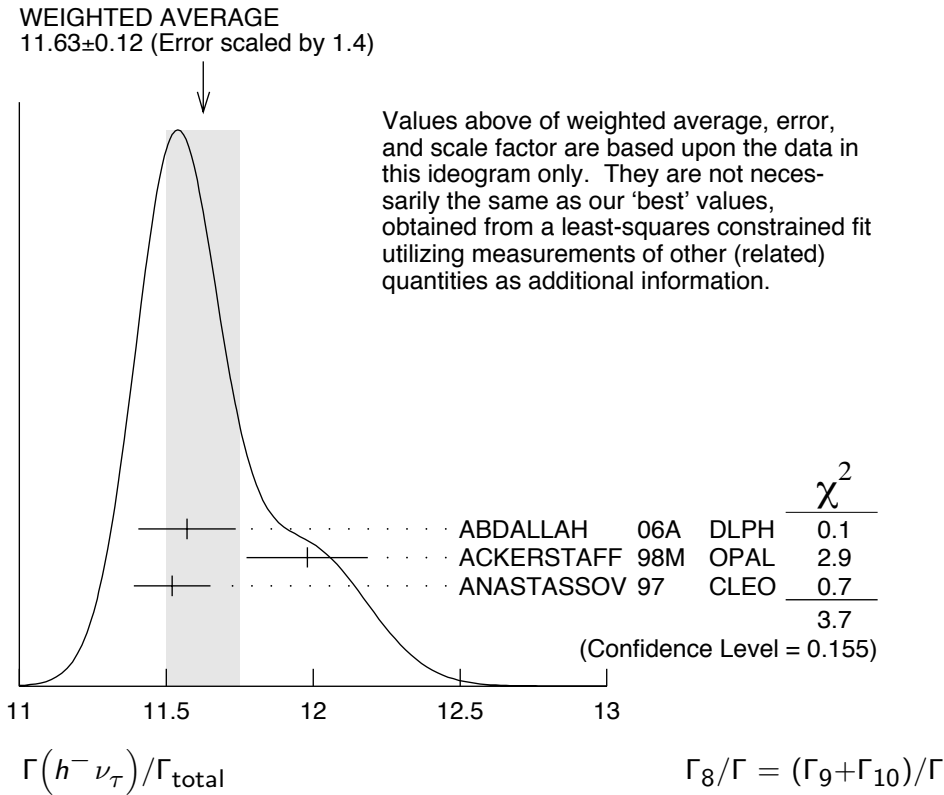
VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
11.59 ±0.06	OUR FIT				Error includes scale factor of 1.1.
11.63 ±0.12	OUR AVERAGE				Error includes scale factor of 1.4. See the ideogram below.
11.571 ±0.120 ±0.114	f&a	19k	⁶⁶ ABDALLAH	06A DLPH	1992–1995 LEP runs
11.98 ±0.13 ±0.16	f&a		ACKERSTAFF	98M OPAL	1991–1995 LEP runs
11.52 ±0.05 ±0.12	f&a		⁶⁷ ANASTASSOV 97	CLEO	$E_{cm}^{ee} = 10.6$ GeV

⁶⁶ Correlation matrix for ABDALLAH 06A branching fractions, in percent:

- (1) $\Gamma(\tau^- \rightarrow h^- \nu_\tau) / \Gamma_{\text{total}}$
- (2) $\Gamma(\tau^- \rightarrow h^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$
- (3) $\Gamma(\tau^- \rightarrow h^- \geq 1\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (4) $\Gamma(\tau^- \rightarrow h^- 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (5) $\Gamma(\tau^- \rightarrow h^- \geq 3\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (6) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (7) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (8) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \geq 1\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (9) $\Gamma(\tau^- \rightarrow h^- h^- h^+ \geq 2\pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (10) $\Gamma(\tau^- \rightarrow 3h^- 2h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$
- (11) $\Gamma(\tau^- \rightarrow 3h^- 2h^+ \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(2)		-34								
(3)		-47	56							
(4)		6	-66	15						
(5)		-6	38	11	-86					
(6)		-7	-8	15	0	-2				
(7)		-2	-1	-5	-3	3	-53			
(8)		-4	-4	-13	-4	-2	-56	75		
(9)		-1	-1	-4	3	-6	26	-78	-16	
(10)		-1	-1	1	0	0	-2	-3	-1	3
(11)		0	0	0	0	0	1	0	-5	-57

⁶⁷ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(e \bar{\nu}_e \nu_\tau)$, $B(\mu \bar{\nu}_\mu \nu_\tau) / B(e \bar{\nu}_e \nu_\tau)$, and $B(h^- \nu_\tau) / B(e \bar{\nu}_e \nu_\tau)$ are 0.50, 0.48, 0.07, and 0.63 respectively.



$\Gamma(h^- \nu_\tau) / \Gamma(e^- \bar{\nu}_e \nu_\tau)$

$\Gamma_8 / \Gamma_5 = (\Gamma_9 + \Gamma_{10}) / \Gamma_5$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE	DOCUMENT ID	TECN	COMMENT
0.650 ± 0.004 OUR FIT			Error includes scale factor of 1.1.
0.6484 ± 0.0041 ± 0.0060 avg	⁶⁸ ANASTASSOV 97	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

⁶⁸ The correlation coefficients between this measurement and the ANASTASSOV 97 measurements of $B(\mu \bar{\nu}_\mu \nu_\tau)$, $B(e \bar{\nu}_e \nu_\tau)$, $B(\mu \bar{\nu}_\mu \nu_\tau) / B(e \bar{\nu}_e \nu_\tau)$, and $B(h^- \nu_\tau)$ are 0.08, -0.39, 0.45, and 0.63 respectively.

$\Gamma(\pi^- \nu_\tau) / \Gamma_{\text{total}}$

Γ_9 / Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
10.90 ± 0.07 OUR FIT				Error includes scale factor of 1.1.
10.828 ± 0.070 ± 0.078 f&a	38k	⁶⁹ SCHAEEL	05C ALEP	1991-1995 LEP runs
11.06 ± 0.11 ± 0.14		⁷⁰ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C
11.7 ± 0.4 ± 1.8	1138	BLOCKER	82D MRK2	$E_{\text{cm}}^{ee} = 3.5-6.7$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

⁶⁹ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}$ measurement for correlations with other measurements.

⁷⁰ Not independent of BUSKULIC 96 $B(h^- \nu_\tau)$ and $B(K^- \nu_\tau)$ values.

$\Gamma(K^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{10}/Γ

VALUE (%) EVTS DOCUMENT ID TECN COMMENT

0.691 ± 0.023 OUR FIT

0.685 ± 0.023 OUR AVERAGE

0.658 ± 0.027 ± 0.029		⁷¹ ABBIENDI	01J	OPAL	1990–1995 LEP runs
0.696 ± 0.025 ± 0.014	2032	BARATE	99K	ALEP	1991–1995 LEP runs
0.85 ± 0.18	27	ABREU	94K	DLPH	LEP 1992 Z data
0.66 ± 0.07 ± 0.09	99	BATTLE	94	CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.72 ± 0.04 ± 0.04	728	BUSKULIC	96	ALEP	Repl. by BARATE 99K
0.59 ± 0.18	16	MILLS	84	DLCO	$E_{\text{cm}}^{ee} = 29$ GeV
1.3 ± 0.5	15	BLOCKER	82B	MRK2	$E_{\text{cm}}^{ee} = 3.9\text{--}6.7$ GeV

⁷¹ The correlation coefficient between this measurement and the ABBIENDI 01J $B(\tau^- \rightarrow K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau)$ is 0.60.

$\Gamma(h^- \geq 1 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{11}/Γ

$$\Gamma_{11}/\Gamma = (\Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.157\Gamma_{35} + 0.157\Gamma_{37} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.0985\Gamma_{47} + 0.708\Gamma_{124} + 0.715\Gamma_{126} + 0.09\Gamma_{144} + 0.09\Gamma_{146})/\Gamma$$

VALUE (%) DOCUMENT ID TECN COMMENT

37.05 ± 0.12 OUR FIT Error includes scale factor of 1.3.

• • • We do not use the following data for averages, fits, limits, etc. • • •

36.14 ± 0.33 ± 0.58		⁷² AKERS	94E	OPAL	1991–1992 LEP runs
38.4 ± 1.2 ± 1.0		⁷³ BURCHAT	87	MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
42.7 ± 2.0 ± 2.9		BERGER	85	PLUT	$E_{\text{cm}}^{ee} = 34.6$ GeV

⁷² Not independent of ACKERSTAFF 98M $B(h^- \pi^0 \nu_\tau)$ and $B(h^- \geq 2\pi^0 \nu_\tau)$ values.

⁷³ BURCHAT 87 quote for $B(\pi^\pm \geq 1 \text{ neutral } \nu_\tau) = 0.378 \pm 0.012 \pm 0.010$. We add 0.006 to account for contribution from $(K^{*-} \nu_\tau)$ which they fixed at BR = 0.013.

$\Gamma(h^- \geq 1\pi^0 \nu_\tau \text{ (ex. } K^0))/\Gamma_{\text{total}}$

$$\Gamma_{12}/\Gamma = (\Gamma_{14} + \Gamma_{16} + \Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.325\Gamma_{124} + 0.325\Gamma_{126})/\Gamma$$

VALUE (%) EVTS DOCUMENT ID TECN COMMENT

36.51 ± 0.12 OUR FIT Error includes scale factor of 1.3.

36.641 ± 0.155 ± 0.127 avg 45k ⁷⁴ ABDALLAH 06A DLPH 1992–1995 LEP runs

⁷⁴ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$\Gamma(h^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{13}/\Gamma = (\Gamma_{14} + \Gamma_{16})/\Gamma$$

VALUE (%) EVTS DOCUMENT ID TECN COMMENT

25.95 ± 0.10 OUR FIT Error includes scale factor of 1.1.

25.74 ± 0.17 OUR AVERAGE

25.740 ± 0.201 ± 0.138	35k	⁷⁵ ABDALLAH	06A	DLPH	1992–1995 LEP runs
25.89 ± 0.17 ± 0.29		ACKERSTAFF	98M	OPAL	1991–1995 LEP runs
25.05 ± 0.35 ± 0.50	6613	ACCIARRI	95	L3	1992 LEP run
25.87 ± 0.12 ± 0.42	51k	⁷⁶ ARTUSO	94	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

25.76 ±0.15 ±0.13	31k	BUSKULIC	96	ALEP	Repl. by SCHAEEL 05C
25.98 ±0.36 ±0.52		⁷⁷ AKERS	94E	OPAL	Repl. by ACKER-STAFF 98M
22.9 ±0.8 ±1.3	283	⁷⁸ ABREU	92N	DLPH	$E_{cm}^{ee} = 88.2-94.2$ GeV
23.1 ±0.4 ±0.9	1249	⁷⁹ ALBRECHT	92Q	ARG	$E_{cm}^{ee} = 10$ GeV
25.02 ±0.64 ±0.88	1849	DECAMP	92C	ALEP	1989-1990 LEP runs
22.0 ±0.8 ±1.9	779	ANTREASYAN	91	CBAL	$E_{cm}^{ee} = 9.4-10.6$ GeV
22.6 ±1.5 ±0.7	1101	BEHREND	90	CELL	$E_{cm}^{ee} = 35$ GeV
23.1 ±1.9 ±1.6		BEHREND	84	CELL	$E_{cm}^{ee} = 14,22$ GeV

⁷⁵ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

⁷⁶ ARTUSO 94 reports the combined result from three independent methods, one of which (23% of the $\tau^- \rightarrow h^- \pi^0 \nu_\tau$) is normalized to the inclusive one-prong branching fraction, taken as 0.854 ± 0.004 . Renormalization to the present value causes negligible change.

⁷⁷ AKERS 94E quote $(26.25 \pm 0.36 \pm 0.52) \times 10^{-2}$; we subtract 0.27% from their number to correct for $\tau^- \rightarrow h^- K_L^0 \nu_\tau$.

⁷⁸ ABREU 92N with 0.5% added to remove their correction for $K^*(892)^-$ backgrounds.

⁷⁹ ALBRECHT 92Q with 0.5% added to remove their correction for $\tau^- \rightarrow K^*(892)^- \nu_\tau$ background.

$\Gamma(\pi^- \pi^0 \nu_\tau)/\Gamma_{total}$

Γ_{14}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
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25.50 ±0.10 OUR FIT Error includes scale factor of 1.1.

25.46 ±0.12 OUR AVERAGE

25.471 ±0.097 ±0.085	f&a	81k	⁸⁰ SCHAEEL	05C	ALEP	1991-1995 LEP runs
25.36 ±0.44	avg		⁸¹ ARTUSO	94	CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

25.30 ±0.15 ±0.13			⁸² BUSKULIC	96	ALEP	Repl. by SCHAEEL 05C
21.5 ±0.4 ±1.9	4400	^{83,84}	ALBRECHT	88L	ARG	$E_{cm}^{ee} = 10$ GeV
23.0 ±1.3 ±1.7	582		ADLER	87B	MRK3	$E_{cm}^{ee} = 3.77$ GeV
25.8 ±1.7 ±2.5			⁸⁵ BURCHAT	87	MRK2	$E_{cm}^{ee} = 29$ GeV
22.3 ±0.6 ±1.4	629	⁸⁴	YELTON	86	MRK2	$E_{cm}^{ee} = 29$ GeV

⁸⁰ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{total}$ measurement for correlations with other measurements.

⁸¹ Not independent of ARTUSO 94 $B(h^- \pi^0 \nu_\tau)$ and BATTLE 94 $B(K^- \pi^0 \nu_\tau)$ values.

⁸² Not independent of BUSKULIC 96 $B(h^- \pi^0 \nu_\tau)$ and $B(K^- \pi^0 \nu_\tau)$ values.

⁸³ The authors divide by $(\Gamma_3 + \Gamma_5 + \Gamma_9 + \Gamma_{10})/\Gamma = 0.467$ to obtain this result.

⁸⁴ Experiment had no hadron identification. Kaon corrections were made, but insufficient information is given to permit their removal.

⁸⁵ BURCHAT 87 value is not independent of YELTON 86 value. Nonresonant decays included.

$\Gamma(\pi^- \pi^0 \text{non-}\rho(770) \nu_\tau) / \Gamma_{\text{total}}$ Γ_{15} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.3 ± 0.1 ± 0.3	86	BEHREND	84	CELL $E_{\text{cm}}^{ee} = 14,22 \text{ GeV}$

⁸⁶ BEHREND 84 assume a flat nonresonant mass distribution down to the $\rho(770)$ mass, using events with mass above 1300 to set the level.

$\Gamma(K^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{16} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.452 ± 0.027 OUR FIT
0.454 ± 0.030 OUR AVERAGE

0.471 ± 0.059 ± 0.023	360	ABBIENDI	04J	OPAL 1991-1995 LEP runs
0.444 ± 0.026 ± 0.024	923	BARATE	99K	ALEP 1991-1995 LEP runs
0.51 ± 0.10 ± 0.07	37	BATTLE	94	CLEO $E_{\text{cm}}^{ee} \approx 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.52 ± 0.04 ± 0.05	395	BUSKULIC	96	ALEP Repl. by BARATE 99K
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$\Gamma(h^- \geq 2\pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{17} / Γ

$$\Gamma_{17} / \Gamma = (\Gamma_{20} + \Gamma_{23} + \Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.157\Gamma_{35} + 0.157\Gamma_{37} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.0985\Gamma_{47} + 0.319\Gamma_{124} + 0.322\Gamma_{126}) / \Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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10.81 ± 0.14 OUR FIT Error includes scale factor of 1.5.

9.91 ± 0.31 ± 0.27 f&a ACKERSTAFF 98M OPAL 1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

9.89 ± 0.34 ± 0.55		⁸⁷ AKERS	94E	OPAL Repl. by ACKER-STAFF 98M
14.0 ± 1.2 ± 0.6	938	⁸⁸ BEHREND	90	CELL $E_{\text{cm}}^{ee} = 35 \text{ GeV}$
12.0 ± 1.4 ± 2.5		⁸⁹ BURCHAT	87	MRK2 $E_{\text{cm}}^{ee} = 29 \text{ GeV}$
13.9 ± 2.0 $\begin{smallmatrix} +1.9 \\ -2.2 \end{smallmatrix}$		⁹⁰ AIHARA	86E	TPC $E_{\text{cm}}^{ee} = 29 \text{ GeV}$

⁸⁷ AKERS 94E not independent of AKERS 94E $B(h^- \geq 1\pi^0 \nu_\tau)$ and $B(h^- \pi^0 \nu_\tau)$ measurements.

⁸⁸ No independent of BEHREND 90 $\Gamma(h^- 2\pi^0 \nu_\tau (\text{exp. } K^0))$ and $\Gamma(h^- \geq 3\pi^0 \nu_\tau)$.

⁸⁹ Error correlated with BURCHAT 87 $\Gamma(\rho^- \nu_e) / \Gamma(\text{total})$ value.

⁹⁰ AIHARA 86E (TPC) quote $B(2\pi^0 \pi^- \nu_\tau) + 1.6B(3\pi^0 \pi^- \nu_\tau) + 1.1B(\pi^0 \eta \pi^- \nu_\tau)$.

$\Gamma(h^- 2\pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{18} / Γ

$$\Gamma_{18} / \Gamma = (\Gamma_{20} + \Gamma_{23} + 0.157\Gamma_{35} + 0.157\Gamma_{37}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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9.47 ± 0.12 OUR FIT Error includes scale factor of 1.3.

• • • We do not use the following data for averages, fits, limits, etc. • • •

9.48 ± 0.13 ± 0.10	12k	⁹¹ BUSKULIC	96	ALEP Repl. by SCHAEEL 05C
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⁹¹ BUSKULIC 96 quote $9.29 \pm 0.13 \pm 0.10$. We add 0.19 to undo their correction for $\tau^- \rightarrow h^- K^0 \nu_\tau$.

$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{19}/Γ
 $\Gamma_{19}/\Gamma = (\Gamma_{20} + \Gamma_{23})/\Gamma$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. f&a marks results used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
9.31 ± 0.12	OUR FIT				Error includes scale factor of 1.3.
9.17 ± 0.27	OUR AVERAGE				
9.498 ± 0.320 ± 0.275	f&a	9.5k	⁹² ABDALLAH	06A DLPH	1992–1995 LEP runs
8.88 ± 0.37 ± 0.42	f&a	1060	ACCIARRI	95 L3	1992 LEP run
8.96 ± 0.16 ± 0.44	avg		⁹³ PROCARIO	93 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
10.38 ± 0.66 ± 0.82		809	⁹⁴ DECAMP	92C ALEP	Repl. by SCHAEEL 05C
5.7 ± 0.5 $\begin{smallmatrix} +1.7 \\ -1.0 \end{smallmatrix}$		133	⁹⁵ ANTREASYAN	91 CBAL	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
10.0 ± 1.5 ± 1.1		333	⁹⁶ BEHREND	90 CELL	$E_{\text{cm}}^{ee} = 35$ GeV
8.7 ± 0.4 ± 1.1		815	⁹⁷ BAND	87 MAC	$E_{\text{cm}}^{ee} = 29$ GeV
6.2 ± 0.6 ± 1.2			⁹⁸ GAN	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
6.0 ± 3.0 ± 1.8			BEHREND	84 CELL	$E_{\text{cm}}^{ee} = 14,22$ GeV

⁹² See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

⁹³ PROCARIO 93 entry is obtained from $B(h^- 2\pi^0 \nu_\tau)/B(h^- \pi^0 \nu_\tau)$ using ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$.

⁹⁴ We subtract 0.0015 to account for $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁹⁵ ANTREASYAN 91 subtract 0.001 to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁹⁶ BEHREND 90 subtract 0.002 to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution.

⁹⁷ BAND 87 assume $B(\pi^- 3\pi^0 \nu_\tau) = 0.01$ and $B(\pi^- \pi^0 \eta \nu_\tau) = 0.005$.

⁹⁸ GAN 87 analysis use photon multiplicity distribution.

$\Gamma(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma(h^- \pi^0 \nu_\tau)$ Γ_{19}/Γ_{13}
 $\Gamma_{19}/\Gamma_{13} = (\Gamma_{20} + \Gamma_{23})/(\Gamma_{14} + \Gamma_{16})$

VALUE		DOCUMENT ID	TECN	COMMENT
0.359 ± 0.006	OUR FIT			Error includes scale factor of 1.3.
0.342 ± 0.006 ± 0.016		⁹⁹ PROCARIO	93 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV

⁹⁹ PROCARIO 93 quote $0.345 \pm 0.006 \pm 0.016$ after correction for 2 kaon backgrounds assuming $B(K^{*-} \nu_\tau) = 1.42 \pm 0.18\%$ and $B(h^- K^0 \pi^0 \nu_\tau) = 0.48 \pm 0.48\%$. We multiply by 0.990 ± 0.010 to remove these corrections to $B(h^- \pi^0 \nu_\tau)$.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{20}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
9.25 ± 0.12	OUR FIT				Error includes scale factor of 1.3.
9.239 ± 0.086 ± 0.090	f&a	31k	¹⁰⁰ SCHAEEL	05C ALEP	1991-1995 LEP runs
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
9.21 ± 0.13 ± 0.11			¹⁰¹ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C

¹⁰⁰ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

¹⁰¹ Not independent of BUSKULIC 96 $B(h^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ and $B(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ values.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0), \text{scalar})/\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ Γ_{21}/Γ_{20}

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.094	95	¹⁰² BROWDER 00	CLEO	$4.7 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹⁰² Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from scalars.

$\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0), \text{vector})/\Gamma(\pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ Γ_{22}/Γ_{20}

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.073	95	¹⁰³ BROWDER 00	CLEO	$4.7 \text{ fb}^{-1} E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

¹⁰³ Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$ from vectors.

$\Gamma(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{23}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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5.8 ± 2.3 OUR FIT

5.8 ± 2.4 OUR AVERAGE

$5.6 \pm 2.0 \pm 1.5$ 131 BARATE 99K ALEP 1991–1995 LEP runs

$9 \pm 10 \pm 3$ 3 ¹⁰⁴ BATTLE 94 CLEO $E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$8 \pm 2 \pm 2$ 59 BUSKULIC 96 ALEP Repl. by BARATE 99K

¹⁰⁴ BATTLE 94 quote $(14 \pm 10 \pm 3) \times 10^{-4}$ or $< 30 \times 10^{-4}$ at 90% CL. We subtract $(5 \pm 2) \times 10^{-4}$ to account for $\tau^- \rightarrow K^- (K^0 \rightarrow \pi^0 \pi^0) \nu_\tau$ background.

$\Gamma(h^- \geq 3\pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{24}/Γ

$$\Gamma_{24}/\Gamma = (\Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.0985\Gamma_{47} + 0.319\Gamma_{124} + 0.322\Gamma_{126})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.33 ± 0.07 OUR FIT Error includes scale factor of 1.1.

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.53 \pm 0.40 \pm 0.46$ 186 DECAMP 92C ALEP Repl. by SCHAEEL 05C

$3.2 \pm 1.0 \pm 1.0$ BEHREND 90 CELL $E_{\text{cm}}^{\text{ee}} = 35 \text{ GeV}$

$\Gamma(h^- \geq 3\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{25}/Γ

$$\Gamma_{25}/\Gamma = (\Gamma_{27} + \Gamma_{28} + \Gamma_{30} + 0.325\Gamma_{124} + 0.325\Gamma_{126})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.25 ± 0.07 OUR FIT Error includes scale factor of 1.1.

$1.403 \pm 0.214 \pm 0.224$ 1.1k ¹⁰⁵ ABDALLAH 06A DLPH 1992–1995 LEP runs

¹⁰⁵ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\frac{\Gamma(h^- 3\pi^0 \nu_\tau)/\Gamma_{\text{total}}}{\Gamma_{26}/\Gamma} = (\Gamma_{27} + \Gamma_{28} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.322\Gamma_{126})/\Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.17±0.08 OUR FIT				Error includes scale factor of 1.1.
1.21±0.17 OUR AVERAGE				Error includes scale factor of 1.2.
1.70±0.24±0.38	f&a	293 ACCIARRI	95 L3	1992 LEP run
1.15±0.08±0.13	avg	¹⁰⁶ PROCARIO	93 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.24±0.09±0.11	2.3k	¹⁰⁷ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C
0.0 ^{+1.4} _{-0.1} ^{+1.1} _{-0.1}		¹⁰⁸ GAN	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
¹⁰⁶ PROCARIO 93 entry is obtained from $B(h^- 3\pi^0 \nu_\tau)/B(h^- \pi^0 \nu_\tau)$ using ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$.				
¹⁰⁷ BUSKULIC 96 quote $B(h^- 3\pi^0 \nu_\tau (\text{ex. } K^0)) = 1.17 \pm 0.09 \pm 0.11$. We add 0.07 to remove their correction for K^0 backgrounds.				
¹⁰⁸ Highly correlated with GAN 87 $\Gamma(\eta \pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ value. Authors quote $B(\pi^\pm 3\pi^0 \nu_\tau) + 0.67B(\pi^\pm \eta \pi^0 \nu_\tau) = 0.047 \pm 0.010 \pm 0.011$.				

$$\frac{\Gamma(h^- 3\pi^0 \nu_\tau)/\Gamma(h^- \pi^0 \nu_\tau)}{\Gamma_{26}/\Gamma_{13}} = (\Gamma_{27} + \Gamma_{28} + 0.157\Gamma_{40} + 0.157\Gamma_{42} + 0.322\Gamma_{126})/(\Gamma_{14} + \Gamma_{16})$$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0452±0.0030 OUR FIT			Error includes scale factor of 1.1.
0.044 ±0.003 ±0.005	¹⁰⁹ PROCARIO	93 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
¹⁰⁹ PROCARIO 93 quote $0.041 \pm 0.003 \pm 0.005$ after correction for 2 kaon backgrounds assuming $B(K^{*-} \nu_\tau) = 1.42 \pm 0.18\%$ and $B(h^- K^0 \pi^0 \nu_\tau) = 0.48 \pm 0.48\%$. We add 0.003 ± 0.003 and multiply the sum by 0.990 ± 0.010 to remove these corrections.			

$$\frac{\Gamma(\pi^- 3\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}}{\Gamma_{27}/\Gamma}$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.04 ±0.08 OUR FIT				Error includes scale factor of 1.1.
0.977±0.069±0.058	6.1k	¹¹⁰ SCHAEEL	05C ALEP	1991-1995 LEP runs
¹¹⁰ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.				

$$\frac{\Gamma(K^- 3\pi^0 \nu_\tau (\text{ex. } K^0, \eta))/\Gamma_{\text{total}}}{\Gamma_{28}/\Gamma}$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
4.2± 2.1 OUR FIT				
3.7± 2.1±1.1	22	BARATE	99K ALEP	1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •				
5 ±13		¹¹¹ BUSKULIC	94E ALEP	Repl. by BARATE 99K
¹¹¹ BUSKULIC 94E quote $B(K^- \geq 0\pi^0 \geq 0K^0 \nu_\tau) - [B(K^- \nu_\tau) + B(K^- \pi^0 \nu_\tau) + B(K^- K^0 \nu_\tau) + B(K^- \pi^0 \pi^0 \nu_\tau) + B(K^- \pi^0 K^0 \nu_\tau)] = (5 \pm 13) \times 10^{-4}$ accounting for common systematic errors in BUSKULIC 94E and BUSKULIC 94F measurements of these modes. We assume $B(K^- \geq 2K^0 \nu_\tau)$ and $B(K^- \geq 4\pi^0 \nu_\tau)$ are negligible.				

$$\frac{\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}}{\Gamma_{29}/\Gamma = (\Gamma_{30} + 0.319\Gamma_{124})/\Gamma} \quad \Gamma_{29}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.16 ± 0.04 OUR FIT

0.16 ± 0.05 ± 0.05 112 PROCARIO 93 CLEO $E_{\text{cm}}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.16 ± 0.04 ± 0.09 232 113 BUSKULIC 96 ALEP Repl. by SCHAEEL 05C

112 PROCARIO 93 quotes $B(h^- 4\pi^0 \nu_\tau)/B(h^- \pi^0 \nu_\tau) = 0.006 \pm 0.002 \pm 0.002$. We multiply by the ARTUSO 94 result for $B(h^- \pi^0 \nu_\tau)$ to obtain $B(h^- 4\pi^0 \nu_\tau)$. PROCARIO 93 assume $B(h^- \geq 5 \pi^0 \nu_\tau)$ is small and do not correct for it.

113 BUSKULIC 96 quote result for $\tau^- \rightarrow h^- \geq 4\pi^0 \nu_\tau$. We assume $B(h^- \geq 5\pi^0 \nu_\tau)$ is negligible.

$$\frac{\Gamma(h^- 4\pi^0 \nu_\tau (\text{ex. } K^0, \eta))/\Gamma_{\text{total}}}{\Gamma_{30}/\Gamma} \quad \Gamma_{30}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.10 ± 0.04 OUR FIT

0.112 ± 0.037 ± 0.035 957 114 SCHAEEL 05C ALEP 1991-1995 LEP runs

114 See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\frac{\Gamma(K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau)/\Gamma_{\text{total}}}{\Gamma_{31}/\Gamma = (\Gamma_{10} + \Gamma_{16} + \Gamma_{23} + \Gamma_{28} + \Gamma_{37} + \Gamma_{42} + 0.715\Gamma_{126})/\Gamma} \quad \Gamma_{31}/\Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.57 ± 0.04 OUR FIT Error includes scale factor of 1.1.

1.53 ± 0.04 OUR AVERAGE

1.528 ± 0.039 ± 0.040 f&a 115 ABBIENDI 01J OPAL 1990–1995 LEP

1.520 ± 0.040 ± 0.041 avg 4006 116 BARATE 99K ALEP runs
1991–1995 LEP

1.54 ± 0.24 f&a ABREU 94K DLPH LEP 1992 Z data

1.70 ± 0.12 ± 0.19 f&a 202 117 BATTLE 94 CLEO $E_{\text{cm}}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.70 ± 0.05 ± 0.06 1610 118 BUSKULIC 96 ALEP Repl. by
BARATE 99K

1.6 ± 0.4 ± 0.2 35 AIHARA 87B TPC $E_{\text{cm}}^{ee} = 29$ GeV

1.71 ± 0.29 53 MILLS 84 DLCO $E_{\text{cm}}^{ee} = 29$ GeV

115 The correlation coefficient between this measurement and the ABBIENDI 01J $B(\tau^- \rightarrow K^- \nu_\tau)$ is 0.60.

116 Not independent of BARATE 99K $B(K^- \nu_\tau)$, $B(K^- \pi^0 \nu_\tau)$, $B(K^- 2\pi^0 \nu_\tau (\text{ex. } K^0))$, $B(K^- 3\pi^0 \nu_\tau (\text{ex. } K^0))$, $B(K^- K^0 \nu_\tau)$, and $B(K^- K^0 \pi^0 \nu_\tau)$ values.

117 BATTLE 94 quote $1.60 \pm 0.12 \pm 0.19$. We add 0.10 ± 0.02 to correct for their rejection of $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

118 Not independent of BUSKULIC 96 $B(K^- \nu_\tau)$, $B(K^- \pi^0 \nu_\tau)$, $B(K^- 2\pi^0 \nu_\tau)$, $B(K^- K^0 \nu_\tau)$, and $B(K^- K^0 \pi^0 \nu_\tau)$ values.

$\Gamma(K^- \geq 1(\pi^0 \text{ or } K^0 \text{ or } \gamma) \nu_\tau) / \Gamma_{\text{total}}$ Γ_{32} / Γ

$$\Gamma_{32} / \Gamma = (\Gamma_{16} + \Gamma_{23} + \Gamma_{28} + \Gamma_{37} + \Gamma_{42} + 0.715\Gamma_{126}) / \Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.878 ± 0.033 OUR FIT

0.86 ± 0.05 OUR AVERAGE

0.869 ± 0.031 ± 0.034	avg	119 ABBIENDI	01J OPAL	1990–1995 LEP runs
0.69 ± 0.25	avg	120 ABREU	94K DLPH	LEP 1992 Z data
1.2 ± 0.5 $\begin{smallmatrix} +0.2 \\ -0.4 \end{smallmatrix}$	9	AIHARA	87B TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

119 Not independent of ABBIENDI 01J $B(\tau^- \rightarrow K^- \nu_\tau)$ and $B(\tau^- \rightarrow K^- \geq 0\pi^0 \geq 0K^0 \geq 0\gamma \nu_\tau)$ values.

120 Not independent of ABREU 94K $B(K^- \nu_\tau)$ and $B(K^- \geq 0 \text{ neutrals } \nu_\tau)$ measurements.

$\Gamma(K_S^0(\text{particles})^- \nu_\tau) / \Gamma_{\text{total}}$ Γ_{33} / Γ

$$\Gamma_{33} / \Gamma = (\frac{1}{2}\Gamma_{35} + \frac{1}{2}\Gamma_{37} + \frac{1}{2}\Gamma_{40} + \frac{1}{2}\Gamma_{42} + \Gamma_{47} + \Gamma_{48}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.927 ± 0.034 OUR FIT Error includes scale factor of 1.1.

0.97 ± 0.07 OUR AVERAGE

0.970 ± 0.058 ± 0.062	929	BARATE	98E ALEP	1991–1995 LEP runs
0.97 ± 0.09 ± 0.06	141	AKERS	94G OPAL	$E_{\text{cm}}^{ee} = 88\text{--}94 \text{ GeV}$

$\Gamma(h^- \bar{K}^0 \nu_\tau) / \Gamma_{\text{total}}$ $\Gamma_{34} / \Gamma = (\Gamma_{35} + \Gamma_{37}) / \Gamma$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.05 ± 0.04 OUR FIT Error includes scale factor of 1.1.

0.90 ± 0.07 OUR AVERAGE

1.01 ± 0.11 ± 0.07	avg	555 121 BARATE	98E ALEP	1991–1995 LEP runs
0.855 ± 0.036 ± 0.073	f&a	1242 COAN	96 CLEO	$E_{\text{cm}}^{ee} \approx 10.6 \text{ GeV}$

121 Not independent of BARATE 98E $B(\tau^- \rightarrow \pi^- \bar{K}^0 \nu_\tau)$ and $B(\tau^- \rightarrow K^- K^0 \nu_\tau)$ values.

$\Gamma(\pi^- \bar{K}^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{35} / Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.90 ± 0.04 OUR FIT Error includes scale factor of 1.1.

0.88 ± 0.05 OUR AVERAGE Error includes scale factor of 1.2.

0.933 ± 0.068 ± 0.049	f&a	377 ABBIENDI	00C OPAL	1991–1995 LEP runs
0.928 ± 0.045 ± 0.034	f&a	937 122 BARATE	99K ALEP	1991–1995 LEP runs
0.855 ± 0.117 ± 0.066	avg	509 123 BARATE	98E ALEP	1991–1995 LEP runs

0.704 ± 0.041 ± 0.072 avg 124 COAN 96 CLEO $E_{cm}^{ee} \approx 10.6$ GeV
 0.95 ± 0.15 ± 0.06 f&a 125 ACCIARRI 95F L3 1991–1993 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.79 ± 0.10 ± 0.09 98 126 BUSKULIC 96 ALEP Repl. by BARATE 99K

122 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

123 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays. Not independent of BARATE 98E $B(K^0 \text{ particles}^- \nu_\tau)$ value.

124 Not independent of COAN 96 $B(h^- K^0 \nu_\tau)$ and $B(K^- K^0 \nu_\tau)$ measurements.

125 ACCIARRI 95F do not identify π^- / K^- and assume $B(K^- K^0 \nu_\tau) = (0.29 \pm 0.12)\%$.

126 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

$\Gamma(\pi^- \bar{K}^0(\text{non-}K^*(892)^-) \nu_\tau) / \Gamma_{\text{total}}$ Γ_{36} / Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.17	95	ACCIARRI	95F L3	1991–1993 LEP runs

$\Gamma(K^- K^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{37} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.153 ± 0.016 OUR FIT				
0.158 ± 0.017 OUR AVERAGE				

0.162 ± 0.021 ± 0.011 150 127 BARATE 99K ALEP 1991–1995 LEP runs

0.158 ± 0.042 ± 0.017 46 128 BARATE 98E ALEP 1991–1995 LEP runs

0.151 ± 0.021 ± 0.022 111 COAN 96 CLEO $E_{cm}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.26 ± 0.09 ± 0.02 13 129 BUSKULIC 96 ALEP Repl. by BARATE 99K

127 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

128 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

129 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

$\Gamma(K^- K^0 \geq 0\pi^0 \nu_\tau) / \Gamma_{\text{total}}$ $\Gamma_{38} / \Gamma = (\Gamma_{37} + \Gamma_{42}) / \Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.307 ± 0.024 OUR FIT				
0.330 ± 0.055 ± 0.039	124	ABBIENDI	00C OPAL	1991–1995 LEP runs

$\Gamma(h^- \bar{K}^0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ $\Gamma_{39} / \Gamma = (\Gamma_{40} + \Gamma_{42}) / \Gamma$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.53 ± 0.04 OUR FIT				
0.50 ± 0.06 OUR AVERAGE				Error includes scale factor of 1.2.

0.446 ± 0.052 ± 0.046 avg 157 130 BARATE 98E ALEP 1991–1995 LEP runs

0.562 ± 0.050 ± 0.048 f&a 264 COAN 96 CLEO $E_{cm}^{ee} \approx 10.6$ GeV

130 Not independent of BARATE 98E $B(\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau)$ and $B(\tau^- \rightarrow K^- K^0 \pi^0 \nu_\tau)$ values.

$\Gamma(\pi^- \bar{K}^0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{40} / Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
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0.38 ± 0.04 OUR FIT

0.36 ± 0.04 OUR AVERAGE

0.347 ± 0.053 ± 0.037	f&a	299	131 BARATE	99K ALEP	1991–1995 LEP runs
0.294 ± 0.073 ± 0.037	f&a	142	132 BARATE	98E ALEP	1991–1995 LEP runs
0.417 ± 0.058 ± 0.044	avg		133 COAN	96 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
0.41 ± 0.12 ± 0.03	f&a		134 ACCIARRI	95F L3	1991–1993 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.32 ± 0.11 ± 0.05		23	135 BUSKULIC	96 ALEP	Repl. by BARATE 99K
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131 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

132 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

133 Not independent of COAN 96 $B(h^- K^0 \pi^0 \nu_\tau)$ and $B(K^- K^0 \pi^0 \nu_\tau)$ measurements.

134 ACCIARRI 95F do not identify π^- / K^- and assume $B(K^- K^0 \pi^0 \nu_\tau) = (0.05 \pm 0.05)\%$.

135 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

$\Gamma(\bar{K}^0 \rho^- \nu_\tau) / \Gamma_{\text{total}}$ Γ_{41} / Γ

VALUE (%)			DOCUMENT ID	TECN	COMMENT
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0.22 ± 0.05 OUR AVERAGE

0.250 ± 0.057 ± 0.044			136 BARATE	99K ALEP	1991–1995 LEP runs
0.188 ± 0.054 ± 0.038			137 BARATE	98E ALEP	1991–1995 LEP runs

136 BARATE 99K measure K^0 's by detecting K_L^0 's in hadron calorimeter. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.72 \pm 0.12 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by this fraction to obtain the quoted result.

137 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.64 \pm 0.09 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by this fraction to obtain the quoted result.

$\Gamma(K^- K^0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{42} / Γ

VALUE (%)		EVTS	DOCUMENT ID	TECN	COMMENT
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0.154 ± 0.020 OUR FIT

0.144 ± 0.023 OUR AVERAGE

0.143 ± 0.025 ± 0.015		78	138 BARATE	99K ALEP	1991–1995 LEP runs
0.152 ± 0.076 ± 0.021		15	139 BARATE	98E ALEP	1991–1995 LEP runs
0.145 ± 0.036 ± 0.020		32	COAN	96 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.10 ± 0.05 ± 0.03		5	140 BUSKULIC	96 ALEP	Repl. by BARATE 99K
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138 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

139 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

140 BUSKULIC 96 measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

$\Gamma(\pi^- \bar{K}^0 \geq 1\pi^0 \nu_\tau)/\Gamma_{\text{total}}$			$\Gamma_{43}/\Gamma = (\Gamma_{40} + \Gamma_{44})/\Gamma$		
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.324 ± 0.074 ± 0.066	148	ABBIENDI	00C	OPAL	1991–1995 LEP runs

$\Gamma(\pi^- \bar{K}^0 \pi^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$			Γ_{44}/Γ		
VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.26 ± 0.24		141	BARATE	99R	ALEP 1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.66	95	17	142	BARATE	99K	ALEP	1991–1995 LEP runs
0.58 ± 0.33 ± 0.14		5	143	BARATE	98E	ALEP	1991–1995 LEP runs

¹⁴¹ BARATE 99R combine the BARATE 98E and BARATE 99K measurements to obtain this value.

¹⁴² BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter.

¹⁴³ BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

$\Gamma(K^- K^0 \pi^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$			Γ_{45}/Γ		
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
<0.16 × 10⁻³	95	144	BARATE	99R	ALEP 1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

<0.18 × 10 ⁻³	95	145	BARATE	99K	ALEP	1991–1995 LEP runs
<0.39 × 10 ⁻³	95	146	BARATE	98E	ALEP	1991–1995 LEP runs

¹⁴⁴ BARATE 99R combine the BARATE 98E and BARATE 99K bounds to obtain this value.

¹⁴⁵ BARATE 99K measure K^0 's by detecting K_L^0 's in hadron calorimeter.

¹⁴⁶ BARATE 98E reconstruct K^0 's by using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.

$\Gamma(\pi^- K^0 \bar{K}^0 \nu_\tau)/\Gamma_{\text{total}}$			$\Gamma_{46}/\Gamma = (2\Gamma_{47} + \Gamma_{48})/\Gamma$		
Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.					

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT	
0.160 ± 0.031 OUR FIT	Error includes scale factor of 1.2.				
0.153 ± 0.030 ± 0.016 avg	74	147	BARATE	98E	ALEP 1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.31 ± 0.12 ± 0.04	148	ACCIARRI	95F	L3	1991–1993 LEP runs
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¹⁴⁷ BARATE 98E obtain this value by adding twice their $B(\pi^- K_S^0 K_S^0 \nu_\tau)$ value to their $B(\pi^- K_S^0 K_L^0 \nu_\tau)$ value.

¹⁴⁸ ACCIARRI 95F assume $B(\pi^- K_S^0 K_S^0 \nu) = B(\pi^- K_S^0 K_L^0 \nu) = 1/2 B(\pi^- K_S^0 K_L^0 \nu)$.

$\Gamma(\pi^- K_S^0 K_S^0 \nu_\tau)/\Gamma_{\text{total}}$			Γ_{47}/Γ		
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
2.4 ± 0.5 OUR FIT					
2.4 ± 0.5 OUR AVERAGE					

2.6 ± 1.0 ± 0.5	6	BARATE	98E	ALEP	1991–1995 LEP runs
2.3 ± 0.5 ± 0.3	42	COAN	96	CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6$ GeV

$\Gamma(\pi^- K_S^0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{48}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
11.2±3.0 OUR FIT				Error includes scale factor of 1.2.
10.1±2.3±1.3	68	BARATE	98E ALEP	1991–1995 LEP runs

$\Gamma(\pi^- K^0 \bar{K}^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{49}/Γ

VALUE	DOCUMENT ID	TECN	COMMENT
(0.31±0.23) × 10⁻³	149 BARATE	99R ALEP	1991–1995 LEP runs
149 BARATE 99R combine BARATE 98E $\Gamma(\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ measurements to obtain this value.			

$\Gamma(\pi^- K_S^0 K_S^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{50}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
<2.0	95	BARATE	98E ALEP	1991–1995 LEP runs

$\Gamma(\pi^- K_S^0 K_L^0 \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{51}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
3.1±1.1±0.5	11	BARATE	98E ALEP	1991–1995 LEP runs

$\Gamma(K^0 h^+ h^- h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{52}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.17	95	TSCHIRHART	88 HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<0.27	90	BELTRAMI	85 HRS	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

$\Gamma(K^0 h^+ h^- h^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{53}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.3±1.9±0.7	6 150	BARATE	98E ALEP	1991–1995 LEP runs
150 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays.				

$\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{54}/Γ

$\Gamma_{54}/\Gamma = (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + 0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{62} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.9101\Gamma_{144} + 0.9101\Gamma_{146})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
15.22± 0.09 OUR FIT				Error includes scale factor of 1.4.
14.8 ± 0.4 OUR AVERAGE				
14.4 ± 0.6 ± 0.3		ADEVA	91F L3	$E_{\text{cm}}^{\text{ee}} = 88.3\text{--}94.3 \text{ GeV}$
15.0 ± 0.4 ± 0.3		BEHREND	89B CELL	$E_{\text{cm}}^{\text{ee}} = 14\text{--}47 \text{ GeV}$
15.1 ± 0.8 ± 0.6		AIHARA	87B TPC	$E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

13.5 ± 0.3 ± 0.3		ABACHI	89B	HRS	$E_{cm}^{ee} = 29$ GeV
12.8 ± 1.0 ± 0.7		¹⁵¹ BURCHAT	87	MRK2	$E_{cm}^{ee} = 29$ GeV
12.1 ± 0.5 ± 1.2		RUCKSTUHL	86	DLCO	$E_{cm}^{ee} = 29$ GeV
12.8 ± 0.5 ± 0.8	1420	SCHMIDKE	86	MRK2	$E_{cm}^{ee} = 29$ GeV
15.3 ± 1.1 $\begin{smallmatrix} +1.3 \\ -1.6 \end{smallmatrix}$	367	ALTHOFF	85	TASS	$E_{cm}^{ee} = 34.5$ GeV
13.6 ± 0.5 ± 0.8		BARTEL	85F	JADE	$E_{cm}^{ee} = 34.6$ GeV
12.2 ± 1.3 ± 3.9		¹⁵² BERGER	85	PLUT	$E_{cm}^{ee} = 34.6$ GeV
13.3 ± 0.3 ± 0.6		FERNANDEZ	85	MAC	$E_{cm}^{ee} = 29$ GeV
24 ± 6	35	BRANDELIK	80	TASS	$E_{cm}^{ee} = 30$ GeV
32 ± 5	692	¹⁵³ BACINO	78B	DLCO	$E_{cm}^{ee} = 3.1-7.4$ GeV
35 ± 11		¹⁵³ BRANDELIK	78	DASP	Assumes $V-A$ decay
18 ± 6.5	33	¹⁵³ JAROS	78	MRK1	$E_{cm}^{ee} > 6$ GeV

¹⁵¹BURCHAT 87 value is not independent of SCHMIDKE 86 value.

¹⁵²Not independent of BERGER 85 $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau)/\Gamma_{total}$, $\Gamma(e^- \bar{\nu}_e \nu_\tau)/\Gamma_{total}$, $\Gamma(h^- \geq 1 \text{ neutrals } \nu_\tau)/\Gamma_{total}$, and $\Gamma(h^- \geq 0 K_L^0 \nu_\tau)/\Gamma_{total}$, and therefore not used in the fit.

¹⁵³Low energy experiments are not in average or fit because the systematic errors in background subtraction are judged to be large.

$$\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-) (\text{"3-prong"})) / \Gamma_{total} \quad \Gamma_{55} / \Gamma$$

$$\Gamma_{55} / \Gamma = (\Gamma_{62} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.9101\Gamma_{144} + 0.9101\Gamma_{146}) / \Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

<u>VALUE (%)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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14.59 ± 0.08 OUR FIT Error includes scale factor of 1.4.

14.61 ± 0.06 OUR AVERAGE

14.652 ± 0.067 ± 0.086	avg		SCHAEL	05C	ALEP	1991-1995 LEP runs
14.569 ± 0.093 ± 0.048	avg	23k	¹⁵⁴ ABREU	01M	DLPH	1992-1995 LEP runs
14.556 ± 0.105 ± 0.076	f&a		¹⁵⁵ ACHARD	01D	L3	1992-1995 LEP runs
14.96 ± 0.09 ± 0.22	f&a	10.4k	AKERS	95Y	OPAL	1991-1994 LEP runs
14.22 ± 0.10 ± 0.37	avg		¹⁵⁶ BALEST	95C	CLEO	$E_{cm}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

15.26 ± 0.26 ± 0.22		ACTON	92H	OPAL	Repl. by AK-ERS 95Y
13.3 ± 0.3 ± 0.8		¹⁵⁷ ALBRECHT	92D	ARG	$E_{cm}^{ee} = 9.4-10.6$ GeV
14.35 $\begin{smallmatrix} +0.40 \\ -0.45 \end{smallmatrix}$ ± 0.24		DECAMP	92C	ALEP	1989-1990 LEP runs

¹⁵⁴The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau \rightarrow 1\text{-prong})$ and $B(\tau \rightarrow 5\text{-prong})$ are -0.98 and -0.08 respectively.

¹⁵⁵The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau \rightarrow \text{"1-prong"})$ and $B(\tau \rightarrow \text{"5-prong"})$ are -0.978 and -0.19 respectively.

¹⁵⁶Not independent of BALEST 95C $B(h^- h^- h^+ \nu_\tau)$ and $B(h^- h^- h^+ \pi^0 \nu_\tau)$ values, and BORTOLETTO 93 $B(h^- h^- h^+ 2\pi^0 \nu_\tau)/B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau)$ value.

¹⁵⁷ This ALBRECHT 92D value is not independent of their $\Gamma(\mu^- \bar{\nu}_\mu \nu_\tau) \Gamma(e^- \bar{\nu}_e \nu_\tau) / \Gamma_{\text{total}}^2$ value.

$$\Gamma(h^- h^- h^+ \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_{56} / \Gamma$$

$$\Gamma_{56} / \Gamma = (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + \Gamma_{62} + \Gamma_{85} + \Gamma_{93} + 0.017\Gamma_{144}) / \Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
9.87 ± 0.08 OUR FIT	Error includes scale factor of 1.3.			
7.6 ± 0.1 ± 0.5 avg	7.5k	¹⁵⁸ ALBRECHT	96E ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
9.92 ± 0.10 ± 0.09	11.2k	¹⁵⁹ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C
9.49 ± 0.36 ± 0.63		DECAMP	92C ALEP	Repl. by SCHAEEL 05C
8.7 ± 0.7 ± 0.3	694	¹⁶⁰ BEHREND	90 CELL	$E_{\text{cm}}^{ee} = 35$ GeV
7.0 ± 0.3 ± 0.7	1566	¹⁶¹ BAND	87 MAC	$E_{\text{cm}}^{ee} = 29$ GeV
6.7 ± 0.8 ± 0.9		¹⁶² BURCHAT	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
6.4 ± 0.4 ± 0.9		¹⁶³ RUCKSTUHL	86 DLCO	$E_{\text{cm}}^{ee} = 29$ GeV
7.8 ± 0.5 ± 0.8	890	SCHMIDKE	86 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
8.4 ± 0.4 ± 0.7	1255	¹⁶³ FERNANDEZ	85 MAC	$E_{\text{cm}}^{ee} = 29$ GeV
9.7 ± 2.0 ± 1.3		BEHREND	84 CELL	$E_{\text{cm}}^{ee} = 14,22$ GeV

¹⁵⁸ ALBRECHT 96E not independent of ALBRECHT 93C $\Gamma(h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) \times \Gamma(\text{particle}^- \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma_{\text{total}}^2$ value.

¹⁵⁹ BUSKULIC 96 quote $B(h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) = 9.50 \pm 0.10 \pm 0.11$. We add 0.42 to remove their K^0 correction and reduce the systematic error accordingly.

¹⁶⁰ BEHREND 90 subtract 0.3% to account for the $\tau^- \rightarrow K^*(892)^- \nu_\tau$ contribution to measured events.

¹⁶¹ BAND 87 subtract for charged kaon modes; not independent of FERNANDEZ 85 value.

¹⁶² BURCHAT 87 value is not independent of SCHMIDKE 86 value.

¹⁶³ Value obtained by multiplying paper’s $R = B(h^- h^- h^+ \nu_\tau) / B(3\text{-prong})$ by $B(3\text{-prong}) = 0.143$ and subtracting 0.3% for $K^*(892)$ background.

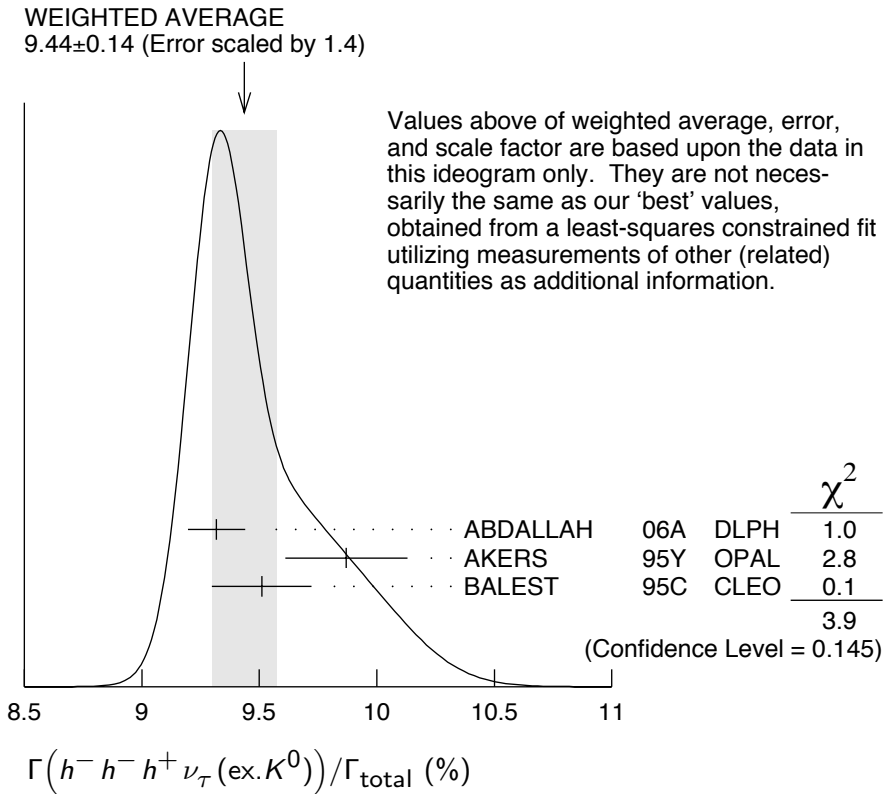
$$\Gamma(h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}} \quad \Gamma_{57} / \Gamma$$

$$\Gamma_{57} / \Gamma = (\Gamma_{62} + \Gamma_{85} + \Gamma_{93} + 0.017\Gamma_{144}) / \Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
9.51 ± 0.08 OUR FIT	Error includes scale factor of 1.3.			
9.44 ± 0.14 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.			
9.317 ± 0.090 ± 0.082 f&a	12.2k	¹⁶⁴ ABDALLAH	06A DLPH	1992–1995 LEP runs
9.87 ± 0.10 ± 0.24 avg		¹⁶⁵ AKERS	95Y OPAL	1991–1994 LEP runs
9.51 ± 0.07 ± 0.20 f&a	37.7k	BALEST	95C CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
9.50 ± 0.10 ± 0.11	11.2k	¹⁶⁶ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C

- 164 See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.
 165 Not independent of AKERS 95Y $B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ and $B(h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ values.
 166 Not independent of BUSKULIC 96 $B(h^- h^- h^+ \nu_\tau)$ value.



$\Gamma(h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$
 ("3-prong") Γ_{57}/Γ_{55}
 $\Gamma_{57}/\Gamma_{55} = (\Gamma_{62} + \Gamma_{85} + \Gamma_{93} + 0.017\Gamma_{144}) / (\Gamma_{62} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.9101\Gamma_{144} + 0.9101\Gamma_{146})$

VALUE	DOCUMENT ID	TECN	COMMENT
0.652 ± 0.004 OUR FIT			Error includes scale factor of 1.1.
$0.660 \pm 0.004 \pm 0.014$	AKERS	95Y OPAL	1991–1994 LEP runs

$\Gamma(h^- h^- h^+ \nu_\tau (\text{ex. } K^0, \omega))/\Gamma_{\text{total}}$ $\Gamma_{58}/\Gamma = (\Gamma_{62} + \Gamma_{85} + \Gamma_{93})/\Gamma$
 VALUE (%) DOCUMENT ID
 9.47 ± 0.08 OUR FIT Error includes scale factor of 1.3.

$\Gamma(\pi^- \pi^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$ $\Gamma_{59}/\Gamma = (0.3431\Gamma_{35} + \Gamma_{62} + 0.017\Gamma_{144})/\Gamma$
 VALUE (%) DOCUMENT ID
 9.33 ± 0.08 OUR FIT Error includes scale factor of 1.3.

$$\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}} \qquad \Gamma_{60}/\Gamma = (\Gamma_{62} + 0.017\Gamma_{144})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
9.02 ± 0.08 OUR FIT				Error includes scale factor of 1.3.
9.13 ± 0.05 ± 0.46	43k	¹⁶⁷ BRIERE	03 CLE3	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

¹⁶⁷ 47% correlated with BRIERE 03 $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ and 71% correlated with $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

$$\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0), \text{ non-axial vector})/\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0)) \qquad \Gamma_{61}/\Gamma_{60} = \Gamma_{61}/(\Gamma_{62} + 0.017\Gamma_{144})$$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.261	95	¹⁶⁸ ACKERSTAFF	97R OPAL	1992–1994 LEP runs

¹⁶⁸ Model-independent limit from structure function analysis on contribution to $B(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ from non-axial vectors.

$$\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0, \omega))/\Gamma_{\text{total}} \qquad \Gamma_{62}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
8.99 ± 0.08 OUR FIT				Error includes scale factor of 1.3.
9.041 ± 0.060 ± 0.076	29k	¹⁶⁹ SCHAEEL	05C ALEP	1991-1995 LEP runs

¹⁶⁹ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\Gamma(h^- h^- h^+ \geq 1 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}} \qquad \Gamma_{63}/\Gamma$$

$$\Gamma_{63}/\Gamma = (0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{89} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.888\Gamma_{144} + 0.9101\Gamma_{146})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
5.34 ± 0.06 OUR FIT				Error includes scale factor of 1.1.

• • • We do not use the following data for averages, fits, limits, etc. • • •

5.6 ± 0.7 ± 0.3	352	¹⁷⁰ BEHREND	90 CELL	$E_{\text{cm}}^{ee} = 35 \text{ GeV}$
4.2 ± 0.5 ± 0.9	203	¹⁷¹ ALBRECHT	87L ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
6.1 ± 0.8 ± 0.9		¹⁷² BURCHAT	87 MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
7.6 ± 0.4 ± 0.9		^{173,174} RUCKSTUHL	86 DLCO	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
4.7 ± 0.5 ± 0.8	530	¹⁷⁵ SCHMIDKE	86 MRK2	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
5.6 ± 0.4 ± 0.7		¹⁷⁴ FERNANDEZ	85 MAC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
6.2 ± 2.3 ± 1.7		BEHREND	84 CELL	$E_{\text{cm}}^{ee} = 14, 22 \text{ GeV}$

¹⁷⁰ BEHREND 90 value is not independent of BEHREND 90 $B(3h\nu_\tau \geq 1 \text{ neutrals}) + B(5\text{-prong})$.

¹⁷¹ ALBRECHT 87L measure the product of branching ratios $B(3\pi^\pm \pi^0 \nu_\tau) B((e\bar{\nu} \text{ or } \mu\bar{\nu} \text{ or } \pi \text{ or } K \text{ or } \rho)\nu_\tau) = 0.029$ and use the PDG 86 values for the second branching ratio which sum to 0.69 ± 0.03 to get the quoted value.

¹⁷² BURCHAT 87 value is not independent of SCHMIDKE 86 value.

¹⁷³ Contributions from kaons and from $>1\pi^0$ are subtracted. Not independent of $(3\text{-prong} + 0\pi^0)$ and $(3\text{-prong} + \geq 0\pi^0)$ values.

¹⁷⁴ Value obtained using paper's $R = B(h^- h^- h^+ \nu_\tau)/B(3\text{-prong})$ and current $B(3\text{-prong}) = 0.143$.

¹⁷⁵ Not independent of SCHMIDKE 86 $h^- h^- h^+ \nu_\tau$ and $h^- h^- h^+ (\geq 0\pi^0)\nu_\tau$ values.

$$\Gamma(h^- h^- h^+ \geq 1 \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}} \quad \Gamma_{64}/\Gamma$$

$$\Gamma_{64}/\Gamma = (\Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{124} + 0.226\Gamma_{126} + 0.888\Gamma_{144} + 0.9101\Gamma_{146})/\Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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5.06 ± 0.06 OUR FIT Error includes scale factor of 1.1.

5.10 ± 0.12 OUR AVERAGE

5.106 ± 0.083 ± 0.103	avg	10.1k	¹⁷⁶ ABDALLAH	06A DLPH	1992–1995 LEP runs
5.09 ± 0.10 ± 0.23	avg		¹⁷⁷ AKERS	95Y OPAL	1991–1994 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

4.95 ± 0.29 ± 0.65		570	DECAMP	92C ALEP	Repl. by SCHAEEL 05C
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¹⁷⁶ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

¹⁷⁷ Not independent of AKERS 95Y $B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ and $B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K^0))/B(h^- h^- h^+ \geq 0 \text{ neutrals } \nu_\tau (\text{ex. } K_S^0 \rightarrow \pi^+ \pi^-))$ values.

$$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau)/\Gamma_{\text{total}} \quad \Gamma_{65}/\Gamma$$

$$\Gamma_{65}/\Gamma = (0.3431\Gamma_{40} + 0.3431\Gamma_{42} + \Gamma_{70} + \Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126} + 0.888\Gamma_{144} + 0.017\Gamma_{146})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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4.73 ± 0.07 OUR FIT Error includes scale factor of 1.2.

• • • We do not use the following data for averages, fits, limits, etc. • • •

4.45 ± 0.09 ± 0.07		6.1k	¹⁷⁸ BUSKULIC	96 ALEP	Repl. by SCHAEEL 05C
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¹⁷⁸ BUSKULIC 96 quote $B(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0)) = 4.30 \pm 0.09 \pm 0.09$. We add 0.15 to remove their K^0 correction and reduce the systematic error accordingly.

$$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}} \quad \Gamma_{66}/\Gamma$$

$$\Gamma_{66}/\Gamma = (\Gamma_{70} + \Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126} + 0.888\Gamma_{144} + 0.017\Gamma_{146})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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4.55 ± 0.06 OUR FIT Error includes scale factor of 1.2.

4.45 ± 0.14 OUR AVERAGE Error includes scale factor of 1.2.

4.545 ± 0.106 ± 0.103		8.9k	¹⁷⁹ ABDALLAH	06A DLPH	1992–1995 LEP runs
4.23 ± 0.06 ± 0.22		7.2k	BALEST	95C CLEO	$E_{\text{cm}}^{\text{ee}} \approx 10.6 \text{ GeV}$

¹⁷⁹ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\Gamma(h^- h^- h^+ \pi^0 \nu_\tau (\text{ex. } K^0, \omega))/\Gamma_{\text{total}} \quad \Gamma_{67}/\Gamma = (\Gamma_{70} + \Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126})/\Gamma$$

VALUE (%)	DOCUMENT ID
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2.78 ± 0.08 OUR FIT Error includes scale factor of 1.2.

$$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}} \quad \Gamma_{68}/\Gamma = (0.3431\Gamma_{40} + \Gamma_{70} + 0.888\Gamma_{144} + 0.017\Gamma_{146})/\Gamma$$

VALUE (%)	DOCUMENT ID
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4.59 ± 0.07 OUR FIT Error includes scale factor of 1.2.

$$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}} \quad \Gamma_{69}/\Gamma = (\Gamma_{70} + 0.888\Gamma_{144} + 0.017\Gamma_{146})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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4.46 ± 0.06 OUR FIT Error includes scale factor of 1.2.

4.55 ± 0.13 OUR AVERAGE Error includes scale factor of 1.6.

4.598 ± 0.057 ± 0.064 16k ¹⁸⁰SCHAEL 05C ALEP 1991-1995 LEP runs

4.19 ± 0.10 ± 0.21 ¹⁸¹EDWARDS 00A CLEO 4.7 fb⁻¹ E_{cm}^{ee} = 10.6 GeV

¹⁸⁰SCHAEL 05C quote (4.590 ± 0.057 ± 0.064)%. We add 0.008% to remove their correction for $\tau^- \rightarrow \pi^- \pi^0 \omega \nu_\tau \rightarrow \pi^- \pi^0 \pi^+ \pi^- \nu_\tau$ decays. See footnote to SCHAEL 05C

$\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

¹⁸¹EDWARDS 00A quote (4.19 ± 0.10) × 10⁻² with a 5% systematic error.

$$\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega))/\Gamma_{\text{total}} \quad \Gamma_{70}/\Gamma$$

VALUE (%)	DOCUMENT ID
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2.69 ± 0.08 OUR FIT Error includes scale factor of 1.2.

$$\Gamma(h^- \rho \pi^0 \nu_\tau)/\Gamma(h^- h^- h^+ \pi^0 \nu_\tau) \quad \Gamma_{71}/\Gamma_{65}$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.30 ± 0.04 ± 0.02 393 ALBRECHT 91D ARG E_{cm}^{ee} = 9.4–10.6 GeV

$$\Gamma(h^- \rho^+ h^- \nu_\tau)/\Gamma(h^- h^- h^+ \pi^0 \nu_\tau) \quad \Gamma_{72}/\Gamma_{65}$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.10 ± 0.03 ± 0.04 142 ALBRECHT 91D ARG E_{cm}^{ee} = 9.4–10.6 GeV

$$\Gamma(h^- \rho^- h^+ \nu_\tau)/\Gamma(h^- h^- h^+ \pi^0 \nu_\tau) \quad \Gamma_{73}/\Gamma_{65}$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.26 ± 0.05 ± 0.01 370 ALBRECHT 91D ARG E_{cm}^{ee} = 9.4–10.6 GeV

$$\Gamma(h^- h^- h^+ \geq 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}} \quad \Gamma_{74}/\Gamma = (\Gamma_{77} + \Gamma_{78} + 0.226\Gamma_{124} + 0.888\Gamma_{146})/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.514 ± 0.034 OUR FIT Error includes scale factor of 1.1.

0.561 ± 0.068 ± 0.095 1.3k ¹⁸²ABDALLAH 06A DLPH 1992–1995 LEP runs

¹⁸²See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau)/\Gamma_{\text{total}} \quad \Gamma_{75}/\Gamma$$

$$\Gamma_{75}/\Gamma = (0.4307\Gamma_{47} + \Gamma_{77} + 0.226\Gamma_{124} + 0.888\Gamma_{146})/\Gamma$$

VALUE (%)	DOCUMENT ID
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0.502 ± 0.034 OUR FIT Error includes scale factor of 1.1.

$$\frac{\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}}{\Gamma_{76}/\Gamma = (\Gamma_{77} + 0.226\Gamma_{124} + 0.888\Gamma_{146})/\Gamma} \quad \Gamma_{76}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.492 ± 0.034 OUR FIT Error includes scale factor of 1.1.

0.435 ± 0.030 ± 0.035 2.6k ¹⁸³ SCHAEL 05C ALEP 1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.50 ± 0.07 ± 0.07 1.8k BUSKULIC 96 ALEP Repl. by SCHAEL 05C
¹⁸³ SCHAEL 05C quote (0.392 ± 0.030 ± 0.035)%. We add 0.043% to remove their correction for $\tau^- \rightarrow \pi^- \eta \pi^0 \nu_\tau \rightarrow \pi^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ and $\tau^- \rightarrow K^*(892)^- \eta \nu_\tau \rightarrow K^- \pi^+ \pi^- 2\pi^0 \nu_\tau$ decays. See footnote to SCHAEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

$$\frac{\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)}{\Gamma_{76}/\Gamma_{54} = (\Gamma_{77} + 0.226\Gamma_{124} + 0.888\Gamma_{146}) / (0.3431\Gamma_{35} + 0.3431\Gamma_{37} + 0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{62} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.9101\Gamma_{144} + 0.9101\Gamma_{146})} \quad \Gamma_{76}/\Gamma_{54}$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.0323 ± 0.0022 OUR FIT Error includes scale factor of 1.1.

0.034 ± 0.002 ± 0.003 668 BORTOLETTO93 CLEO $E_{\text{cm}}^{ee} \approx 10.6$ GeV

$$\frac{\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau (\text{ex. } K^0, \omega, \eta))/\Gamma_{\text{total}}}{\Gamma_{77}/\Gamma}$$

VALUE (units 10 ⁻⁴)	DOCUMENT ID
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9 ± 4 OUR FIT

$$\frac{\Gamma(h^- h^- h^+ 3\pi^0 \nu_\tau)/\Gamma_{\text{total}}}{\Gamma_{78}/\Gamma}$$

VALUE (units 10 ⁻⁴)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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2.2 ± 0.5 OUR FIT

2.2 ± 0.3 ± 0.4 139 ANASTASSOV 01 CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 4.9 95 SCHAEL 05C ALEP 1991-1995 LEP runs

2.85 ± 0.56 ± 0.51 57 ANDERSON 97 CLEO Repl. by ANAS-TASSOV 01

11 ± 4 ± 5 440 ¹⁸⁴ BUSKULIC 96 ALEP Repl. by SCHAEL 05C

¹⁸⁴ BUSKULIC 96 state their measurement is for $B(h^- h^- h^+ \geq 3\pi^0 \nu_\tau)$. We assume that $B(h^- h^- h^+ \geq 4\pi^0 \nu_\tau)$ is very small.

$$\frac{\Gamma(K^- h^+ h^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}}{\Gamma_{79}/\Gamma = (0.3431\Gamma_{37} + 0.3431\Gamma_{42} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{126})/\Gamma}$$

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
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0.679 ± 0.035 OUR FIT Error includes scale factor of 1.3.

< 0.6 90 AIHARA 84C TPC $E_{\text{cm}}^{ee} = 29$ GeV

$$\frac{\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}}{\Gamma_{80}/\Gamma = (\Gamma_{85} + \Gamma_{93})/\Gamma}$$

VALUE (%)	DOCUMENT ID
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0.486 ± 0.032 OUR FIT Error includes scale factor of 1.4.

$$\Gamma(K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$$

$$\Gamma_{80} / \Gamma_{60} = (\Gamma_{85} + \Gamma_{93}) / (\Gamma_{62} + 0.017\Gamma_{144})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
5.4 ± 0.4 OUR FIT				Error includes scale factor of 1.4.
5.44 ± 0.21 ± 0.53	7.9k	RICHICHI	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$$\Gamma(K^- h^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}} \quad \Gamma_{81} / \Gamma = (\Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126}) / \Gamma$$

VALUE (units 10^{-4})	DOCUMENT ID
8.5 ± 1.2 OUR FIT	

$$\Gamma(K^- h^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0))$$

$$\Gamma_{81} / \Gamma_{69} = (\Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126}) / (\Gamma_{70} + 0.888\Gamma_{144} + 0.017\Gamma_{146})$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.91 ± 0.27 OUR FIT				
2.61 ± 0.45 ± 0.42	719	RICHICHI	99	CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

$$\Gamma(K^- \pi^+ \pi^- \geq 0 \text{ neutrals } \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_{82} / \Gamma = (0.3431\Gamma_{37} + 0.3431\Gamma_{42} + \Gamma_{85} + \Gamma_{89} + 0.285\Gamma_{126}) / \Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.52 ± 0.04 OUR FIT				Error includes scale factor of 1.5.
0.58^{+0.15}_{-0.13} ± 0.12	20	¹⁸⁵ BAUER	94	TPC $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.22 ^{+0.16} _{-0.13} ± 0.05	9	¹⁸⁶ MILLS	85	DLCO $E_{\text{cm}}^{\text{ee}} = 29 \text{ GeV}$
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¹⁸⁵ We multiply 0.58% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

¹⁸⁶ Error correlated with MILLS 85 ($K K \pi \nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.

$$\Gamma(K^- \pi^+ \pi^- \geq 0 \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}} \quad \Gamma_{83} / \Gamma = (\Gamma_{85} + \Gamma_{89} + 0.226\Gamma_{126}) / \Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
0.41 ± 0.04 OUR FIT			Error includes scale factor of 1.5.
0.30 ± 0.05 OUR AVERAGE			
0.343 ± 0.073 ± 0.031	avg	ABBIENDI	00D OPAL 1990–1995 LEP runs
0.275 ± 0.064	avg	¹⁸⁷ BARATE	98 ALEP 1991–1995 LEP runs

¹⁸⁷ Not independent of BARATE 98 $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ values.

$$\Gamma(K^- \pi^+ \pi^- \nu_\tau) / \Gamma_{\text{total}} \quad \Gamma_{84} / \Gamma = (0.3431\Gamma_{37} + \Gamma_{85}) / \Gamma$$

VALUE (%)	DOCUMENT ID
0.39 ± 0.04 OUR FIT	

Error includes scale factor of 1.6.

$\Gamma(K^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$

Γ_{85}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%) EVTS DOCUMENT ID TECN COMMENT

0.333±0.035 OUR FIT Error includes scale factor of 1.6.

0.33 ±0.05 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.

0.415±0.053±0.040 f&a 269 ABBIENDI 04J OPAL 1991-1995 LEP runs

0.384±0.014±0.038 f&a 3.5k 188 BRIERE 03 CLE3 $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

0.346±0.023±0.056 avg 158 189 RICHICHI 99 CLEO $E_{\text{cm}}^{\text{ee}} = 10.6 \text{ GeV}$

0.214±0.037±0.029 f&a BARATE 98 ALEP 1991-1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

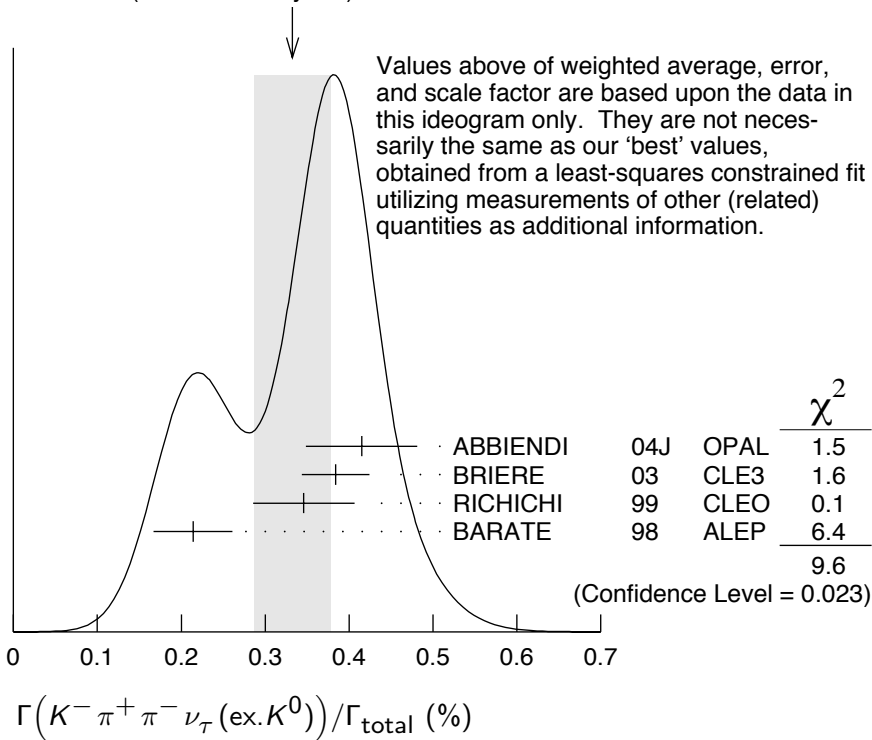
0.360±0.082±0.048 ABBIENDI 00D OPAL 1990-1995 LEP runs

188 47% correlated with BRIERE 03 $\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau$ and 34% correlated with $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

189 Not independent of RICHICHI 99

$\Gamma(\tau^- \rightarrow K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0))/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$, $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ values.

WEIGHTED AVERAGE
0.33±0.05 (Error scaled by 1.8)



$\Gamma(K^- \rho^0 \nu_\tau \rightarrow K^- \pi^+ \pi^- \nu_\tau) / \Gamma(K^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ $\Gamma_{86} / \Gamma_{85}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.48±0.14±0.10	¹⁹⁰ ASNER	00B CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.39±0.14 ¹⁹¹ BARATE 99R ALEP 1991–1995 LEP runs
¹⁹⁰ ASNER 00B assume $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0) decays proceed only through $K \rho$ and $K^* \pi$ intermediate states. They assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0) decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances, and assume $B(K_1(1270) \rightarrow K^*(892)\pi) = (16 \pm 5)\%$, $B(K_1(1270) \rightarrow K\rho) = (42 \pm 6)\%$, and $B(K_1(1400) \rightarrow K\rho) = 0$.

¹⁹¹ BARATE 99R assume $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0) decays proceed only through $K \rho$ and $K^* \pi$ intermediate states. The quoted error is statistical only.

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ $\Gamma_{87} / \Gamma = (0.3431\Gamma_{42} + \Gamma_{89} + 0.226\Gamma_{126}) / \Gamma$

<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>
13.2±1.4 OUR FIT	

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ $\Gamma_{88} / \Gamma = (\Gamma_{89} + 0.226\Gamma_{126}) / \Gamma$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

<u>VALUE (units 10^{-4})</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
7.9±1.2 OUR FIT				

7.3±1.2 OUR AVERAGE

7.4±0.8±1.1	f&a	¹⁹² ARMS	05 CLE3	7.6 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
7.5±2.6±1.8	avg	¹⁹³ RICHICHI	99 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
6.1±3.9±1.8	f&a	BARATE	98 ALEP	1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

<17 95 ABBIENDI 00D OPAL 1990–1995 LEP runs
¹⁹² Not independent of ARMS 05 $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^- \omega \nu_\tau) / \Gamma_{\text{total}}$ values.

¹⁹³ Not independent of RICHICHI 99 $\Gamma(\tau^- \rightarrow K^- h^+ \pi^- \nu_\tau (\text{ex. } K^0)) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$, $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0)) / \Gamma_{\text{total}}$ values.

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \eta)) / \Gamma_{\text{total}}$ Γ_{89} / Γ

<u>VALUE (units 10^{-4})</u>	<u>DOCUMENT ID</u>
7.3±1.2 OUR FIT	

$\Gamma(K^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0, \omega)) / \Gamma_{\text{total}}$ Γ_{90} / Γ

<u>VALUE (units 10^{-4})</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
3.7±0.5±0.8	833	ARMS	05 CLE3	7.6 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

$\Gamma(K^- \pi^+ K^- \geq 0 \text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{91}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.09	95	BAUER 94	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

$\Gamma(K^- K^+ \pi^- \geq 0 \text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ $\Gamma_{92}/\Gamma = (\Gamma_{93} + \Gamma_{94})/\Gamma$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.159 ± 0.010 OUR FIT Error includes scale factor of 1.4.

0.203 ± 0.031 OUR AVERAGE

0.159 ± 0.053 ± 0.020	f&a	ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.238 ± 0.042	avg	194 BARATE	98	ALEP	1991–1995 LEP runs
0.15 $^{+0.09}_{-0.07}$ ± 0.03	f&a	4 195 BAUER	94	TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

¹⁹⁴ Not independent of BARATE 98 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$ and $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ values.

¹⁹⁵ We multiply 0.15% by 0.20, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$\Gamma(K^- K^+ \pi^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{93}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.153 ± 0.010 OUR FIT Error includes scale factor of 1.4.

0.154 ± 0.009 OUR AVERAGE

0.155 ± 0.006 ± 0.009	f&a	932 ¹⁹⁶ BRIERE	03	CLE3	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
0.087 ± 0.056 ± 0.040	avg	ABBIENDI	00D	OPAL	1990–1995 LEP runs
0.145 ± 0.013 ± 0.028	avg	2.3k ¹⁹⁷ RICHICHI	99	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
0.163 ± 0.021 ± 0.017	f&a	BARATE	98	ALEP	1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.22 $^{+0.17}_{-0.11}$ ± 0.05	9	¹⁹⁸ MILLS	85	DLCO	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
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¹⁹⁶ 71% correlated with BRIERE 03 $\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau$ and 34% correlated with $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ because of a common 5% normalization error.

¹⁹⁷ Not independent of RICHICHI 99 $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ values.

¹⁹⁸ Error correlated with MILLS 85 ($K \pi \pi \pi^0 \nu$) value. We multiply 0.22% by 0.23, the relative systematic error quoted by MILLS 85, to obtain the systematic error.

$\Gamma(K^- K^+ \pi^- \nu_\tau)/\Gamma(\pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ $\Gamma_{93}/\Gamma_{60} = \Gamma_{93}/(\Gamma_{62} + 0.017\Gamma_{144})$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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1.70 ± 0.11 OUR FIT Error includes scale factor of 1.4.

1.60 ± 0.15 ± 0.30 2.3k RICHICHI 99 CLEO $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{94}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.61±0.20 OUR FIT					Error includes scale factor of 1.1.
0.60±0.18 OUR AVERAGE					
0.55±0.14±0.12	f&a	48	ARMS	05	CLE3 7.6 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
3.3 ±1.8 ±0.7	avg	158	¹⁹⁹ RICHICHI	99	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
7.5 ±2.9 ±1.5	f&a		BARATE	98	ALEP 1991–1995 LEP runs
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<27	95		ABBIENDI	00D	OPAL 1990–1995 LEP runs

¹⁹⁹ Not independent of RICHICHI 99

$\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau)/\Gamma(\tau^- \rightarrow \pi^- \pi^+ \pi^- \nu_\tau (\text{ex. } K^0))$ and BALEST 95C $\Gamma(\tau^- \rightarrow h^- h^- h^+ \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ values.

$\Gamma(K^- K^+ \pi^- \pi^0 \nu_\tau)/\Gamma(\pi^- \pi^+ \pi^- \pi^0 \nu_\tau (\text{ex. } K^0))$ $\Gamma_{94}/\Gamma_{69} = \Gamma_{94}/(\Gamma_{70} + 0.888\Gamma_{144} + 0.017\Gamma_{146})$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.14±0.04 OUR FIT				Error includes scale factor of 1.1.
0.79±0.44±0.16	158	²⁰⁰ RICHICHI	99	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
²⁰⁰ RICHICHI 99 also quote a 95%CL upper limit of 0.0157 for this measurement.				

$\Gamma(K^- K^+ K^- \geq 0 \text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{95}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.21	95	BAUER	94	TPC $E_{\text{cm}}^{ee} = 29$ GeV

$\Gamma(K^- K^+ K^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{96}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<3.7 × 10⁻⁵	90	BRIERE	03	CLE3 $E_{\text{cm}}^{ee} = 10.6$ GeV
<1.9 × 10 ⁻⁴	90	BARATE	98	ALEP 1991–1995 LEP runs

$\Gamma(K^- K^+ K^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{97}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<4.8 × 10⁻⁶	90	ARMS	05	CLE3 7.6 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\pi^- K^+ \pi^- \geq 0 \text{ neut. } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{98}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.25	95	BAUER	94	TPC $E_{\text{cm}}^{ee} = 29$ GeV

$\Gamma(e^- e^- e^+ \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ Γ_{99}/Γ

VALUE (units 10^{-5})	EVTS	DOCUMENT ID	TECN	COMMENT
2.8±1.4±0.4	5	ALAM	96	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- e^- e^+ \bar{\nu}_\mu \nu_\tau)/\Gamma_{\text{total}}$					Γ_{100}/Γ
VALUE (units 10^{-5})	CL%	DOCUMENT ID	TECN	COMMENT	
<3.6	90	ALAM	96	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(3h^- 2h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ (ex. } K_S^0 \rightarrow \pi^- \pi^+ \text{) ("5-prong")})/\Gamma_{\text{total}}$ Γ_{101}/Γ
 Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average. $\Gamma_{101}/\Gamma = (\Gamma_{102} + \Gamma_{103})/\Gamma$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.102 ± 0.004 OUR FIT	Error includes scale factor of 1.1.			
0.107 ± 0.007 OUR AVERAGE	Error includes scale factor of 1.1.			
0.093 ± 0.009 ± 0.012	avg	SCHAEL	05C	ALEP 1991-1995 LEP runs
0.115 ± 0.013 ± 0.006	avg 112	²⁰¹ ABREU	01M	DLPH 1992-1995 LEP runs
0.170 ± 0.022 ± 0.026	f&a	²⁰² ACHARD	01D	L3 1992-1995 LEP runs
0.119 ± 0.013 ± 0.008	avg 119	²⁰³ ACKERSTAFF	99E	OPAL 1991-1995 LEP runs
0.097 ± 0.005 ± 0.011	f&a 419	GIBAUT	94B	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
0.102 ± 0.029	f&a 13	BYLSMA	87	HRS $E_{\text{cm}}^{ee} = 29$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.26 ± 0.06 ± 0.05		ACTON	92H	OPAL $E_{\text{cm}}^{ee} = 88.2-94.2$ GeV
0.10 ^{+0.05} _{-0.04} ± 0.03		DECAMP	92C	ALEP 1989-1990 LEP runs
0.16 ± 0.13 ± 0.04		BEHREND	89B	CELL $E_{\text{cm}}^{ee} = 14-47$ GeV
0.3 ± 0.1 ± 0.2		BARTEL	85F	JADE $E_{\text{cm}}^{ee} = 34.6$ GeV
0.13 ± 0.04	10	BELTRAMI	85	HRS Repl. by BYLSMA 87
0.16 ± 0.08 ± 0.04	4	BURCHAT	85	MRK2 $E_{\text{cm}}^{ee} = 29$ GeV
1.0 ± 0.4	10	BEHREND	82	CELL Repl. by BEHREND 89B

²⁰¹ The correlation coefficients between this measurement and the ABREU 01M measurements of $B(\tau \rightarrow 1\text{-prong})$ and $B(\tau \rightarrow 3\text{-prong})$ are -0.08 and -0.08 respectively.
²⁰² The correlation coefficients between this measurement and the ACHARD 01D measurements of $B(\tau \rightarrow \text{"1-prong"})$ and $B(\tau \rightarrow \text{"3-prong"})$ are -0.082 and -0.19 respectively.
²⁰³ Not independent of ACKERSTAFF 99E $B(\tau^- \rightarrow 3h^- 2h^+ \nu_\tau \text{ (ex. } K^0))$ and $B(\tau^- \rightarrow 3h^- 2h^+ \pi^0 \nu_\tau \text{ (ex. } K^0))$ measurements.

$\Gamma(3h^- 2h^+ \nu_\tau \text{ (ex. } K^0))/\Gamma_{\text{total}}$					Γ_{102}/Γ
VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT	
8.38 ± 0.35 OUR FIT	Error includes scale factor of 1.1.				
8.32 ± 0.35 OUR AVERAGE					
9.7 ± 1.5 ± 0.5	96	²⁰⁴ ABDALLAH	06A	DLPH 1992-1995 LEP runs	
8.56 ± 0.05 ± 0.42	34k	AUBERT,B	05W	BABR 232 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV	
7.2 ± 0.9 ± 1.2	165	²⁰⁵ SCHAEL	05C	ALEP 1991-1995 LEP runs	
9.1 ± 1.4 ± 0.6	97	ACKERSTAFF	99E	OPAL 1991-1995 LEP runs	

$7.7 \pm 0.5 \pm 0.9$	295	GIBAUT	94B	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$6.4 \pm 2.3 \pm 1.0$	12	ALBRECHT	88B	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
5.1 ± 2.0	7	BYLSMA	87	HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$8.0 \pm 1.1 \pm 1.3$	58	BUSKULIC	96	ALEP	Repl. by SCHAEEL 05C
6.7 ± 3.0	5	²⁰⁶ BELTRAMI	85	HRS	Repl. by BYLSMA 87

²⁰⁴ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

²⁰⁵ See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

²⁰⁶ The error quoted is statistical only.

$\Gamma(3h^- 2h^+ \pi^0 \nu_\tau (\text{ex. } K^0))/\Gamma_{\text{total}}$ Γ_{103}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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1.78 ± 0.27 OUR FIT

1.74 ± 0.27 OUR AVERAGE

$1.6 \pm 1.2 \pm 0.6$	13	²⁰⁷ ABDALLAH	06A	DLPH	1992–1995 LEP runs
$2.1 \pm 0.7 \pm 0.9$	95	²⁰⁸ SCHAEEL	05C	ALEP	1991–1995 LEP runs
$1.7 \pm 0.2 \pm 0.2$	231	ANASTASSOV	01	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$2.7 \pm 1.8 \pm 0.9$	23	ACKERSTAFF	99E	OPAL	1991–1995 LEP runs

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.8 \pm 0.7 \pm 1.2$	18	BUSKULIC	96	ALEP	Repl. by SCHAEEL 05C
$1.9 \pm 0.4 \pm 0.4$	31	GIBAUT	94B	CLEO	Repl. by ANAS-TASSOV 01

5.1 ± 2.2	6	BYLSMA	87	HRS	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$
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6.7 ± 3.0	5	²⁰⁹ BELTRAMI	85	HRS	Repl. by BYLSMA 87
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²⁰⁷ See footnote to ABDALLAH 06A $\Gamma(\tau^- \rightarrow h^- \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

²⁰⁸ SCHAEEL 05C quote $(1.4 \pm 0.7 \pm 0.9) \times 10^{-4}$. We add 0.7×10^{-4} to remove their correction for $\tau^- \rightarrow \eta \pi^- \pi^+ \pi^- \nu_\tau \rightarrow 3\pi^- 2\pi^+ \pi^0 \nu_\tau$ and $\tau^- \rightarrow K^*(892)^- \eta \nu_\tau \rightarrow 3\pi^- 2\pi^+ \pi^0 \nu_\tau$ decays. See footnote to SCHAEEL 05C $\Gamma(\tau^- \rightarrow e^- \bar{\nu}_e \nu_\tau)/\Gamma_{\text{total}}$ measurement for correlations with other measurements.

²⁰⁹ The error quoted is statistical only.

$\Gamma(3h^- 2h^+ 2\pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{104}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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$< 3.4 \times 10^{-6}$	90	AUBERT,B	06	BABR 232 fb^{-1} $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.1 \times 10^{-4}$	90	GIBAUT	94B	CLEO $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
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$\Gamma((5\pi)^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{105}/Γ

$$\Gamma_{105}/\Gamma = (\Gamma_{30} + \Gamma_{47} + \Gamma_{77} + \Gamma_{102} + 0.553\Gamma_{124} + 0.888\Gamma_{146})/\Gamma$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE (%)	DOCUMENT ID	TECN	COMMENT
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0.76 ± 0.05 OUR FIT Error includes scale factor of 1.1.

0.61 ± 0.06 ± 0.08	avg	²¹⁰ GIBAUT	94B	CLEO $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
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²¹⁰ Not independent of GIBAUT 94B $B(3h^- 2h^+ \nu_\tau)$, PROCARIO 93 $B(h^- 4\pi^0 \nu_\tau)$, and BORTOLETTO 93 $B(2h^- h^+ 2\pi^0 \nu_\tau)/B(\text{“3prong”})$ measurements. Result is corrected for η contributions.

$\Gamma(4h^-3h^+ \geq 0 \text{ neutrals } \nu_\tau \text{ ("7-prong")})/\Gamma_{\text{total}}$ Γ_{106}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.0 \times 10^{-7}$	90	AUBERT,B	05F BABR	232 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.8 \times 10^{-5}$	95	ACKERSTAFF	97J OPAL	1990–1995 LEP runs
$<2.4 \times 10^{-6}$	90	EDWARDS	97B CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$<2.9 \times 10^{-4}$	90	BYLSMA	87 HRS	$E_{\text{cm}}^{ee} = 29$ GeV

$\Gamma(4h^-3h^+ \nu_\tau)/\Gamma_{\text{total}}$ Γ_{107}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.3 \times 10^{-7}$	90	AUBERT,B	05F BABR	232 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(4h^-3h^+ \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{108}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.5 \times 10^{-7}$	90	AUBERT,B	05F BABR	232 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(X^-(S=-1)\nu_\tau)/\Gamma_{\text{total}}$

$$\Gamma_{109}/\Gamma = (\Gamma_{10} + \Gamma_{16} + \Gamma_{23} + \Gamma_{28} + \Gamma_{35} + \Gamma_{40} + \Gamma_{85} + \Gamma_{89} + \Gamma_{126})/\Gamma$$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)		DOCUMENT ID	TECN	COMMENT
2.95 ± 0.07 OUR FIT	Error includes scale factor of 1.1.			
2.87 ± 0.12	avg	²¹¹ BARATE	99R ALEP	1991–1995 LEP runs

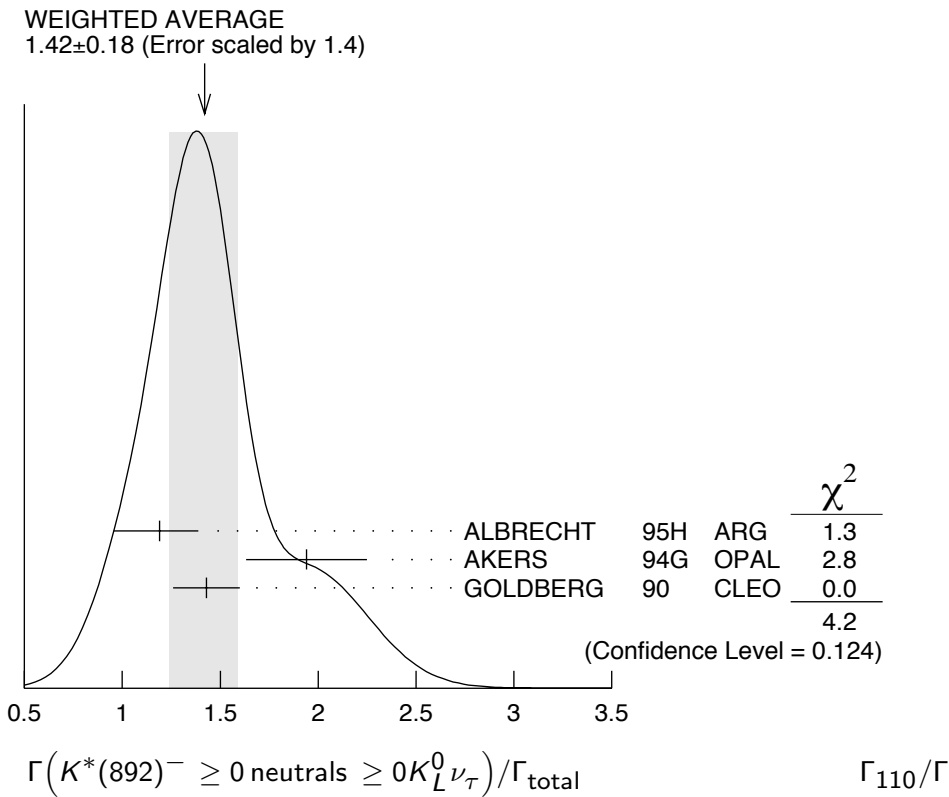
²¹¹BARATE 99R perform a combined analysis of all ALEPH LEP 1 data on τ branching fraction measurements for decay modes having total strangeness equal to -1 .

$\Gamma(K^*(892)^- \geq 0 \text{ neutrals } \geq 0 K_L^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{110}/Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.42 ± 0.18 OUR AVERAGE	Error includes scale factor of 1.4. See the ideogram below.			
$1.19 \pm 0.15^{+0.13}_{-0.18}$	104	ALBRECHT	95H ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
$1.94 \pm 0.27 \pm 0.15$	74	²¹² AKERS	94G OPAL	$E_{\text{cm}}^{ee} = 88\text{--}94$ GeV
$1.43 \pm 0.11 \pm 0.13$	475	²¹³ GOLDBERG	90 CLEO	$E_{\text{cm}}^{ee} = 9.4\text{--}10.9$ GeV

²¹²AKERS 94G reject events in which a K_S^0 accompanies the $K^*(892)^-$. We do not correct for them.

²¹³GOLDBERG 90 estimates that 10% of observed $K^*(892)$ are accompanied by a π^0 .



$\Gamma(K^*(892)^- \nu_\tau) / \Gamma_{\text{total}}$

Γ_{111} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.29 ± 0.05				OUR AVERAGE
1.326 ± 0.063		BARATE	99R	ALEP 1991–1995 LEP runs
1.11 ± 0.12		214 COAN	96	CLEO $E_{\text{cm}}^{ee} \approx 10.6$ GeV
1.42 ± 0.22 ± 0.09		215 ACCIARRI	95F	L3 1991–1993 LEP runs
1.23 ± 0.21 $\begin{smallmatrix} +0.11 \\ -0.21 \end{smallmatrix}$	54	216 ALBRECHT	88L	ARG $E_{\text{cm}}^{ee} = 10$ GeV
1.9 ± 0.3 ± 0.4	44	217 TSCHIRHART	88	HRS $E_{\text{cm}}^{ee} = 29$ GeV
1.5 ± 0.4 ± 0.4	15	218 AIHARA	87C	TPC $E_{\text{cm}}^{ee} = 29$ GeV
1.3 ± 0.3 ± 0.3	31	YELTON	86	MRK2 $E_{\text{cm}}^{ee} = 29$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.39 ± 0.09 ± 0.10		219 BUSKULIC	96	ALEP Repl. by BARATE 99R
1.45 ± 0.13 ± 0.11	273	220 BUSKULIC	94F	ALEP Repl. by BUSKULIC 96
1.7 ± 0.7	11	DORFAN	81	MRK2 $E_{\text{cm}}^{ee} = 4.2\text{--}6.7$ GeV

214 Not independent of COAN 96 $B(\pi^- \bar{K}^0 \nu_\tau)$ and BATTLE 94 $B(K^- \pi^0 \nu_\tau)$ measurements. $K\pi$ final states are consistent with and assumed to originate from $K^*(892)^-$ production.

215 This result is obtained from their $B(\pi^- \bar{K}^0 \nu_\tau)$ assuming all those decays originate in $K^*(892)^-$ decays.

216 The authors divide by $\Gamma_2 / \Gamma = 0.865$ to obtain this result.

217 Not independent of TSCHIRHART 88 $\Gamma(\tau^- \rightarrow h^- \bar{K}^0 \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau) / \Gamma(\text{total})$.

218 Decay π^- identified in this experiment, is assumed in the others.

219 Not independent of BUSKULIC 96 $B(\pi^- \bar{K}^0 \nu_\tau)$ and $B(K^- \pi^0 \nu_\tau)$ measurements.

220 BUSKULIC 94F obtain this result from BUSKULIC 94F $B(\bar{K}^0 \pi^- \nu_\tau)$ and BUSKULIC 94E $B(K^- \pi^0 \nu_\tau)$ assuming all of those decays originate in $K^*(892)^-$ decays.

$\Gamma(K^*(892)^- \nu_\tau) / \Gamma(\pi^- \pi^0 \nu_\tau)$ $\Gamma_{111} / \Gamma_{14}$

VALUE		DOCUMENT ID	TECN	COMMENT
0.075 ± 0.027	221	ABREU	94K	DLPH LEP 1992 Z data

221 ABREU 94K quote $B(\tau^- \rightarrow K^*(892)^- \nu_\tau) B(K^*(892)^- \rightarrow K^- \pi^0) / B(\tau^- \rightarrow \rho^- \nu_\tau) = 0.025 \pm 0.009$. We divide by $B(K^*(892)^- \rightarrow K^- \pi^0) = 0.333$ to obtain this result.

$\Gamma(K^*(892)^0 K^- \geq 0 \text{ neutrals } \nu_\tau) / \Gamma_{\text{total}}$ Γ_{112} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.32 ± 0.08 ± 0.12	119	GOLDBERG	90	CLEO $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$

$\Gamma(K^*(892)^0 K^- \nu_\tau) / \Gamma_{\text{total}}$ Γ_{113} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.21 ± 0.04 OUR AVERAGE				

0.213 ± 0.048	222	BARATE	98	ALEP 1991–1995 LEP runs
0.20 ± 0.05 ± 0.04	47	ALBRECHT	95H	ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

222 BARATE 98 measure the $K^- (\rho^0 \rightarrow \pi^+ \pi^-)$ fraction in $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ decays to be $(35 \pm 11)\%$ and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$ assuming the intermediate states are all $K^- \rho$ and $K^- K^*(892)^0$.

$\Gamma(\bar{K}^*(892)^0 \pi^- \geq 0 \text{ neutrals } \nu_\tau) / \Gamma_{\text{total}}$ Γ_{114} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.38 ± 0.11 ± 0.13	105	GOLDBERG	90	CLEO $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.9 \text{ GeV}$

$\Gamma(\bar{K}^*(892)^0 \pi^- \nu_\tau) / \Gamma_{\text{total}}$ Γ_{115} / Γ

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.22 ± 0.05 OUR AVERAGE				

0.209 ± 0.058	223	BARATE	98	ALEP 1991–1995 LEP runs
0.25 ± 0.10 ± 0.05	27	ALBRECHT	95H	ARG $E_{\text{cm}}^{\text{ee}} = 9.4\text{--}10.6 \text{ GeV}$

223 BARATE 98 measure the $K^- K^*(892)^0$ fraction in $\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau$ decays to be $(87 \pm 13)\%$ and derive this result from their measurement of $\Gamma(\tau^- \rightarrow K^- K^+ \pi^- \nu_\tau) / \Gamma_{\text{total}}$.

$\Gamma((\bar{K}^*(892)\pi)^- \nu_\tau \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau) / \Gamma_{\text{total}}$ Γ_{116} / Γ

VALUE (%)	DOCUMENT ID	TECN	COMMENT
0.10 ± 0.04 OUR AVERAGE			

0.097 ± 0.044 ± 0.036	224	BARATE	99K	ALEP 1991–1995 LEP runs
0.106 ± 0.037 ± 0.032	225	BARATE	98E	ALEP 1991–1995 LEP runs

224 BARATE 99K measure K^0 's by detecting K_L^0 's in their hadron calorimeter. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.72 \pm 0.12 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by one minus this fraction to obtain the quoted result.

225 BARATE 98E reconstruct K^0 's using $K_S^0 \rightarrow \pi^+ \pi^-$ decays. They determine the $\bar{K}^0 \rho^-$ fraction in $\tau^- \rightarrow \pi^- \bar{K}^0 \pi^0 \nu_\tau$ decays to be $(0.64 \pm 0.09 \pm 0.10)$ and multiply their $B(\pi^- \bar{K}^0 \pi^0 \nu_\tau)$ measurement by one minus this fraction to obtain the quoted result.

$\Gamma(K_1(1270)^- \nu_\tau)/\Gamma_{\text{total}}$				Γ_{117}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.47±0.11 OUR AVERAGE				
0.48±0.11		BARATE	99R ALEP	1991–1995 LEP runs
0.41 ^{+0.41} _{-0.35} ±0.10	5	²²⁶ BAUER	94 TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

²²⁶We multiply 0.41% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$\Gamma(K_1(1400)^- \nu_\tau)/\Gamma_{\text{total}}$				Γ_{118}/Γ
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
0.17±0.26 OUR AVERAGE Error includes scale factor of 1.7.				
0.05±0.17		BARATE	99R ALEP	1991–1995 LEP runs
0.76 ^{+0.40} _{-0.33} ±0.20	11	²²⁷ BAUER	94 TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

²²⁷We multiply 0.76% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error.

$[\Gamma(K_1(1270)^- \nu_\tau) + \Gamma(K_1(1400)^- \nu_\tau)]/\Gamma_{\text{total}}$				$(\Gamma_{117} + \Gamma_{118})/\Gamma$
VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.17^{+0.41}_{-0.37}±0.29				
	16	²²⁸ BAUER	94 TPC	$E_{\text{cm}}^{ee} = 29 \text{ GeV}$

²²⁸We multiply 1.17% by 0.25, the relative systematic error quoted by BAUER 94, to obtain the systematic error. Not independent of BAUER 94 $B(K_1(1270)^- \nu_\tau)$ and BAUER 94 $B(K_1(1400)^- \nu_\tau)$ measurements.

$\Gamma(K_1(1270)^- \nu_\tau)/[\Gamma(K_1(1270)^- \nu_\tau) + \Gamma(K_1(1400)^- \nu_\tau)]$				$\Gamma_{117}/(\Gamma_{117} + \Gamma_{118})$
VALUE		DOCUMENT ID	TECN	COMMENT
0.69±0.15 OUR AVERAGE				
0.71±0.16±0.11		²²⁹ ABBIENDI	00D OPAL	1990–1995 LEP runs
0.66±0.19±0.13		²³⁰ ASNER	00B CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

²²⁹ABBIENDI 00D assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ decays is dominated by the $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

²³⁰ASNER 00B assume the resonance structure of $\tau^- \rightarrow K^- \pi^+ \pi^- \nu_\tau$ (ex. K^0) decays is dominated by $K_1(1270)^-$ and $K_1(1400)^-$ resonances.

$\Gamma(K^*(1410)^- \nu_\tau)/\Gamma_{\text{total}}$				Γ_{119}/Γ
VALUE (units 10^{-3})		DOCUMENT ID	TECN	COMMENT
1.5^{+1.4}_{-1.0}				
		BARATE	99R ALEP	1991–1995 LEP runs

$\Gamma(K_0^*(1430)^- \nu_\tau)/\Gamma_{\text{total}}$				Γ_{120}/Γ
VALUE (units 10^{-3})	CL%	DOCUMENT ID	TECN	COMMENT
<0.5				
	95	BARATE	99R ALEP	1991–1995 LEP runs

$\Gamma(K_2^*(1430)^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{121}/Γ

VALUE (%)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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<0.3	95		TSCHIRHART 88	HRS	$E_{\text{cm}}^{ee} = 29$ GeV
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••• We do not use the following data for averages, fits, limits, etc. •••

<0.33	95		²³¹ ACCIARRI	95F L3	1991–1993 LEP runs
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<0.9	95	0	DORFAN	81 MRK2	$E_{\text{cm}}^{ee} = 4.2\text{--}6.7$ GeV
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²³¹ ACCIARRI 95F quote $B(\tau^- \rightarrow K^*(1430)^- \rightarrow \pi^- \bar{K}^0 \nu_\tau) < 0.11\%$. We divide by $B(K^*(1430)^- \rightarrow \pi^- \bar{K}^0) = 0.33$ to obtain the limit shown.

$\Gamma(a_0(980)^- \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}} \times B(a_0(980) \rightarrow K^0 K^-)$ $\Gamma_{122}/\Gamma \times B$

VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT
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<2.8	90	GOLDBERG 90	CLEO	$E_{\text{cm}}^{ee} = 9.4\text{--}10.9$ GeV
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$\Gamma(\eta\pi^- \nu_\tau)/\Gamma_{\text{total}}$ Γ_{123}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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< 1.4	95	0	BARTELT	96 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
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••• We do not use the following data for averages, fits, limits, etc. •••

< 6.2	95		BUSKULIC	97C ALEP	1991–1994 LEP runs
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< 3.4	95		ARTUSO	92 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
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< 90	95		ALBRECHT	88M ARG	$E_{\text{cm}}^{ee} \approx 10$ GeV
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<140	90		BEHREND	88 CELL	$E_{\text{cm}}^{ee} = 14\text{--}46.8$ GeV
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<180	95		BARINGER	87 CLEO	$E_{\text{cm}}^{ee} = 10.5$ GeV
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<250	90	0	COFFMAN	87 MRK3	$E_{\text{cm}}^{ee} = 3.77$ GeV
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510 $\pm 100 \pm 120$		65	DERRICK	87 HRS	$E_{\text{cm}}^{ee} = 29$ GeV
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<100	95		GAN	87B MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
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$\Gamma(\eta\pi^- \pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{124}/Γ

VALUE (%)	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
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0.177 \pm 0.024 OUR FIT

0.173 \pm 0.024 OUR AVERAGE

0.18 $\pm 0.04 \pm 0.02$

BUSKULIC	97C ALEP	1991–1994 LEP runs
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0.17 $\pm 0.02 \pm 0.02$	125	ARTUSO	92 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
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••• We do not use the following data for averages, fits, limits, etc. •••

<1.10	95		ALBRECHT	88M ARG	$E_{\text{cm}}^{ee} \approx 10$ GeV
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<2.10	95		BARINGER	87 CLEO	$E_{\text{cm}}^{ee} = 10.5$ GeV
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4.20 $\begin{smallmatrix} +0.70 \\ -1.20 \end{smallmatrix} \pm 1.60$		²³² GAN	87 MRK2	$E_{\text{cm}}^{ee} = 29$ GeV
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²³² Highly correlated with GAN 87 $\Gamma(\pi^- 3\pi^0 \nu_\tau)/\Gamma(\text{total})$ value.

$\Gamma(\eta\pi^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ Γ_{125}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
1.5±0.5		30	233 ANASTASSOV 01	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.4±0.6±0.3		15	234 BERGFELD	97 CLEO	Repl. by ANASTASSOV 01
< 4.3	95		ARTUSO	92 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
<120	95		ALBRECHT	88M ARG	$E_{\text{cm}}^{ee} \approx 10$ GeV

233 Weighted average of BERGFELD 97 and ANASTASSOV 01 value of $(1.5 \pm 0.6 \pm 0.3) \times 10^{-4}$ obtained using η 's reconstructed from $\eta \rightarrow \pi^+\pi^-\pi^0$ decays.

234 BERGFELD 97 reconstruct η 's using $\eta \rightarrow \gamma\gamma$ decays.

$\Gamma(\eta K^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{126}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
2.7±0.6 OUR FIT					
2.7±0.6 OUR AVERAGE					
2.9 ^{+1.3} _{-1.2} ±0.7			BUSKULIC	97C ALEP	1991–1994 LEP runs
2.6±0.5±0.5	85		BARTELT	96 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<4.7	95		ARTUSO	92 CLEO	$E_{\text{cm}}^{ee} \approx 10.6$ GeV

$\Gamma(\eta K^*(892)^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{127}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.90±0.80±0.42	25	BISHAI	99 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\eta K^-\pi^0\nu_\tau)/\Gamma_{\text{total}}$ Γ_{128}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
1.77±0.56±0.71	36	BISHAI	99 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\eta\bar{K}^0\pi^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{129}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.20±0.70±0.22	15	235 BISHAI	99 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

235 We multiply the BISHAI 99 measurement $B(\tau^- \rightarrow \eta K_S^0 \pi^- \nu_\tau) = (1.10 \pm 0.35 \pm 0.11) \times 10^{-4}$ by 2 to obtain the listed value.

$\Gamma(\eta\pi^+\pi^-\pi^-\geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{130}/Γ

VALUE (%)	CL%	DOCUMENT ID	TECN	COMMENT
<0.3	90	ABACHI	87B HRS	$E_{\text{cm}}^{ee} = 29$ GeV

$\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{131}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
2.3±0.5	170	236 ANASTASSOV 01	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.4 ^{+0.6} _{-0.5} ±0.6	89	237 BERGFELD	97 CLEO	Repl. by ANASTASSOV 01

²³⁶ Weighted average of BERGFELD 97 and ANASTASSOV 01 measurements using η 's reconstructed from $\eta \rightarrow \pi^+ \pi^- \pi^0$ and $\eta \rightarrow 3\pi^0$ decays.

²³⁷ BERGFELD 97 reconstruct η 's using $\eta \rightarrow \gamma\gamma$ and $\eta \rightarrow 3\pi^0$ decays.

$\Gamma(\eta a_1(1260)^- \nu_\tau \rightarrow \eta \pi^- \rho^0 \nu_\tau) / \Gamma_{\text{total}}$					Γ_{132} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 3.9 \times 10^{-4}$	90	BERGFELD 97	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	

$\Gamma(\eta \eta \pi^- \nu_\tau) / \Gamma_{\text{total}}$					Γ_{133} / Γ
VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT	
< 1.1	95	ARTUSO 92	CLEO	$E_{\text{cm}}^{ee} \approx 10.6 \text{ GeV}$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 83	95	ALBRECHT 88M	ARG	$E_{\text{cm}}^{ee} \approx 10 \text{ GeV}$	
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$\Gamma(\eta \eta \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$					Γ_{134} / Γ
VALUE (units 10^{-4})	CL%	DOCUMENT ID	TECN	COMMENT	
< 2.0	95	ARTUSO 92	CLEO	$E_{\text{cm}}^{ee} \approx 10.6 \text{ GeV}$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 90	95	ALBRECHT 88M	ARG	$E_{\text{cm}}^{ee} \approx 10 \text{ GeV}$	
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$\Gamma(\eta'(958) \pi^- \nu_\tau) / \Gamma_{\text{total}}$					Γ_{135} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 7.4 \times 10^{-5}$	90	BERGFELD 97	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	

$\Gamma(\eta'(958) \pi^- \pi^0 \nu_\tau) / \Gamma_{\text{total}}$					Γ_{136} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 8.0 \times 10^{-5}$	90	BERGFELD 97	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	

$\Gamma(\phi \pi^- \nu_\tau) / \Gamma_{\text{total}}$					Γ_{137} / Γ
VALUE	CL%	DOCUMENT ID	TECN	COMMENT	
$< 2.0 \times 10^{-4}$	90	²³⁸ AVERY 97	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 3.5 \times 10^{-4}$	90	ALBRECHT 95H	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6 \text{ GeV}$	
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²³⁸ AVERY 97 limit varies from $(1.2\text{--}2.0) \times 10^{-4}$ depending on decay model assumptions.

$\Gamma(\phi K^- \nu_\tau) / \Gamma_{\text{total}}$					Γ_{138} / Γ
VALUE (units 10^{-5})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$4.05 \pm 0.25 \pm 0.26$		551	INAMI 06	BELL	$401 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

< 6.7	90	²³⁹ AVERY 97	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	
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²³⁹ AVERY 97 limit varies from $(5.4\text{--}6.7) \times 10^{-5}$ depending on decay model assumptions.

$\Gamma(f_1(1285)\pi^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{139}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
4.1±0.8 OUR AVERAGE				
3.9±0.7±0.5	1.4k	²⁴⁰ AUBERT,B	05W BABR	232 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
5.8 ^{+1.4} _{-1.3} ±1.8	54	²⁴¹ BERGFELD	97 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

²⁴⁰AUBERT,B 05W use the $f_1(1285) \rightarrow 2\pi^+2\pi^-$ decay mode.

²⁴¹BERGFELD 97 use the $f_1(1285) \rightarrow \eta\pi^+\pi^-$ decay mode.

$\Gamma(f_1(1285)\pi^-\nu_\tau \rightarrow \eta\pi^-\pi^+\pi^-\nu_\tau)/\Gamma(\eta\pi^-\pi^+\pi^-\nu_\tau)$ $\Gamma_{140}/\Gamma_{131}$

VALUE	DOCUMENT ID	TECN	COMMENT
0.55±0.14	BERGFELD	97 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\pi(1300)^-\nu_\tau \rightarrow (\rho\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{141}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.0 × 10⁻⁴	90	ASNER	00 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\pi(1300)^-\nu_\tau \rightarrow ((\pi\pi)_{S\text{-wave}}\pi)^-\nu_\tau \rightarrow (3\pi)^-\nu_\tau)/\Gamma_{\text{total}}$ Γ_{142}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<1.9 × 10⁻⁴	90	ASNER	00 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(h^-\omega \geq 0 \text{ neutrals } \nu_\tau)/\Gamma_{\text{total}}$ Γ_{143}/Γ
 $\Gamma_{143}/\Gamma = (\Gamma_{144} + \Gamma_{146})/\Gamma$

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
2.39±0.09 OUR FIT				Error includes scale factor of 1.2.
1.65±0.3 ±0.2 avg	1513	ALBRECHT	88M ARG	$E_{\text{cm}}^{ee} \approx 10$ GeV

$\Gamma(h^-\omega\nu_\tau)/\Gamma_{\text{total}}$ Γ_{144}/Γ

Data marked "avg" are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. "f&a" marks results used for the fit and the average.

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
1.99±0.08 OUR FIT				Error includes scale factor of 1.2.
1.92±0.07 OUR AVERAGE				
1.91±0.07±0.06	f&a	5803	BUSKULIC	97C ALEP 1991–1994 LEP runs
1.95±0.07±0.11	avg	2223	²⁴² BALEST	95C CLEO $E_{\text{cm}}^{ee} \approx 10.6$ GeV
1.60±0.27±0.41	f&a	139	BARINGER	87 CLEO $E_{\text{cm}}^{ee} = 10.5$ GeV

²⁴²Not independent of BALEST 95C $B(\tau^- \rightarrow h^-\omega\nu_\tau)/B(\tau^- \rightarrow h^-h^+\pi^0\nu_\tau)$ value.

$$\frac{\Gamma(h^- \omega \nu_\tau)}{\Gamma(h^- h^- h^+ \pi^0 \nu_\tau \text{ (ex. } K^0\text{)})} \quad \Gamma_{144}/\Gamma_{66}$$

$$\Gamma_{144}/\Gamma_{66} = \Gamma_{144}/(\Gamma_{70} + \Gamma_{89} + \Gamma_{94} + 0.226\Gamma_{126} + 0.888\Gamma_{144} + 0.017\Gamma_{146})$$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.437 ± 0.017 OUR FIT Error includes scale factor of 1.2.

0.453 ± 0.019 OUR AVERAGE

0.431 ± 0.033	2350	²⁴³ BUSKULIC	96	ALEP LEP 1991–1993 data
0.464 ± 0.016 ± 0.017	2223	²⁴⁴ BALEST	95C	CLEO $E_{cm}^{ee} \approx 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.37 ± 0.05 ± 0.02	458	²⁴⁵ ALBRECHT	91D	ARG $E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
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²⁴³ BUSKULIC 96 quote the fraction of $\tau \rightarrow h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0) decays which originate in a $h^- \omega$ final state = 0.383 ± 0.029 . We divide this by the $\omega(782) \rightarrow \pi^+ \pi^- \pi^0$ branching fraction (0.888).

²⁴⁴ BALEST 95C quote the fraction of $\tau^- \rightarrow h^- h^- h^+ \pi^0 \nu_\tau$ (ex. K^0) decays which originate in a $h^- \omega$ final state equals $0.412 \pm 0.014 \pm 0.015$. We divide this by the $\omega(782) \rightarrow \pi^+ \pi^- \pi^0$ branching fraction (0.888).

²⁴⁵ ALBRECHT 91D quote the fraction of $\tau^- \rightarrow h^- h^- h^+ \pi^0 \nu_\tau$ decays which originate in a $\pi^- \omega$ final state equals $0.33 \pm 0.04 \pm 0.02$. We divide this by the $\omega(782) \rightarrow \pi^+ \pi^- \pi^0$ branching fraction (0.888).

$$\frac{\Gamma(K^- \omega \nu_\tau)}{\Gamma_{\text{total}}} \quad \Gamma_{145}/\Gamma$$

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
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4.1 ± 0.6 ± 0.7	500	ARMS	05	CLE3 7.6 fb^{-1} , $E_{cm}^{ee} = 10.6$ GeV
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$$\frac{\Gamma(h^- \omega \pi^0 \nu_\tau)}{\Gamma_{\text{total}}} \quad \Gamma_{146}/\Gamma$$

VALUE (%)	EVTS	DOCUMENT ID	TECN	COMMENT
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0.41 ± 0.04 OUR FIT

0.43 ± 0.06 ± 0.05	7283	BUSKULIC	97C	ALEP 1991–1994 LEP runs
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$$\frac{\Gamma(h^- \omega \pi^0 \nu_\tau)}{\Gamma(h^- h^- h^+ \geq 0 \text{ neutrals} \geq 0 K_L^0 \nu_\tau)} \quad \Gamma_{146}/\Gamma_{54}$$

$$\Gamma_{146}/\Gamma_{54} = \Gamma_{146}/(\Gamma_{35} + 0.3431\Gamma_{37} + 0.3431\Gamma_{40} + 0.3431\Gamma_{42} + 0.4307\Gamma_{47} + 0.6861\Gamma_{48} + \Gamma_{62} + \Gamma_{70} + \Gamma_{77} + \Gamma_{78} + \Gamma_{85} + \Gamma_{89} + \Gamma_{93} + \Gamma_{94} + 0.285\Gamma_{124} + 0.285\Gamma_{126} + 0.9101\Gamma_{144} + 0.9101\Gamma_{146})$$

Data marked “avg” are highly correlated with data appearing elsewhere in the Listings, and are therefore used for the average given below but not in the overall fits. “f&a” marks results used for the fit and the average.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.0267 ± 0.0028 OUR FIT

0.028 ± 0.003 ± 0.003	avg	430	²⁴⁶ BORTOLETTO93	CLEO $E_{cm}^{ee} \approx 10.6$ GeV
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²⁴⁶ Not independent of BORTOLETTO 93 $\Gamma(\tau^- \rightarrow h^- h^- h^+ 2\pi^0 \nu_\tau \text{ (ex. } K^0\text{)})$ value.

$$\frac{\Gamma(h^- \omega \pi^0 \nu_\tau)}{\Gamma(h^- h^- h^+ 2\pi^0 \nu_\tau \text{ (ex. } K^0\text{)})} \quad \Gamma_{146}/\Gamma_{76}$$

$$\Gamma_{146}/\Gamma_{76} = \Gamma_{146}/(\Gamma_{77} + 0.226\Gamma_{124} + 0.888\Gamma_{146})$$

VALUE	DOCUMENT ID	TECN	COMMENT
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0.83 ± 0.08 OUR FIT

0.81 ± 0.06 ± 0.06	BORTOLETTO93	CLEO	$E_{cm}^{ee} \approx 10.6$ GeV
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$\Gamma(h^- \omega 2\pi^0 \nu_\tau)/\Gamma_{\text{total}}$ Γ_{147}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.4 \pm 0.4 \pm 0.3$	53	ANASTASSOV 01	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$1.89^{+0.74}_{-0.67} \pm 0.40$	19	ANDERSON 97	CLEO	Repl. by ANASTASSOV 01
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$\Gamma(h^- 2\omega \nu_\tau)/\Gamma_{\text{total}}$ Γ_{148}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5.4 \times 10^{-7}$	90	AUBERT,B 06	BABR	232 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

$\Gamma(2h^- h^+ \omega \nu_\tau)/\Gamma_{\text{total}}$ Γ_{149}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID	TECN	COMMENT
$1.2 \pm 0.2 \pm 0.1$	110	ANASTASSOV 01	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

$\Gamma(e^- \gamma)/\Gamma_{\text{total}}$ Γ_{150}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.1 \times 10^{-7}$	90	AUBERT 06C	BABR	232 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 3.9 \times 10^{-7}$	90	HAYASAKA 05	BELL	86.7 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 2.7 \times 10^{-6}$	90	EDWARDS 97	CLEO	
$< 1.1 \times 10^{-4}$	90	ABREU 95U	DLPH	1990–1993 LEP runs
$< 1.2 \times 10^{-4}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 2.0 \times 10^{-4}$	90	KEH 88	CBAL	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 6.4 \times 10^{-4}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee} = 3.8\text{--}6.8 \text{ GeV}$

$\Gamma(\mu^- \gamma)/\Gamma_{\text{total}}$ Γ_{151}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 6.8 \times 10^{-8}$	90	AUBERT,B 05A	BABR	232 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 3.1 \times 10^{-7}$	90	ABE 04B	BELL	86.3 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 1.1 \times 10^{-6}$	90	AHMED 00	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 3.0 \times 10^{-6}$	90	EDWARDS 97	CLEO	
$< 6.2 \times 10^{-5}$	90	ABREU 95U	DLPH	1990–1993 LEP runs
$< 0.42 \times 10^{-5}$	90	BEAN 93	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 3.4 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 55 \times 10^{-5}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee} = 3.8\text{--}6.8 \text{ GeV}$

$\Gamma(e^- \pi^0)/\Gamma_{\text{total}}$ Γ_{152}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 8.0 \times 10^{-8}$	90	MIYAZAKI 07	BELL	401 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
••• We do not use the following data for averages, fits, limits, etc. •••				
$< 1.3 \times 10^{-7}$	90	AUBERT 07i	BABR	339 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 1.9 \times 10^{-7}$	90	ENARI 05	BELL	154 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 3.7 \times 10^{-6}$	90	BONVICINI 97	CLEO	$E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 17 \times 10^{-5}$	90	ALBRECHT 92k	ARG	$E_{\text{cm}}^{ee}=10 \text{ GeV}$
$< 14 \times 10^{-5}$	90	KEH 88	CBAL	$E_{\text{cm}}^{ee}=10 \text{ GeV}$
$< 210 \times 10^{-5}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee}=3.8\text{--}6.8 \text{ GeV}$

$\Gamma(\mu^- \pi^0)/\Gamma_{\text{total}}$ Γ_{153}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.1 \times 10^{-7}$	90	AUBERT 07i	BABR	339 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
••• We do not use the following data for averages, fits, limits, etc. •••				
$< 1.2 \times 10^{-7}$	90	MIYAZAKI 07	BELL	401 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 4.1 \times 10^{-7}$	90	ENARI 05	BELL	154 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 4.0 \times 10^{-6}$	90	BONVICINI 97	CLEO	$E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 4.4 \times 10^{-5}$	90	ALBRECHT 92k	ARG	$E_{\text{cm}}^{ee}=10 \text{ GeV}$
$< 82 \times 10^{-5}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee}=3.8\text{--}6.8 \text{ GeV}$

$\Gamma(e^- K_S^0)/\Gamma_{\text{total}}$ Γ_{154}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 5.6 \times 10^{-8}$	90	MIYAZAKI 06A	BELL	281 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
••• We do not use the following data for averages, fits, limits, etc. •••				
$< 9.1 \times 10^{-7}$	90	CHEN 02c	CLEO	$E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 1.3 \times 10^{-3}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee}=3.8\text{--}6.8 \text{ GeV}$

$\Gamma(\mu^- K_S^0)/\Gamma_{\text{total}}$ Γ_{155}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 4.9 \times 10^{-8}$	90	MIYAZAKI 06A	BELL	281 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
••• We do not use the following data for averages, fits, limits, etc. •••				
$< 9.5 \times 10^{-7}$	90	CHEN 02c	CLEO	$E_{\text{cm}}^{ee}=10.6 \text{ GeV}$
$< 1.0 \times 10^{-3}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee}=3.8\text{--}6.8 \text{ GeV}$

$\Gamma(e^- \eta)/\Gamma_{\text{total}}$ Γ_{156}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 9.2 \times 10^{-8}$	90	MIYAZAKI 07	BELL	401 fb^{-1} , $E_{\text{cm}}^{ee}=10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.6 \times 10^{-7}$	90	AUBERT	07i	BABR	339 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV
$< 2.4 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV
$< 8.2 \times 10^{-6}$	90	BONVICINI	97	CLEO	$E_{cm}^{ee}=10.6$ GeV
$< 6.3 \times 10^{-5}$	90	ALBRECHT	92k	ARG	$E_{cm}^{ee}=10$ GeV
$< 24 \times 10^{-5}$	90	KEH	88	CBAL	$E_{cm}^{ee}=10$ GeV

$\Gamma(\mu^- \eta)/\Gamma_{total}$

Γ_{157}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 6.5 \times 10^{-8}$	90	MIYAZAKI	07	BELL 401 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 1.5 \times 10^{-7}$	90	AUBERT	07i	BABR	339 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV
$< 1.5 \times 10^{-7}$	90	ENARI	05	BELL	154 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV
$< 3.4 \times 10^{-7}$	90	ENARI	04	BELL	84.3 fb^{-1} , $E_{cm}^{ee}=10.6$ GeV
$< 9.6 \times 10^{-6}$	90	BONVICINI	97	CLEO	$E_{cm}^{ee}=10.6$ GeV
$< 7.3 \times 10^{-5}$	90	ALBRECHT	92k	ARG	$E_{cm}^{ee}=10$ GeV

$\Gamma(e^- \rho^0)/\Gamma_{total}$

Γ_{158}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 6.5 \times 10^{-7}$	90	YUSA	06	BELL 158 fb^{-1} $E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.0 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{cm}^{ee}=10.6$ GeV
$< 4.2 \times 10^{-6}$	90	²⁴⁷ BARTELT	94	CLEO	Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92k	ARG	$E_{cm}^{ee}=10$ GeV
$< 37 \times 10^{-5}$	90	HAYES	82	MRK2	$E_{cm}^{ee}=3.8-6.8$ GeV

²⁴⁷ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \rho^0)/\Gamma_{total}$

Γ_{159}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb^{-1} $E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 6.3 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{cm}^{ee}=10.6$ GeV
$< 5.7 \times 10^{-6}$	90	²⁴⁸ BARTELT	94	CLEO	Repl. by BLISS 98
$< 2.9 \times 10^{-5}$	90	ALBRECHT	92k	ARG	$E_{cm}^{ee}=10$ GeV
$< 44 \times 10^{-5}$	90	HAYES	82	MRK2	$E_{cm}^{ee}=3.8-6.8$ GeV

²⁴⁸ BARTELT 94 assume phase space decays.

$\Gamma(e^- K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{160}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<5.1 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
$<6.3 \times 10^{-6}$	90	²⁴⁹ BARTELT	94	CLEO Repl. by BLISS 98
$<3.8 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{ee} = 10$ GeV

²⁴⁹ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- K^*(892)^0)/\Gamma_{\text{total}}$ Γ_{161}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.9 \times 10^{-7}$	90	YUSA	06	BELL 158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<7.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
$<9.4 \times 10^{-6}$	90	²⁵⁰ BARTELT	94	CLEO Repl. by BLISS 98
$<4.5 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{ee} = 10$ GeV

²⁵⁰ BARTELT 94 assume phase space decays.

$\Gamma(e^- \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{162}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<7.4 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
$<1.1 \times 10^{-5}$	90	²⁵¹ BARTELT	94	CLEO Repl. by BLISS 98

²⁵¹ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \bar{K}^*(892)^0)/\Gamma_{\text{total}}$ Γ_{163}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.0 \times 10^{-7}$	90	YUSA	06	BELL 158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<7.5 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV
$<8.7 \times 10^{-6}$	90	²⁵² BARTELT	94	CLEO Repl. by BLISS 98

²⁵² BARTELT 94 assume phase space decays.

$\Gamma(e^- \eta'(958))/\Gamma_{\text{total}}$ Γ_{164}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.6 \times 10^{-7}$	90	MIYAZAKI	07	BELL 401 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.4 \times 10^{-7}$	90	AUBERT	07I	BABR 339 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
$< 10. \times 10^{-7}$	90	ENARI	05	BELL 154 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \eta'(958))/\Gamma_{\text{total}}$ Γ_{165}/Γ

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 1.3 \times 10^{-7}$	90	MIYAZAKI 07	BELL	401 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 1.4 \times 10^{-7}$	90	AUBERT 071	BABR	339 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6$ GeV
$< 4.7 \times 10^{-7}$	90	ENARI 05	BELL	154 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- \phi)/\Gamma_{\text{total}}$ Γ_{166}/Γ
 Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 7.3 \times 10^{-7}$	90	YUSA 06	BELL	158 fb^{-1} $E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 6.9 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \phi)/\Gamma_{\text{total}}$ Γ_{167}/Γ
 Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 7.7 \times 10^{-7}$	90	YUSA 06	BELL	158 fb^{-1} $E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 7.0 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- e^+ e^-)/\Gamma_{\text{total}}$ Γ_{168}/Γ
 Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.0 \times 10^{-7}$	90	AUBERT 04J	BABR	91.5 fb^{-1} $E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 3.5 \times 10^{-7}$	90	YUSA 04	BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6$ GeV
$< 2.9 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$< 0.33 \times 10^{-5}$	90	²⁵³ BARTELT 94	CLEO	Repl. by BLISS 98
$< 1.3 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10$ GeV
$< 2.7 \times 10^{-5}$	90	BOWCOCK 90	CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$
$< 40 \times 10^{-5}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee} = 3.8-6.8$ GeV

²⁵³BARTELT 94 assume phase space decays.

$\Gamma(e^- \mu^+ \mu^-)/\Gamma_{\text{total}}$ Γ_{169}/Γ
 Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.0 \times 10^{-7}$	90	YUSA 04	BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 3.3 \times 10^{-7}$	90	AUBERT 04J	BABR	91.5 fb^{-1} $E_{\text{cm}}^{ee} = 10.6$ GeV
$< 1.8 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$< 0.36 \times 10^{-5}$	90	²⁵⁴ BARTELT 94	CLEO	Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10$ GeV
$< 2.7 \times 10^{-5}$	90	BOWCOCK 90	CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$
$< 33 \times 10^{-5}$	90	HAYES 82	MRK2	$E_{\text{cm}}^{ee} = 3.8-6.8$ GeV

²⁵⁴ BARTELT 94 assume phase space decays.

$\Gamma(e^+ \mu^- \mu^-)/\Gamma_{\text{total}}$ **Γ_{170}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.3 \times 10^{-7}$	90	AUBERT	04J BABR	$91.5 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<2.0 \times 10^{-7}$	90	YUSA	04 BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<1.5 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<0.35 \times 10^{-5}$	90	²⁵⁵ BARTELT	94 CLEO	Repl. by BLISS 98
$<1.8 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<1.6 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁵⁵ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- e^+ e^-)/\Gamma_{\text{total}}$ **Γ_{171}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.9 \times 10^{-7}$	90	YUSA	04 BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<2.7 \times 10^{-7}$	90	AUBERT	04J BABR	$91.5 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<1.7 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<0.34 \times 10^{-5}$	90	²⁵⁶ BARTELT	94 CLEO	Repl. by BLISS 98
$<1.4 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<2.7 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$
$<44 \times 10^{-5}$	90	HAYES	82 MRK2	$E_{\text{cm}}^{ee} = 3.8\text{--}6.8 \text{ GeV}$

²⁵⁶ BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ e^- e^-)/\Gamma_{\text{total}}$ **Γ_{172}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.1 \times 10^{-7}$	90	AUBERT	04J BABR	$91.5 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<2.0 \times 10^{-7}$	90	YUSA	04 BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<1.5 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<0.34 \times 10^{-5}$	90	²⁵⁷ BARTELT	94 CLEO	Repl. by BLISS 98
$<1.4 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<1.6 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁵⁷ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \mu^+ \mu^-)/\Gamma_{\text{total}}$ **Γ_{173}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 1.9 \times 10^{-7}$	90	AUBERT	04J BABR	91.5 fb^{-1} $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.0 \times 10^{-7}$	90	YUSA	04 BELL	87.1 fb^{-1} at $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 0.43 \times 10^{-5}$	90	²⁵⁸ BARTELT	94 CLEO	Repl. by BLISS 98
$< 1.9 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 1.7 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$
$< 49 \times 10^{-5}$	90	HAYES	82 MRK2	$E_{\text{cm}}^{ee} = 3.8\text{--}6.8 \text{ GeV}$

²⁵⁸ BARTELT 94 assume phase space decays.

$\Gamma(e^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ **Γ_{174}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 1.2 \times 10^{-7}$	90	AUBERT, BE	05D BABR	221 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 7.3 \times 10^{-7}$	90	YUSA	06 BELL	158 fb^{-1} $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 2.2 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 4.4 \times 10^{-6}$	90	²⁵⁹ BARTELT	94 CLEO	Repl. by BLISS 98
$< 2.7 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 6.0 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁵⁹ BARTELT 94 assume phase space decays.

$\Gamma(e^+ \pi^- \pi^-)/\Gamma_{\text{total}}$ **Γ_{175}/Γ**

Test of lepton number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.0 \times 10^{-7}$	90	YUSA	06 BELL	158 fb^{-1} $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 2.7 \times 10^{-7}$	90	AUBERT, BE	05D BABR	221 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 1.9 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$< 4.4 \times 10^{-6}$	90	²⁶⁰ BARTELT	94 CLEO	Repl. by BLISS 98
$< 1.8 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$< 1.7 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁶⁰ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \pi^+ \pi^-)/\Gamma_{\text{total}}$ **Γ_{176}/Γ**

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$< 2.9 \times 10^{-7}$	90	AUBERT, BE	05D BABR	221 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<4.8 \times 10^{-7}$	90	YUSA	06	BELL	$158 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<8.2 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<7.4 \times 10^{-6}$	90	²⁶¹ BARTELT	94	CLEO	Repl. by BLISS 98
$<3.6 \times 10^{-5}$	90	ALBRECHT	92K	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<3.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁶¹ BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ \pi^- \pi^-)/\Gamma_{\text{total}}$ Γ_{177}/Γ

Test of lepton number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<0.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<3.4 \times 10^{-7}$	90	YUSA	06	BELL	$158 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<3.4 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<6.9 \times 10^{-6}$	90	²⁶² BARTELT	94	CLEO	Repl. by BLISS 98
$<6.3 \times 10^{-5}$	90	ALBRECHT	92K	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<3.9 \times 10^{-5}$	90	BOWCOCK	90	CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁶² BARTELT 94 assume phase space decays.

$\Gamma(e^- \pi^+ K^-)/\Gamma_{\text{total}}$ Γ_{178}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.2 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<7.2 \times 10^{-7}$	90	YUSA	06	BELL	$158 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<6.4 \times 10^{-6}$	90	BLISS	98	CLEO	$E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$
$<7.7 \times 10^{-6}$	90	²⁶³ BARTELT	94	CLEO	Repl. by BLISS 98
$<2.9 \times 10^{-5}$	90	ALBRECHT	92K	ARG	$E_{\text{cm}}^{ee} = 10 \text{ GeV}$
$<5.8 \times 10^{-5}$	90	BOWCOCK	90	CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁶³ BARTELT 94 assume phase space decays.

$\Gamma(e^- \pi^- K^+)/\Gamma_{\text{total}}$ Γ_{179}/Γ

Test of lepton family number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<1.6 \times 10^{-7}$	90	YUSA	06	BELL $158 \text{ fb}^{-1} E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<1.7 \times 10^{-7}$	90	AUBERT,BE	05D	BABR $221 \text{ fb}^{-1}, E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	
$<3.8 \times 10^{-6}$	90	BLISS	98	CLEO $E_{\text{cm}}^{ee} = 10.6 \text{ GeV}$	
$<4.6 \times 10^{-6}$	90	²⁶⁴ BARTELT	94	CLEO	Repl. by BLISS 98
$<5.8 \times 10^{-5}$	90	BOWCOCK	90	CLEO	$E_{\text{cm}}^{ee} = 10.4\text{--}10.9$

²⁶⁴ BARTELT 94 assume phase space decays.

$\Gamma(e^+ \pi^- K^-)/\Gamma_{\text{total}}$ **Γ_{180}/Γ**
 Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.8 \times 10^{-7}$	90	AUBERT,BE 05D	BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<1.9 \times 10^{-7}$	90	YUSA 06	BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<2.1 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$<4.5 \times 10^{-6}$	90	²⁶⁵ BARTELT 94	CLEO	Repl. by BLISS 98
$<2.0 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10$ GeV
$<4.9 \times 10^{-5}$	90	BOWCOCK 90	CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$

²⁶⁵ BARTELT 94 assume phase space decays.

$\Gamma(e^- K_S^0 K_S^0)/\Gamma_{\text{total}}$ **Γ_{181}/Γ**
 Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.2 \times 10^{-6}$	90	CHEN 02C	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- K^+ K^-)/\Gamma_{\text{total}}$ **Γ_{182}/Γ**
 Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.4 \times 10^{-7}$	90	AUBERT,BE 05D	BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<3.0 \times 10^{-7}$	90	YUSA 06	BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<6.0 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^+ K^- K^-)/\Gamma_{\text{total}}$ **Γ_{183}/Γ**
 Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<1.5 \times 10^{-7}$	90	AUBERT,BE 05D	BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<3.1 \times 10^{-7}$	90	YUSA 06	BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<3.8 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \pi^+ K^-)/\Gamma_{\text{total}}$ **Γ_{184}/Γ**
 Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.6 \times 10^{-7}$	90	AUBERT,BE 05D	BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$< 2.7 \times 10^{-7}$	90	YUSA 06	BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$< 7.5 \times 10^{-6}$	90	BLISS 98	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$< 8.7 \times 10^{-6}$	90	²⁶⁶ BARTELT 94	CLEO	Repl. by BLISS 98
$< 11 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10$ GeV
$< 7.7 \times 10^{-5}$	90	BOWCOCK 90	CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$

²⁶⁶ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- \pi^- K^+)/\Gamma_{\text{total}}$ Γ_{185}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.2 \times 10^{-7}$	90	AUBERT,BE	05D BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<7.3 \times 10^{-7}$	90	YUSA	06 BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<7.4 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$<1.5 \times 10^{-5}$	90	²⁶⁷ BARTELT	94 CLEO	Repl. by BLISS 98
$<7.7 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$

²⁶⁷ BARTELT 94 assume phase space decays.

$\Gamma(\mu^+ \pi^- K^-)/\Gamma_{\text{total}}$ Γ_{186}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.2 \times 10^{-7}$	90	AUBERT,BE	05D BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<2.9 \times 10^{-7}$	90	YUSA	06 BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<7.0 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
$<2.0 \times 10^{-5}$	90	²⁶⁸ BARTELT	94 CLEO	Repl. by BLISS 98
$<5.8 \times 10^{-5}$	90	ALBRECHT	92K ARG	$E_{\text{cm}}^{ee} = 10$ GeV
$<4.0 \times 10^{-5}$	90	BOWCOCK	90 CLEO	$E_{\text{cm}}^{ee} = 10.4-10.9$

²⁶⁸ BARTELT 94 assume phase space decays.

$\Gamma(\mu^- K_S^0 K_S^0)/\Gamma_{\text{total}}$ Γ_{187}/Γ

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<3.4 \times 10^{-6}$	90	CHEN	02C CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- K^+ K^-)/\Gamma_{\text{total}}$ Γ_{188}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 2.5 \times 10^{-7}$	90	AUBERT,BE	05D BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$< 8.0 \times 10^{-7}$	90	YUSA	06 BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV
$<15 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^+ K^- K^-)/\Gamma_{\text{total}}$ Γ_{189}/Γ

Test of lepton number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<4.4 \times 10^{-7}$	90	YUSA	06 BELL	158 fb ⁻¹ $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<4.8 \times 10^{-7}$	90	AUBERT,BE	05D BABR	221 fb ⁻¹ , $E_{\text{cm}}^{ee} = 10.6$ GeV
$<6.0 \times 10^{-6}$	90	BLISS	98 CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{190}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<6.5 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \pi^0 \pi^0)/\Gamma_{\text{total}}$ Γ_{191}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<14 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- \eta \eta)/\Gamma_{\text{total}}$ Γ_{192}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<35 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \eta \eta)/\Gamma_{\text{total}}$ Γ_{193}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<60 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- \pi^0 \eta)/\Gamma_{\text{total}}$ Γ_{194}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<24 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\mu^- \pi^0 \eta)/\Gamma_{\text{total}}$ Γ_{195}/Γ

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<22 \times 10^{-6}$	90	BONVICINI	97	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\bar{p} \gamma)/\Gamma_{\text{total}}$ Γ_{196}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 3.5 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<29 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{ee} = 10$ GeV
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$\Gamma(\bar{p} \pi^0)/\Gamma_{\text{total}}$ Γ_{197}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<15 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$<66 \times 10^{-5}$	90	ALBRECHT	92K	ARG $E_{\text{cm}}^{ee} = 10$ GeV
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$\Gamma(\bar{p} 2\pi^0)/\Gamma_{\text{total}}$ Γ_{198}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<33 \times 10^{-6}$	90	GODANG	99	CLEO $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\bar{p}\eta)/\Gamma_{\text{total}}$ Γ_{199}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 8.9 \times 10^{-6}$	90	GODANG 99	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$< 130 \times 10^{-5}$	90	ALBRECHT 92K	ARG	$E_{\text{cm}}^{ee} = 10$ GeV

$\Gamma(\bar{p}\pi^0\eta)/\Gamma_{\text{total}}$ Γ_{200}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 27 \times 10^{-6}$	90	GODANG 99	CLEO	$E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\Lambda\pi^-)/\Gamma_{\text{total}}$ Γ_{201}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 0.72 \times 10^{-7}$	90	MIYAZAKI 06	BELL	154 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(\bar{\Lambda}\pi^-)/\Gamma_{\text{total}}$ Γ_{202}/Γ

Test of lepton number and baryon number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 1.4 \times 10^{-7}$	90	MIYAZAKI 06	BELL	154 fb^{-1} , $E_{\text{cm}}^{ee} = 10.6$ GeV

$\Gamma(e^- \text{ light boson})/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ Γ_{203}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.015	95	269 ALBRECHT 95G	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.018	95	270 ALBRECHT 90E	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
< 0.040	95	271 BALTRUSAIT..85	MRK3	$E_{\text{cm}}^{ee} = 3.77$ GeV

269 ALBRECHT 95G limit holds for bosons with mass < 0.4 GeV. The limit rises to 0.036 for a mass of 1.0 GeV, then falls to 0.006 at the upper mass limit of 1.6 GeV.

270 ALBRECHT 90E limit applies for spinless boson with mass < 100 MeV, and rises to 0.050 for mass = 500 MeV.

271 BALTRUSAITIS 85 limit applies for spinless boson with mass < 100 MeV.

$\Gamma(\mu^- \text{ light boson})/\Gamma(e^- \bar{\nu}_e \nu_\tau)$ Γ_{204}/Γ_5

Test of lepton family number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
< 0.026	95	272 ALBRECHT 95G	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.033	95	273 ALBRECHT 90E	ARG	$E_{\text{cm}}^{ee} = 9.4\text{--}10.6$ GeV
< 0.125	95	274 BALTRUSAIT..85	MRK3	$E_{\text{cm}}^{ee} = 3.77$ GeV

272 ALBRECHT 95G limit holds for bosons with mass < 1.3 GeV. The limit rises to 0.034 for a mass of 1.4 GeV, then falls to 0.003 at the upper mass limit of 1.6 GeV.

273 ALBRECHT 90E limit applies for spinless boson with mass < 100 MeV, and rises to 0.071 for mass = 500 MeV.

274 BALTRUSAITIS 85 limit applies for spinless boson with mass < 100 MeV.

τ -DECAY PARAMETERS

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$\rho^\tau(e \text{ or } \mu)$ PARAMETER

(V–A) theory predicts $\rho = 0.75$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.745±0.008 OUR FIT				
0.749±0.008 OUR AVERAGE				
0.742±0.014±0.006	81k	HEISTER	01E ALEP	1991–1995 LEP runs
0.775±0.023±0.020	36k	ABREU	00L DLPH	1992–1995 runs
0.781±0.028±0.018	46k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.762±0.035	54k	ACCIARRI	98R L3	1991–1995 LEP runs
0.731±0.031		²⁷⁵ ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.72 ±0.09 ±0.03		²⁷⁶ ABE	97O SLD	1993–1995 SLC runs
0.747±0.010±0.006	55k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV
0.79 ±0.10 ±0.10	3732	FORD	87B MAC	$E_{cm}^{ee} = 29$ GeV
0.71 ±0.09 ±0.03	1426	BEHRENDIS	85 CLEO	e^+e^- near $\Upsilon(4S)$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.735±0.013±0.008	31k	AMMAR	97B CLEO	Repl. by ALEXANDER 97F
0.794±0.039±0.031	18k	ACCIARRI	96H L3	Repl. by ACCIARRI 98R
0.732±0.034±0.020	8.2k	²⁷⁷ ALBRECHT	95 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.738±0.038		²⁷⁸ ALBRECHT	95C ARG	Repl. by ALBRECHT 98
0.751±0.039±0.022		BUSKULIC	95D ALEP	Repl. by HEISTER 01E
0.742±0.035±0.020	8000	ALBRECHT	90E ARG	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV

²⁷⁵ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

²⁷⁶ ABE 97O assume $\eta^\tau = 0$ in their fit. Letting η^τ vary in the fit gives a ρ^τ value of $0.69 \pm 0.13 \pm 0.05$.

²⁷⁷ Value is from a simultaneous fit for the ρ^τ and η^τ decay parameters to the lepton energy spectrum. Not independent of ALBRECHT 90E $\rho^\tau(e \text{ or } \mu)$ value which assumes $\eta^\tau = 0$. Result is strongly correlated with ALBRECHT 95C.

²⁷⁸ Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.

$\rho^\tau(e)$ PARAMETER

(V–A) theory predicts $\rho = 0.75$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.747±0.010 OUR FIT				
0.744±0.010 OUR AVERAGE				
0.747±0.019±0.014	44k	HEISTER	01E ALEP	1991–1995 LEP runs
0.744±0.036±0.037	17k	ABREU	00L DLPH	1992–1995 runs
0.779±0.047±0.029	25k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.68 ±0.04 ±0.07		²⁷⁹ ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.71 ±0.14 ±0.05		ABE	97O SLD	1993–1995 SLC runs
0.747±0.012±0.004	34k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV

$0.735 \pm 0.036 \pm 0.020$	4.7k	280	ALBRECHT	95	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
$0.79 \pm 0.08 \pm 0.06$	3230	281	ALBRECHT	93G	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
$0.64 \pm 0.06 \pm 0.07$	2753		JANSSEN	89	CBAL	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
$0.62 \pm 0.17 \pm 0.14$	1823		FORD	87B	MAC	$E_{cm}^{ee} = 29$ GeV
0.60 ± 0.13	699		BEHREND	85	CLEO	e^+e^- near $\Upsilon(4S)$
$0.72 \pm 0.10 \pm 0.11$	594		BACINO	79B	DLCO	$E_{cm}^{ee} = 3.5\text{--}7.4$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.732 \pm 0.014 \pm 0.009$	19k		AMMAR	97B	CLEO	Repl. by ALEXAN- DER 97F
$0.793 \pm 0.050 \pm 0.025$			BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
$0.747 \pm 0.045 \pm 0.028$	5106		ALBRECHT	90E	ARG	Repl. by AL- BRECHT 95

279 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

280 ALBRECHT 95 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- h^+ (\pi^0) \bar{\nu}_\tau)$ and their charged conjugates.

281 ALBRECHT 93G use tau pair events of the type $\tau^- \tau^+ \rightarrow (\mu^- \bar{\nu}_\mu \nu_\tau)(e^+ \nu_e \bar{\nu}_\tau)$ and their charged conjugates.

$\rho^\tau(\mu)$ PARAMETER

($V-A$) theory predicts $\rho = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.763 ± 0.020 OUR FIT

0.770 ± 0.022 OUR AVERAGE

$0.776 \pm 0.045 \pm 0.019$	46k		HEISTER	01E	ALEP	1991–1995 LEP runs
$0.999 \pm 0.098 \pm 0.045$	22k		ABREU	00L	DLPH	1992–1995 runs
$0.777 \pm 0.044 \pm 0.016$	27k		ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
$0.69 \pm 0.06 \pm 0.06$		282	ALBRECHT	98	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
$0.54 \pm 0.28 \pm 0.14$			ABE	97O	SLD	1993–1995 SLC runs
$0.750 \pm 0.017 \pm 0.045$	22k		ALEXANDER	97F	CLEO	$E_{cm}^{ee} = 10.6$ GeV
$0.76 \pm 0.07 \pm 0.08$	3230		ALBRECHT	93G	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
$0.734 \pm 0.055 \pm 0.027$	3041		ALBRECHT	90E	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
$0.89 \pm 0.14 \pm 0.08$	1909		FORD	87B	MAC	$E_{cm}^{ee} = 29$ GeV
0.81 ± 0.13	727		BEHREND	85	CLEO	e^+e^- near $\Upsilon(4S)$

• • • We do not use the following data for averages, fits, limits, etc. • • •

$0.747 \pm 0.048 \pm 0.044$	13k		AMMAR	97B	CLEO	Repl. by ALEXAN- DER 97F
$0.693 \pm 0.057 \pm 0.028$			BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

282 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

$\xi^\tau(e \text{ or } \mu)$ PARAMETER

($V-A$) theory predicts $\xi = 1$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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0.985 ± 0.030 OUR FIT

0.981 ± 0.031 OUR AVERAGE

$0.986 \pm 0.068 \pm 0.031$	81k		HEISTER	01E	ALEP	1991–1995 LEP runs
$0.929 \pm 0.070 \pm 0.030$	36k		ABREU	00L	DLPH	1992–1995 runs
$0.98 \pm 0.22 \pm 0.10$	46k		ACKERSTAFF	99D	OPAL	1990–1995 LEP runs
0.70 ± 0.16	54k		ACCIARRI	98R	L3	1991–1995 LEP runs

1.03 ± 0.11		283	ALBRECHT	98	ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
1.05 ± 0.35 ± 0.04		284	ABE	97O	SLD	1993–1995 SLC runs
1.007 ± 0.040 ± 0.015	55k		ALEXANDER	97F	CLEO	$E_{cm}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
0.94 ± 0.21 ± 0.07	18k		ACCIARRI	96H	L3	Repl. by ACCIARRI 98R
0.97 ± 0.14		285	ALBRECHT	95C	ARG	Repl. by ALBRECHT 98
1.18 ± 0.15 ± 0.16			BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.90 ± 0.15 ± 0.10	3230	286	ALBRECHT	93G	ARG	$E_{cm}^{ee} = 9.4\text{--}10.6$ GeV
283 Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.						
284 ABE 97O assume $\eta^T = 0$ in their fit. Letting η^T vary in the fit gives a ξ^T value of $1.02 \pm 0.36 \pm 0.05$.						
285 Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- h^+ \bar{\nu}_\tau)$ and their charged conjugates.						
286 ALBRECHT 93G measurement determines $ \xi^T $ for the case $\xi^T(e) = \xi^T(\mu)$, but the authors point out that other LEP experiments determine the sign to be positive.						

$\xi^T(e)$ PARAMETER

(V–A) theory predicts $\xi = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.994 ± 0.040 OUR FIT				
1.00 ± 0.04 OUR AVERAGE				
1.011 ± 0.094 ± 0.038	44k	HEISTER	01E	ALEP 1991–1995 LEP runs
1.01 ± 0.12 ± 0.05	17k	ABREU	00L	DLPH 1992–1995 runs
1.13 ± 0.39 ± 0.14	25k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
1.11 ± 0.20 ± 0.08		287	ALBRECHT	98 ARG $E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
1.16 ± 0.52 ± 0.06			ABE	97O SLD 1993–1995 SLC runs
0.979 ± 0.048 ± 0.016	34k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.03 ± 0.23 ± 0.09		BUSKULIC	95D	ALEP Repl. by HEISTER 01E
287 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.				

$\xi^T(\mu)$ PARAMETER

(V–A) theory predicts $\xi = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1.030 ± 0.059 OUR FIT				
1.06 ± 0.06 OUR AVERAGE				
1.030 ± 0.120 ± 0.050	46k	HEISTER	01E	ALEP 1991–1995 LEP runs
1.16 ± 0.19 ± 0.06	22k	ABREU	00L	DLPH 1992–1995 runs
0.79 ± 0.41 ± 0.09	27k	ACKERSTAFF	99D	OPAL 1990–1995 LEP runs
1.26 ± 0.27 ± 0.14		288	ALBRECHT	98 ARG $E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.75 ± 0.50 ± 0.14			ABE	97O SLD 1993–1995 SLC runs
1.054 ± 0.069 ± 0.047	22k	ALEXANDER	97F	CLEO $E_{cm}^{ee} = 10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1.23 ± 0.22 ± 0.10		BUSKULIC	95D	ALEP Repl. by HEISTER 01E
288 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.				

$\eta^\tau(\mathbf{e\ or\ }\mu)$ PARAMETER

($V-A$) theory predicts $\eta = 0$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.013±0.020 OUR FIT				
0.015±0.021 OUR AVERAGE				
0.012±0.026±0.004	81k	HEISTER	01E ALEP	1991–1995 LEP runs
−0.005±0.036±0.037		ABREU	00L DLPH	1992–1995 runs
0.027±0.055±0.005	46k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.27 ±0.14	54k	ACCIARRI	98R L3	1991–1995 LEP runs
−0.13 ±0.47 ±0.15		ABE	97O SLD	1993–1995 SLC runs
−0.015±0.061±0.062	31k	AMMAR	97B CLEO	$E_{cm}^{ee} = 10.6$ GeV
0.03 ±0.18 ±0.12	8.2k	ALBRECHT	95 ARG	$E_{cm}^{ee} = 9.5–10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.25 ±0.17 ±0.11	18k	ACCIARRI	96H L3	Repl. by ACCIARRI 98R
−0.04 ±0.15 ±0.11		BUSKULIC	95D ALEP	Repl. by HEISTER 01E

$\eta^\tau(\mu)$ PARAMETER

($V-A$) theory predicts $\eta = 0$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.094±0.073 OUR FIT				
0.17 ±0.15 OUR AVERAGE Error includes scale factor of 1.2.				
0.160±0.150±0.060	46k	HEISTER	01E ALEP	1991–1995 LEP runs
0.72 ±0.32 ±0.15		ABREU	00L DLPH	1992–1995 runs
−0.59 ±0.82 ±0.45	289	ABE	97O SLD	1993–1995 SLC runs
0.010±0.149±0.171	13k	²⁹⁰ AMMAR	97B CLEO	$E_{cm}^{ee} = 10.6$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.010±0.065±0.001	27k	²⁹¹ ACKERSTAFF	99D OPAL	1990–1995 LEP runs
−0.24 ±0.23 ±0.18		BUSKULIC	95D ALEP	Repl. by HEISTER 01E
²⁸⁹ Highly correlated (corr. = 0.92) with ABE 97O $\rho^\tau(\mu)$ measurement.				
²⁹⁰ Highly correlated (corr. = 0.949) with AMMAR 97B $\rho^\tau(\mu)$ value.				
²⁹¹ ACKERSTAFF 99D result is dominated by a constraint on η^τ from the OPAL measurements of the τ lifetime and $B(\tau^- \rightarrow \mu^- \bar{\nu}_\mu \nu_\tau)$ assuming lepton universality for the total coupling strength.				

$(\delta\xi)^\tau(\mathbf{e\ or\ }\mu)$ PARAMETER

($V-A$) theory predicts $(\delta\xi) = 0.75$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.746±0.021 OUR FIT				
0.744±0.022 OUR AVERAGE				
0.776±0.045±0.024	81k	HEISTER	01E ALEP	1991–1995 LEP runs
0.779±0.070±0.028	36k	ABREU	00L DLPH	1992–1995 runs
0.65 ±0.14 ±0.07	46k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.70 ±0.11	54k	ACCIARRI	98R L3	1991–1995 LEP runs
0.63 ±0.09	²⁹²	ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5–10.6$ GeV
0.88 ±0.27 ±0.04	²⁹³	ABE	97O SLD	1993–1995 SLC runs
0.745±0.026±0.009	55k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.81 ± 0.14 ± 0.06	18k	ACCIARRI	96H L3	Repl. by ACCIARRI 98R
0.65 ± 0.12		294 ALBRECHT	95C ARG	Repl. by ALBRECHT 98
0.88 ± 0.11 ± 0.07		BUSKULIC	95D ALEP	Repl. by HEISTER 01E

292 Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 98, ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

293 ABE 97O assume $\eta^\tau = 0$ in their fit. Letting η^τ vary in the fit gives a $(\rho\xi)^\tau$ value of $0.87 \pm 0.27 \pm 0.04$.

294 Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E. ALBRECHT 95C uses events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(h^+ h^- h^+ \bar{\nu}_\tau)$ and their charged conjugates.

$(\delta\xi)^\tau(e)$ PARAMETER

(V-A) theory predicts $(\delta\xi) = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.734 ± 0.028 OUR FIT				
0.731 ± 0.029 OUR AVERAGE				
0.778 ± 0.066 ± 0.024	44k	HEISTER	01E ALEP	1991–1995 LEP runs
0.85 ± 0.12 ± 0.04	17k	ABREU	00L DLPH	1992–1995 runs
0.72 ± 0.31 ± 0.14	25k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.56 ± 0.14 ± 0.06		295 ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.85 ± 0.43 ± 0.08		ABE	97O SLD	1993–1995 SLC runs
0.720 ± 0.032 ± 0.010	34k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.11 ± 0.17 ± 0.07		BUSKULIC	95D ALEP	Repl. by HEISTER 01E
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295 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

$(\delta\xi)^\tau(\mu)$ PARAMETER

(V-A) theory predicts $(\delta\xi) = 0.75$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.778 ± 0.037 OUR FIT				
0.79 ± 0.04 OUR AVERAGE				
0.786 ± 0.066 ± 0.028	46k	HEISTER	01E ALEP	1991–1995 LEP runs
0.86 ± 0.13 ± 0.04	22k	ABREU	00L DLPH	1992–1995 runs
0.63 ± 0.23 ± 0.05	27k	ACKERSTAFF	99D OPAL	1990–1995 LEP runs
0.73 ± 0.18 ± 0.10		296 ALBRECHT	98 ARG	$E_{cm}^{ee} = 9.5\text{--}10.6$ GeV
0.82 ± 0.32 ± 0.07		ABE	97O SLD	1993–1995 SLC runs
0.786 ± 0.041 ± 0.032	22k	ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.71 ± 0.14 ± 0.06		BUSKULIC	95D ALEP	Repl. by HEISTER 01E
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296 ALBRECHT 98 use tau pair events of the type $\tau^- \tau^+ \rightarrow (\ell^- \bar{\nu}_\ell \nu_\tau)(\pi^+ \pi^0 \bar{\nu}_\tau)$, and their charged conjugates.

$\xi^T(\pi)$ PARAMETER

($V-A$) theory predicts $\xi^T(\pi) = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.993±0.022 OUR FIT

0.994±0.023 OUR AVERAGE

0.994±0.020±0.014	27k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.81 ±0.17 ±0.02		ABE	97O	SLD	1993–1995 SLC runs
1.03 ±0.06 ±0.04	2.0k	COAN	97	CLEO	$E_{cm}^{ee} = 10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.987±0.057±0.027		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
0.95 ±0.11 ±0.05		²⁹⁷ BUSKULIC	94D	ALEP	1990+1991 LEP run

²⁹⁷ Superseded by BUSKULIC 95D.

$\xi^T(\rho)$ PARAMETER

($V-A$) theory predicts $\xi^T(\rho) = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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0.994±0.008 OUR FIT

0.994±0.009 OUR AVERAGE

0.987±0.012±0.011	59k	HEISTER	01E	ALEP	1991–1995 LEP runs
0.99 ±0.12 ±0.04		ABE	97O	SLD	1993–1995 SLC runs
0.995±0.010±0.003	66k	ALEXANDER	97F	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.022±0.028±0.030	1.7k	²⁹⁸ ALBRECHT	94E	ARG	$E_{cm}^{ee} = 9.4-10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.045±0.058±0.032		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E
1.03 ±0.11 ±0.05		²⁹⁹ BUSKULIC	94D	ALEP	1990+1991 LEP run

²⁹⁸ ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90I to obtain the quoted result.

²⁹⁹ Superseded by BUSKULIC 95D.

$\xi^T(a_1)$ PARAMETER

($V-A$) theory predicts $\xi^T(a_1) = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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1.001±0.027 OUR FIT

1.002±0.028 OUR AVERAGE

1.000±0.016±0.024	35k	³⁰⁰ HEISTER	01E	ALEP	1991–1995 LEP runs
1.02 ±0.13 ±0.03	17.2k	ASNER	00	CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.29 ±0.26 ±0.11	7.4k	³⁰¹ ACKERSTAFF	97R	OPAL	1992–1994 LEP runs
0.85 ^{+0.15} _{-0.17} ±0.05		ALBRECHT	95C	ARG	$E_{cm}^{ee} = 9.5-10.6$ GeV
1.25 ±0.23 ^{+0.15} _{-0.08}	7.5k	ALBRECHT	93C	ARG	$E_{cm}^{ee} = 9.4-10.6$ GeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

1.08 ^{+0.46} _{-0.41} ^{+0.14} _{-0.25}	2.6k	³⁰² AKERS	95P	OPAL	Repl. by ACKER-STAFF 97R
0.937±0.116±0.064		BUSKULIC	95D	ALEP	Repl. by HEISTER 01E

- 300 HEISTER 01E quote $1.000 \pm 0.016 \pm 0.013 \pm 0.020$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty.
- 301 ACKERSTAFF 97R obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.16 \pm 0.04$, and with the model of of Isgur *et al.* (PR **D39**,1357 (1989)) they obtain $1.20 \pm 0.21 \pm 0.14$.
- 302 AKERS 95P obtain this result with a model independent fit to the hadronic structure functions. Fitting with the model of Kuhn and Santamaria (ZPHY **C48**, 445 (1990)) gives $0.87 \pm 0.27^{+0.05}_{-0.06}$, and with the model of of Isgur *et al.* (PR **D39**,1357 (1989)) they obtain $1.10 \pm 0.31^{+0.13}_{-0.14}$.

ξ^T (all hadronic modes) PARAMETER

($V-A$) theory predicts $\xi^T = 1$.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.995±0.007 OUR FIT				
0.997±0.007 OUR AVERAGE				
0.992±0.007±0.008	102k	303 HEISTER	01E ALEP	1991–1995 LEP runs
0.997±0.027±0.011	39k	304 ABREU	00L DLPH	1992–1995 runs
1.02 ±0.13 ±0.03	17.2k	305 ASNER	00 CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.032±0.031	37k	306 ACCIARRI	98R L3	1991–1995 LEP runs
0.93 ±0.10 ±0.04		ABE	97O SLD	1993–1995 SLC runs
1.29 ±0.26 ±0.11	7.4k	307 ACKERSTAFF	97R OPAL	1992–1994 LEP runs
0.995±0.010±0.003	66k	308 ALEXANDER	97F CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.03 ±0.06 ±0.04	2.0k	309 COAN	97 CLEO	$E_{cm}^{ee} = 10.6$ GeV
1.017±0.039		310 ALBRECHT	95C ARG	$E_{cm}^{ee} = 9.5–10.6$ GeV
1.25 ±0.23 $^{+0.15}_{-0.08}$	7.5k	311 ALBRECHT	93C ARG	$E_{cm}^{ee} = 9.4–10.6$ GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.970±0.053±0.011	14k	312 ACCIARRI	96H L3	Repl. by ACCIARRI 98R
1.08 $^{+0.46}_{-0.41}$ $^{+0.14}_{-0.25}$	2.6k	313 AKERS	95P OPAL	Repl. by ACKERSTAFF 97R
1.006±0.032±0.019		314 BUSKULIC	95D ALEP	Repl. by HEISTER 01E
1.022±0.028±0.030	1.7k	315 ALBRECHT	94E ARG	$E_{cm}^{ee} = 9.4–10.6$ GeV
0.99 ±0.07 ±0.04		316 BUSKULIC	94D ALEP	1990+1991 LEP run

- 303 HEISTER 01E quote $0.992 \pm 0.007 \pm 0.006 \pm 0.005$ where the errors are statistical, systematic, and an uncertainty due to the final state model. We combine the systematic error and model uncertainty. They use $\tau \rightarrow \pi \nu_\tau$, $\tau \rightarrow K \nu_\tau$, $\tau \rightarrow \rho \nu_\tau$, and $\tau \rightarrow a_1 \nu_\tau$ decays.
- 304 ABREU 00L use $\tau^- \rightarrow h^- \geq 0\pi^0 \nu_\tau$ decays.
- 305 ASNER 00 use $\tau^- \rightarrow \pi^- 2\pi^0 \nu_\tau$ decays.
- 306 ACCIARRI 98R use $\tau \rightarrow \pi \nu_\tau$, $\tau \rightarrow K \nu_\tau$, and $\tau \rightarrow \rho \nu_\tau$ decays.
- 307 ACKERSTAFF 97R use $\tau \rightarrow a_1 \nu_\tau$ decays.
- 308 ALEXANDER 97F use $\tau \rightarrow \rho \nu_\tau$ decays.
- 309 COAN 97 use $h^+ h^-$ energy correlations.
- 310 Combined fit to ARGUS tau decay parameter measurements in ALBRECHT 95C, ALBRECHT 93G, and ALBRECHT 94E.
- 311 Uses $\tau \rightarrow a_1 \nu_\tau$ decays. Replaced by ALBRECHT 95C.
- 312 ACCIARRI 96H use $\tau \rightarrow \pi \nu_\tau$, $\tau \rightarrow K \nu_\tau$, and $\tau \rightarrow \rho \nu_\tau$ decays.
- 313 AKERS 95P use $\tau \rightarrow a_1 \nu_\tau$ decays.

- 314 BUSKULIC 95D use $\tau \rightarrow \pi\nu_\tau$, $\tau \rightarrow \rho\nu_\tau$, and $\tau \rightarrow a_1\nu_\tau$ decays.
 315 ALBRECHT 94E measure the square of this quantity and use the sign determined by ALBRECHT 90I to obtain the quoted result. Uses $\tau \rightarrow a_1\nu_\tau$ decays. Replaced by ALBRECHT 95C.
 316 BUSKULIC 94D use $\tau \rightarrow \pi\nu_\tau$ and $\tau \rightarrow \rho\nu_\tau$ decays. Superseded by BUSKULIC 95D.

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ALBRECHT	95	PL B341 441	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	95C	PL B349 576	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	95G	ZPHY C68 25	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	95H	ZPHY C68 215	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BALEST	95C	PRL 75 3809	R. Balest <i>et al.</i>	(CLEO Collab.)
BERNABEU	95	NP B436 474	J. Bernabeu <i>et al.</i>	
BUSKULIC	95C	PL B346 371	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
BUSKULIC	95D	PL B346 379	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
	Also	PL B363 265 (erratum)	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
ABREU	94K	PL B334 435	P. Abreu <i>et al.</i>	(DELPHI Collab.)
AKERS	94E	PL B328 207	R. Akers <i>et al.</i>	(OPAL Collab.)
AKERS	94G	PL B339 278	R. Akers <i>et al.</i>	(OPAL Collab.)
ALBRECHT	94E	PL B337 383	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ARTUSO	94	PRL 72 3762	M. Artuso <i>et al.</i>	(CLEO Collab.)
BARTELT	94	PRL 73 1890	J.E. Bartelt <i>et al.</i>	(CLEO Collab.)
BATTLE	94	PRL 73 1079	M. Battle <i>et al.</i>	(CLEO Collab.)
BAUER	94	PR D50 R13	D.A. Bauer <i>et al.</i>	(TPC/2gamma Collab.)
BUSKULIC	94D	PL B321 168	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
BUSKULIC	94E	PL B332 209	D. Buskalic <i>et al.</i>	(ALEPH Collab.)
BUSKULIC	94F	PL B332 219	D. Buskalic <i>et al.</i>	(ALEPH Collab.)

GIBAUT	94B	PRL 73 934	D. Gibaut <i>et al.</i>	(CLEO Collab.)
ADRIANI	93M	PRPL 236 1	O. Adriani <i>et al.</i>	(L3 Collab.)
ALBRECHT	93C	ZPHY C58 61	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	93G	PL B316 608	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BALEST	93	PR D47 R3671	R. Balest <i>et al.</i>	(CLEO Collab.)
BEAN	93	PRL 70 138	A. Bean <i>et al.</i>	(CLEO Collab.)
BORTOLETTO	93	PRL 71 1791	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
ESCRIBANO	93	PL B301 419	R. Escribano, E. Masso	(BARC)
PROCARIO	93	PRL 70 1207	M. Procario <i>et al.</i>	(CLEO Collab.)
ABREU	92N	ZPHY C55 555	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ACTON	92F	PL B281 405	D.P. Acton <i>et al.</i>	(OPAL Collab.)
ACTON	92H	PL B288 373	P.D. Acton <i>et al.</i>	(OPAL Collab.)
AKERIB	92	PRL 69 3610	D.S. Akerib <i>et al.</i>	(CLEO Collab.)
Also		PRL 71 3395 (erratum)	D.S. Akerib <i>et al.</i>	(CLEO Collab.)
ALBRECHT	92D	ZPHY C53 367	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92K	ZPHY C55 179	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92M	PL B292 221	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92Q	ZPHY C56 339	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AMMAR	92	PR D45 3976	R. Ammar <i>et al.</i>	(CLEO Collab.)
ARTUSO	92	PRL 69 3278	M. Artuso <i>et al.</i>	(CLEO Collab.)
BAI	92	PRL 69 3021	J.Z. Bai <i>et al.</i>	(BES Collab.)
BATTLE	92	PL B291 488	M. Battle <i>et al.</i>	(CLEO Collab.)
BUSKULIC	92J	PL B297 459	D. Buskulic <i>et al.</i>	(ALEPH Collab.)
DECAMP	92C	ZPHY C54 211	D. Decamp <i>et al.</i>	(ALEPH Collab.)
ADEVA	91F	PL B265 451	B. Adeva <i>et al.</i>	(L3 Collab.)
ALBRECHT	91D	PL B260 259	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEXANDER	91D	PL B266 201	G. Alexander <i>et al.</i>	(OPAL Collab.)
ANTREASYAN	91	PL B259 216	D. Antreasyan <i>et al.</i>	(Crystal Ball Collab.)
GRIFOLS	91	PL B255 611	J.A. Grifols, A. Mendez	(BARC)
ABACHI	90	PR D41 1414	S. Abachi <i>et al.</i>	(HRS Collab.)
ALBRECHT	90E	PL B246 278	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	90I	PL B250 164	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BEHREND	90	ZPHY C46 537	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
BOWCOCK	90	PR D41 805	T.J.V. Bowcock <i>et al.</i>	(CLEO Collab.)
DELAGUILA	90	PL B252 116	F. del Aguila, M. Sher	(BARC, WILL)
GOLDBERG	90	PL B251 223	M. Goldberg <i>et al.</i>	(CLEO Collab.)
WU	90	PR D41 2339	D.Y. Wu <i>et al.</i>	(Mark II Collab.)
ABACHI	89B	PR D40 902	S. Abachi <i>et al.</i>	(HRS Collab.)
BEHREND	89B	PL B222 163	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
JANSEN	89	PL B228 273	H. Janssen <i>et al.</i>	(Crystal Ball Collab.)
KLEINWORT	89	ZPHY C42 7	C. Kleinwort <i>et al.</i>	(JADE Collab.)
ADEVA	88	PR D38 2665	B. Adeva <i>et al.</i>	(Mark-J Collab.)
ALBRECHT	88B	PL B202 149	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	88L	ZPHY C41 1	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	88M	ZPHY C41 405	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AMIDEI	88	PR D37 1750	D. Amidei <i>et al.</i>	(Mark II Collab.)
BEHREND	88	PL B200 226	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
BRAUNSCH...	88C	ZPHY C39 331	W. Braunschweig <i>et al.</i>	(TASSO Collab.)
KEH	88	PL B212 123	S. Keh <i>et al.</i>	(Crystal Ball Collab.)
TSCHIRHART	88	PL B205 407	R. Tschirhart <i>et al.</i>	(HRS Collab.)
ABACHI	87B	PL B197 291	S. Abachi <i>et al.</i>	(HRS Collab.)
ABACHI	87C	PRL 59 2519	S. Abachi <i>et al.</i>	(HRS Collab.)
ADLER	87B	PRL 59 1527	J. Adler <i>et al.</i>	(Mark III Collab.)
AIHARA	87B	PR D35 1553	H. Aihara <i>et al.</i>	(TPC Collab.)
AIHARA	87C	PRL 59 751	H. Aihara <i>et al.</i>	(TPC Collab.)
ALBRECHT	87L	PL B185 223	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	87P	PL B199 580	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BAND	87	PL B198 297	H.R. Band <i>et al.</i>	(MAC Collab.)
BAND	87B	PRL 59 415	H.R. Band <i>et al.</i>	(MAC Collab.)
BARINGER	87	PRL 59 1993	P. Baringer <i>et al.</i>	(CLEO Collab.)
BEBEK	87C	PR D36 690	C. Bebek <i>et al.</i>	(CLEO Collab.)
BURCHAT	87	PR D35 27	P.R. Burchat <i>et al.</i>	(Mark II Collab.)
BYLSMA	87	PR D35 2269	B.G. Bylsma <i>et al.</i>	(HRS Collab.)
COFFMAN	87	PR D36 2185	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
DERRICK	87	PL B189 260	M. Derrick <i>et al.</i>	(HRS Collab.)
FORD	87	PR D35 408	W.T. Ford <i>et al.</i>	(MAC Collab.)
FORD	87B	PR D36 1971	W.T. Ford <i>et al.</i>	(MAC Collab.)
GAN	87	PRL 59 411	K.K. Gan <i>et al.</i>	(Mark II Collab.)
GAN	87B	PL B197 561	K.K. Gan <i>et al.</i>	(Mark II Collab.)
AIHARA	86E	PRL 57 1836	H. Aihara <i>et al.</i>	(TPC Collab.)
BARTEL	86D	PL B182 216	W. Bartel <i>et al.</i>	(JADE Collab.)

PDG	86	PL 170B 1	M. Aguilar-Benitez <i>et al.</i>	(CERN, CIT+)
RUCKSTUHL	86	PRL 56 2132	W. Ruckstuhl <i>et al.</i>	(DELCO Collab.)
SCHMIDKE	86	PRL 57 527	W.B. Schmidke <i>et al.</i>	(Mark II Collab.)
YELTON	86	PRL 56 812	J.M. Yelton <i>et al.</i>	(Mark II Collab.)
ALTHOFF	85	ZPHY C26 521	M. Althoff <i>et al.</i>	(TASSO Collab.)
ASH	85B	PRL 55 2118	W.W. Ash <i>et al.</i>	(MAC Collab.)
BALTRUSAITIS...	85	PRL 55 1842	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BARTEL	85F	PL 161B 188	W. Bartel <i>et al.</i>	(JADE Collab.)
BEHREND	85	PR D32 2468	S. Behrends <i>et al.</i>	(CLEO Collab.)
BELTRAMI	85	PRL 54 1775	I. Beltrami <i>et al.</i>	(HRS Collab.)
BERGER	85	ZPHY C28 1	C. Berger <i>et al.</i>	(PLUTO Collab.)
BURCHAT	85	PRL 54 2489	P.R. Burchat <i>et al.</i>	(Mark II Collab.)
FERNANDEZ	85	PRL 54 1624	E. Fernandez <i>et al.</i>	(MAC Collab.)
MILLS	85	PRL 54 624	G.B. Mills <i>et al.</i>	(DELCO Collab.)
AIHARA	84C	PR D30 2436	H. Aihara <i>et al.</i>	(TPC Collab.)
BEHREND	84	ZPHY C23 103	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
MILLS	84	PRL 52 1944	G.B. Mills <i>et al.</i>	(DELCO Collab.)
BEHREND	83C	PL 127B 270	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
SILVERMAN	83	PR D27 1196	D.J. Silverman, G.L. Shaw	(UCI)
BEHREND	82	PL 114B 282	H.J. Behrend <i>et al.</i>	(CELLO Collab.)
BLOCKER	82B	PRL 48 1586	C.A. Blocker <i>et al.</i>	(Mark II Collab.)
BLOCKER	82D	PL 109B 119	C.A. Blocker <i>et al.</i>	(Mark II Collab.) J
FELDMAN	82	PRL 48 66	G.J. Feldman <i>et al.</i>	(Mark II Collab.)
HAYES	82	PR D25 2869	K.G. Hayes <i>et al.</i>	(Mark II Collab.)
BERGER	81B	PL 99B 489	C. Berger <i>et al.</i>	(PLUTO Collab.)
DORFAN	81	PRL 46 215	J.M. Dorfan <i>et al.</i>	(Mark II Collab.)
BRANDELIK	80	PL 92B 199	R. Brandelik <i>et al.</i>	(TASSO Collab.)
ZHOLENTZ	80	PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)
Also		SJNP 34 814	A.A. Zholents <i>et al.</i>	(NOVO)
		Translated from YAF 34	1471.	
BACINO	79B	PRL 42 749	W.J. Bacino <i>et al.</i>	(DELCO Collab.)
KIRKBY	79	SLAC-PUB-2419	J. Kirkby	(SLAC) J
		Batavia Lepton Photon Conference.		
BACINO	78B	PRL 41 13	W.J. Bacino <i>et al.</i>	(DELCO Collab.) J
Also		Tokyo Conf. 249	J. Kirz	(STON)
Also		PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)
BRANDELIK	78	PL 73B 109	R. Brandelik <i>et al.</i>	(DASP Collab.) J
FELDMAN	78	Tokyo Conf. 777	G.J. Feldman	(SLAC) J
JAROS	78	PRL 40 1120	J. Jaros <i>et al.</i>	(SLAC, LBL, NWES, HAWA)
PERL	75	PRL 35 1489	M.L. Perl <i>et al.</i>	(LBL, SLAC)

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GENTILE	96	PRPL 274 287	S. Gentile, M. Pohl	(ROMAI, ETH)
WEINSTEIN	93	ARNPS 43 457	A.J. Weinstein, R. Stroynowski	(CIT, SMU)
PERL	92	RPP 55 653	M.L. Perl	(SLAC)
PICH	90	MPL A5 1995	A. Pich	(VALE)
BARISH	88	PRPL 157 1	B.C. Barish, R. Stroynowski	(CIT)
GAN	88	IJMP A3 531	K.K. Gan, M.L. Perl	(SLAC)
HAYES	88	PR D38 3351	K.G. Hayes, M.L. Perl	(SLAC)
PERL	80	ARNPS 30 299	M.L. Perl	(SLAC)