

$$I(J^P) = \frac{1}{2}(0^-)$$

## $D^\pm$ MASS

The fit includes  $D^\pm$ ,  $D^0$ ,  $D_s^\pm$ ,  $D^{*\pm}$ ,  $D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1869.3 ± 0.5 OUR FIT</b>		Error includes scale factor of 1.1.		
<b>1869.4 ± 0.5 OUR AVERAGE</b>				
1870.0 ± 0.5 ± 1.0	317	BARLAG	90C ACCM	$\pi^-$ Cu 230 GeV
1863 ± 4		DERRICK	84 HRS	$e^+ e^-$ 29 GeV
1869.4 ± 0.6		<sup>1</sup> TRILLING	81 RVUE	$e^+ e^-$ 3.77 GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1875 ± 10	9	ADAMOVICH	87 EMUL	Photoproduction
1860 ± 16	6	ADAMOVICH	84 EMUL	Photoproduction
1868.4 ± 0.5		<sup>1</sup> SCHINDLER	81 MRK2	$e^+ e^-$ 3.77 GeV
1874 ± 5		GOLDHABER	77 MRK1	$D^0$ , $D^+$ recoil spectra
1868.3 ± 0.9		<sup>1</sup> PERUZZI	77 MRK1	$e^+ e^-$ 3.77 GeV
1874 ± 11		PICCOLO	77 MRK1	$e^+ e^-$ 4.03, 4.41 GeV
1876 ± 15	50	PERUZZI	76 MRK1	$K^\mp \pi^\pm \pi^\pm$

<sup>1</sup> PERUZZI 77 and SCHINDLER 81 errors do not include the 0.13% uncertainty in the absolute SPEAR energy calibration. TRILLING 81 uses the high precision  $J/\psi(1S)$  and  $\psi(2S)$  measurements of ZHOLENTZ 80 to determine this uncertainty and combines the PERUZZI 77 and SCHINDLER 81 results to obtain the value quoted.

## $D^\pm$ MEAN LIFE

Measurements with an error  $> 100 \times 10^{-15}$  s have been omitted from the Listings.

VALUE ( $10^{-15}$ s)	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1051 ± 13 OUR AVERAGE</b>				
1033.6 ± 22.1 <sup>+9.9</sup> <sub>-12.7</sub>	3777	BONVICINI	99 CLE2	$e^+ e^- \approx \Upsilon(4S)$
1048 ± 15 ± 11	9k	FRABETTI	94D E687	$D^+ \rightarrow K^- \pi^+ \pi^+$
1075 ± 40 ± 18	2455	FRABETTI	91 E687	$\gamma$ Be, $D^+ \rightarrow K^- \pi^+ \pi^+$
1030 ± 80 ± 60	200	ALVAREZ	90 NA14	$\gamma$ , $D^+ \rightarrow K^- \pi^+ \pi^+$
1050 <sup>+77</sup> <sub>-72</sub>	317	<sup>2</sup> BARLAG	90C ACCM	$\pi^-$ Cu 230 GeV
1050 ± 80 ± 70	363	ALBRECHT	88I ARG	$e^+ e^-$ 10 GeV
1090 ± 30 ± 25	2992	RAAB	88 E691	Photoproduction

<sup>2</sup> BARLAG 90C estimates the systematic error to be negligible.

## $D^+$ DECAY MODES

$D^-$  modes are charge conjugates of the modes below.

Mode	Fraction ( $\Gamma_i/\Gamma$ )	Scale factor/ Confidence level
<b>Inclusive modes</b>		
$\Gamma_1$ $e^+$ anything	$(17.2 \pm 1.9) \%$	
$\Gamma_2$ $K^-$ anything	$(24.2 \pm 2.8) \%$	S=1.4
$\Gamma_3$ $\bar{K}^0$ anything + $K^0$ anything	$(59 \pm 7) \%$	
$\Gamma_4$ $K^+$ anything	$(5.8 \pm 1.4) \%$	
$\Gamma_5$ $\eta$ anything	[a] $< 13$ %	CL=90%
$\Gamma_6$ $\phi$ anything	$< 1.8$ %	CL=90%
$\Gamma_7$ $\phi e^+$ anything	$< 1.6$ %	CL=90%
$\Gamma_8$ $\mu^+$ anything		
<b>Leptonic and semileptonic modes</b>		
$\Gamma_9$ $\mu^+ \nu_\mu$	$(8 \pm^{+17}_{-5}) \times 10^{-4}$	
$\Gamma_{10}$ $\bar{K}^0 \ell^+ \nu_\ell$	[b] $(6.7 \pm 0.8) \%$	
$\Gamma_{11}$ $\bar{K}^0 e^+ \nu_e$	$(6.6 \pm 0.9) \%$	
$\Gamma_{12}$ $\bar{K}^0 \mu^+ \nu_\mu$	$(7.0 \pm^{+3.0}_{-2.0}) \%$	
$\Gamma_{13}$ $K^- \pi^+ e^+ \nu_e$	$(4.1 \pm^{+0.9}_{-0.7}) \%$	
$\Gamma_{14}$ $\bar{K}^*(892)^0 e^+ \nu_e$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(3.2 \pm 0.33) \%$	
$\Gamma_{15}$ $K^- \pi^+ e^+ \nu_e$ nonresonant	$< 7 \times 10^{-3}$	CL=90%
$\Gamma_{16}$ $K^- \pi^+ \mu^+ \nu_\mu$	$(3.2 \pm 0.4) \%$	S=1.1
In the fit as $\frac{2}{3}\Gamma_{28} + \Gamma_{18}$ , where $\frac{2}{3}\Gamma_{28} = \Gamma_{17}$ .		
$\Gamma_{17}$ $\bar{K}^*(892)^0 \mu^+ \nu_\mu$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(3.0 \pm 0.4) \%$	
$\Gamma_{18}$ $K^- \pi^+ \mu^+ \nu_\mu$ nonresonant	$(2.7 \pm 1.1) \times 10^{-3}$	
$\Gamma_{19}$ $\bar{K}^0 \pi^+ \pi^- e^+ \nu_e$		
$\Gamma_{20}$ $K^- \pi^+ \pi^0 e^+ \nu_e$		
$\Gamma_{21}$ $(\bar{K}^*(892)\pi)^0 e^+ \nu_e$	$< 1.2$ %	CL=90%
$\Gamma_{22}$ $(\bar{K}\pi\pi)^0 e^+ \nu_e$ non- $\bar{K}^*(892)$	$< 9 \times 10^{-3}$	CL=90%
$\Gamma_{23}$ $K^- \pi^+ \pi^0 \mu^+ \nu_\mu$	$< 1.4 \times 10^{-3}$	CL=90%
$\Gamma_{24}$ $\pi^0 \ell^+ \nu_\ell$	[c] $(3.1 \pm 1.5) \times 10^{-3}$	
$\Gamma_{25}$ $\pi^+ \pi^- e^+ \nu_e$		
Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.		
$\Gamma_{26}$ $\bar{K}^*(892)^0 \ell^+ \nu_\ell$	[b] $(4.8 \pm 0.4) \%$	
$\Gamma_{27}$ $\bar{K}^*(892)^0 e^+ \nu_e$	$(4.8 \pm 0.5) \%$	
$\Gamma_{28}$ $\bar{K}^*(892)^0 \mu^+ \nu_\mu$	$(4.5 \pm 0.6) \%$	S=1.1

$\Gamma_{29}$	$\bar{K}_1(1270)^0 \mu^+ \nu_\mu$	$< 3.5$	%	CL=95%
$\Gamma_{30}$	$\bar{K}^*(1410)^0 \mu^+ \nu_\mu$			
$\Gamma_{31}$	$\bar{K}_2^*(1430)^0 \mu^+ \nu_\mu$	$< 8$	$\times 10^{-3}$	CL=95%
$\Gamma_{32}$	$\rho^0 e^+ \nu_e$	$(2.2 \pm 0.8)$	$\times 10^{-3}$	
$\Gamma_{33}$	$\rho^0 \mu^+ \nu_\mu$	$(2.7 \pm 0.7)$	$\times 10^{-3}$	
$\Gamma_{34}$	$\phi e^+ \nu_e$	$< 2.09$	%	CL=90%
$\Gamma_{35}$	$\phi \mu^+ \nu_\mu$	$< 3.72$	%	CL=90%
$\Gamma_{36}$	$\eta \ell^+ \nu_\ell$	$< 5$	$\times 10^{-3}$	CL=90%
$\Gamma_{37}$	$\eta'(958) \mu^+ \nu_\mu$	$< 9$	$\times 10^{-3}$	CL=90%

### Hadronic modes with a $\bar{K}$ or $\bar{K}K\bar{K}$

$\Gamma_{38}$	$\bar{K}^0 \pi^+$	$(2.77 \pm 0.18)$	%	
$\Gamma_{39}$	$K^- \pi^+ \pi^+$	[d] $(9.1 \pm 0.6)$	%	
$\Gamma_{40}$	$\bar{K}^*(892)^0 \pi^+$ $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(1.28 \pm 0.13)$	%	
$\Gamma_{41}$	$\bar{K}_0^*(1430)^0 \pi^+$ $\times B(\bar{K}_0^*(1430)^0 \rightarrow K^- \pi^+)$	$(2.3 \pm 0.3)$	%	
$\Gamma_{42}$	$\bar{K}^*(1680)^0 \pi^+$ $\times B(\bar{K}^*(1680)^0 \rightarrow K^- \pi^+)$	$(3.7 \pm 0.8)$	$\times 10^{-3}$	
$\Gamma_{43}$	$K^- \pi^+ \pi^+$ nonresonant	$(8.6 \pm 0.8)$	%	
$\Gamma_{44}$	$\bar{K}^0 \pi^+ \pi^0$	[d] $(9.7 \pm 3.0)$	%	S=1.1
$\Gamma_{45}$	$\bar{K}^0 \rho^+$	$(6.6 \pm 2.5)$	%	
$\Gamma_{46}$	$\bar{K}^*(892)^0 \pi^+$ $\times B(\bar{K}^{*0} \rightarrow \bar{K}^0 \pi^0)$	$(6.4 \pm 0.6)$	$\times 10^{-3}$	
$\Gamma_{47}$	$\bar{K}^0 \pi^+ \pi^0$ nonresonant	$(1.3 \pm 1.1)$	%	
$\Gamma_{48}$	$K^- \pi^+ \pi^+ \pi^0$	[d] $(6.4 \pm 1.1)$	%	
$\Gamma_{49}$	$\bar{K}^*(892)^0 \rho^+$ total $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(1.4 \pm 0.9)$	%	
$\Gamma_{50}$	$\bar{K}_1(1400)^0 \pi^+$ $\times B(\bar{K}_1(1400)^0 \rightarrow K^- \pi^+ \pi^0)$	$(2.1 \pm 0.5)$	%	
$\Gamma_{51}$	$K^- \rho^+ \pi^+$ total	$(3.1 \pm 1.1)$	%	
$\Gamma_{52}$	$K^- \rho^+ \pi^+ 3$ -body	$(1.1 \pm 0.4)$	%	
$\Gamma_{53}$	$\bar{K}^*(892)^0 \pi^+ \pi^0$ total $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(4.5 \pm 0.9)$	%	
$\Gamma_{54}$	$\bar{K}^*(892)^0 \pi^+ \pi^0 3$ -body $\times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$(2.8 \pm 0.9)$	%	
$\Gamma_{55}$	$K^*(892)^- \pi^+ \pi^+ 3$ -body $\times B(K^{*-} \rightarrow K^- \pi^0)$	$(7 \pm 3)$	$\times 10^{-3}$	
$\Gamma_{56}$	$K^- \pi^+ \pi^+ \pi^0$ nonresonant	[e] $(1.2 \pm 0.6)$	%	
$\Gamma_{57}$	$\bar{K}^0 \pi^+ \pi^+ \pi^-$	[d] $(7.0 \pm 0.9)$	%	
$\Gamma_{58}$	$\bar{K}^0 a_1(1260)^+$ $\times B(a_1(1260)^+ \rightarrow \pi^+ \pi^+ \pi^-)$	$(4.0 \pm 0.9)$	%	
$\Gamma_{59}$	$\bar{K}_1(1400)^0 \pi^+$ $\times B(\bar{K}_1(1400)^0 \rightarrow \bar{K}^0 \pi^+ \pi^-)$	$(2.1 \pm 0.5)$	%	

Γ <sub>60</sub>	$K^*(892)^- \pi^+ \pi^+$ 3-body × B( $K^{*-} \rightarrow \bar{K}^0 \pi^-$ )	( 1.4 ± 0.6 ) %	
Γ <sub>61</sub>	$\bar{K}^0 \rho^0 \pi^+$ total	( 4.2 ± 0.9 ) %	
Γ <sub>62</sub>	$\bar{K}^0 \rho^0 \pi^+$ 3-body	( 5 ± 5 ) × 10 <sup>-3</sup>	
Γ <sub>63</sub>	$\bar{K}^0 \pi^+ \pi^+ \pi^-$ nonresonant	( 8 ± 4 ) × 10 <sup>-3</sup>	
Γ <sub>64</sub>	$K^- \pi^+ \pi^+ \pi^-$	[d] ( 7.3 ± 1.0 ) × 10 <sup>-3</sup>	
Γ <sub>65</sub>	$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ × B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )	( 5.5 ± 2.3 ) × 10 <sup>-3</sup>	
Γ <sub>66</sub>	$\bar{K}^*(892)^0 \rho^0 \pi^+$ × B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )	( 1.9 <sup>+ 1.1</sup> <sub>- 1.0</sub> ) × 10 <sup>-3</sup>	
Γ <sub>67</sub>	$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ no- $\rho$ × B( $\bar{K}^{*0} \rightarrow K^- \pi^+$ )	( 2.9 ± 1.1 ) × 10 <sup>-3</sup>	
Γ <sub>68</sub>	$K^- \rho^0 \pi^+ \pi^+$	( 3.1 ± 1.0 ) × 10 <sup>-3</sup>	
Γ <sub>69</sub>	$K^- \pi^+ \pi^+ \pi^-$ nonresonant	< 2.4 × 10 <sup>-3</sup>	CL=90%
Γ <sub>70</sub>	$K^- \pi^+ \pi^+ \pi^0 \pi^0$		
Γ <sub>71</sub>	$\bar{K}^0 \pi^+ \pi^+ \pi^- \pi^0$		
Γ <sub>72</sub>	$\bar{K}^0 \pi^+ \pi^+ \pi^- \pi^-$		
Γ <sub>73</sub>	$K^- \pi^+ \pi^+ \pi^- \pi^0$		
Γ <sub>74</sub>	$\bar{K}^0 \bar{K}^0 K^+$	( 1.8 ± 0.8 ) %	
Γ <sub>75</sub>	$K^+ K^- \bar{K}^0 \pi^+$	( 5.4 ± 1.4 ) × 10 <sup>-4</sup>	

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

Γ <sub>76</sub>	$\bar{K}^0 \rho^+$	( 6.6 ± 2.5 ) %	
Γ <sub>77</sub>	$\bar{K}^0 a_1(1260)^+$	( 8.1 ± 1.7 ) %	
Γ <sub>78</sub>	$\bar{K}^0 a_2(1320)^+$	< 3 × 10 <sup>-3</sup>	CL=90%
Γ <sub>79</sub>	$\bar{K}^*(892)^0 \pi^+$	( 1.92 ± 0.19 ) %	
Γ <sub>80</sub>	$\bar{K}^*(892)^0 \rho^+$ total	[e] ( 2.1 ± 1.4 ) %	
Γ <sub>81</sub>	$\bar{K}^*(892)^0 \rho^+$ S-wave	[e] ( 1.7 ± 1.6 ) %	
Γ <sub>82</sub>	$\bar{K}^*(892)^0 \rho^+$ P-wave	< 1 × 10 <sup>-3</sup>	CL=90%
Γ <sub>83</sub>	$\bar{K}^*(892)^0 \rho^+$ D-wave	( 10 ± 7 ) × 10 <sup>-3</sup>	
Γ <sub>84</sub>	$\bar{K}^*(892)^0 \rho^+$ D-wave longitudinal	< 7 × 10 <sup>-3</sup>	CL=90%
Γ <sub>85</sub>	$\bar{K}_1(1270)^0 \pi^+$	< 7 × 10 <sup>-3</sup>	CL=90%
Γ <sub>86</sub>	$\bar{K}_1(1400)^0 \pi^+$	( 4.9 ± 1.2 ) %	
Γ <sub>87</sub>	$\bar{K}^*(1410)^0 \pi^+$		
Γ <sub>88</sub>	$\bar{K}_0^*(1430)^0 \pi^+$	( 3.7 ± 0.4 ) %	
Γ <sub>89</sub>	$\bar{K}^*(1680)^0 \pi^+$	( 1.45 ± 0.31 ) %	
Γ <sub>90</sub>	$\bar{K}^*(892)^0 \pi^+ \pi^0$ total	( 6.7 ± 1.4 ) %	
Γ <sub>91</sub>	$\bar{K}^*(892)^0 \pi^+ \pi^0$ 3-body	[e] ( 4.2 ± 1.4 ) %	
Γ <sub>92</sub>	$K^*(892)^- \pi^+ \pi^+$ total		
Γ <sub>93</sub>	$K^*(892)^- \pi^+ \pi^+$ 3-body	( 2.1 ± 0.9 ) %	
Γ <sub>94</sub>	$K^- \rho^+ \pi^+$ total	( 3.1 ± 1.1 ) %	

$\Gamma_{95}$	$K^- \rho^+ \pi^+$ 3-body	$( 1.1 \pm 0.4 ) \%$	
$\Gamma_{96}$	$\bar{K}^0 \rho^0 \pi^+$ total	$( 4.2 \pm 0.9 ) \%$	CL=90%
$\Gamma_{97}$	$\bar{K}^0 \rho^0 \pi^+$ 3-body	$( 5 \pm 5 ) \times 10^{-3}$	
$\Gamma_{98}$	$\bar{K}^0 f_0(980) \pi^+$		
$\Gamma_{99}$	$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$	$( 8.2 \pm 3.4 ) \times 10^{-3}$	S=1.7
$\Gamma_{100}$	$\bar{K}^*(892)^0 \rho^0 \pi^+$	$( 2.9 \pm 1.7 ) \times 10^{-3}$	S=1.8
$\Gamma_{101}$	$\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-$ no- $\rho$	$( 4.3 \pm 1.7 ) \times 10^{-3}$	
$\Gamma_{102}$	$K^- \rho^0 \pi^+ \pi^+$	$( 3.1 \pm 1.0 ) \times 10^{-3}$	

### Pionic modes

$\Gamma_{103}$	$\pi^+ \pi^0$	$( 2.5 \pm 0.7 ) \times 10^{-3}$	
$\Gamma_{104}$	$\pi^+ \pi^+ \pi^-$	$( 3.1 \pm 0.4 ) \times 10^{-3}$	S=1.5
$\Gamma_{105}$	$\sigma \pi^+$	$( 2.1 \pm 0.5 ) \times 10^{-3}$	
$\Gamma_{106}$	$\rho^0 \pi^+$	$( 1.04 \pm 0.18 ) \times 10^{-3}$	
$\Gamma_{107}$	$f_0(980) \pi^+ \times B(f_0 \rightarrow \pi^+ \pi^-)$ [f]	$( 1.9 \pm 0.5 ) \times 10^{-4}$	
$\Gamma_{108}$	$f_2(1270) \pi^+ \times B(f_2 \rightarrow \pi^+ \pi^-)$	$( 6.0 \pm 1.1 ) \times 10^{-4}$	
$\Gamma_{109}$	$f_0(1370) \pi^+$		
$\Gamma_{110}$	$\rho(1450)^0 \pi^+$		
$\Gamma_{111}$	$\pi^+ \pi^+ \pi^-$ nonresonant	$( 2.4 \pm 2.1 ) \times 10^{-4}$	
$\Gamma_{112}$	$\pi^+ \pi^+ \pi^- \pi^0$	—	
$\Gamma_{113}$	$\eta \pi^+ \times B(\eta \rightarrow \pi^+ \pi^- \pi^0)$	$( 6.9 \pm 1.4 ) \times 10^{-4}$	
$\Gamma_{114}$	$\omega \pi^+ \times B(\omega \rightarrow \pi^+ \pi^- \pi^0)$	$< 6 \times 10^{-3}$	CL=90%
$\Gamma_{115}$	$\pi^+ \pi^+ \pi^+ \pi^- \pi^-$	$( 2.1 \pm 0.4 ) \times 10^{-3}$	
$\Gamma_{116}$	$\pi^+ \pi^+ \pi^+ \pi^- \pi^- \pi^0$		

Fractions of some of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\Gamma_{117}$	$\eta \pi^+$	$( 3.0 \pm 0.6 ) \times 10^{-3}$	
$\Gamma_{118}$	$\rho^0 \pi^+$	$( 1.04 \pm 0.18 ) \times 10^{-3}$	
$\Gamma_{119}$	$\omega \pi^+$	$< 7 \times 10^{-3}$	CL=90%
$\Gamma_{120}$	$\eta \rho^+$	$< 7 \times 10^{-3}$	CL=90%
$\Gamma_{121}$	$\eta'(958) \pi^+$	$( 5.0 \pm 1.0 ) \times 10^{-3}$	
$\Gamma_{122}$	$\eta'(958) \rho^+$	$< 5 \times 10^{-3}$	CL=90%
$\Gamma_{123}$	$f_2(1270) \pi^+$	$( 1.06 \pm 0.20 ) \times 10^{-3}$	

### Hadronic modes with a $K\bar{K}$ pair

$\Gamma_{124}$	$K^+ \bar{K}^0$	$( 5.8 \pm 0.6 ) \times 10^{-3}$	S=1.2
$\Gamma_{125}$	$K^+ K^- \pi^+$	[d] $( 8.8 \pm 0.8 ) \times 10^{-3}$	
$\Gamma_{126}$	$\phi \pi^+ \times B(\phi \rightarrow K^+ K^-)$	$( 3.0 \pm 0.3 ) \times 10^{-3}$	
$\Gamma_{127}$	$K^+ \bar{K}^*(892)^0 \times B(\bar{K}^{*0} \rightarrow K^- \pi^+)$	$( 2.8 \pm 0.4 ) \times 10^{-3}$	
$\Gamma_{128}$	$K^+ K^- \pi^+$ nonresonant	$( 4.5 \pm 0.9 ) \times 10^{-3}$	
$\Gamma_{129}$	$K^0 \bar{K}^0 \pi^+$	—	

$\Gamma_{130}$	$K^*(892)^+\bar{K}^0$ $\times B(K^{*+} \rightarrow K^0\pi^+)$		$(2.1 \pm 0.9) \%$	
$\Gamma_{131}$	$K^+K^-\pi^+\pi^0$		—	
$\Gamma_{132}$	$\phi\pi^+\pi^0 \times B(\phi \rightarrow K^+K^-)$		$(1.1 \pm 0.5) \%$	
$\Gamma_{133}$	$\phi\rho^+ \times B(\phi \rightarrow K^+K^-)$	$< 7$	$\times 10^{-3}$	CL=90%
$\Gamma_{134}$	$K^+K^-\pi^+\pi^0$ non- $\phi$		$(1.5 \pm_{-0.6}^{0.7}) \%$	
$\Gamma_{135}$	$K^+\bar{K}^0\pi^+\pi^-$		$(4.0 \pm 0.7) \times 10^{-3}$	
$\Gamma_{136}$	$K^0K^-\pi^+\pi^+$		$(5.4 \pm 0.8) \times 10^{-3}$	
$\Gamma_{137}$	$K^*(892)^+\bar{K}^*(892)^0$ $\times B^2(K^{*+} \rightarrow K^0\pi^+)$		$(1.2 \pm 0.5) \%$	
$\Gamma_{138}$	$K^0K^-\pi^+\pi^+$ non- $K^*\bar{K}^{*0}$	$< 7.9$	$\times 10^{-3}$	CL=90%
$\Gamma_{139}$	$K^+K^-\pi^+\pi^+\pi^-$		—	
$\Gamma_{140}$	$\phi\pi^+\pi^+\pi^-$ $\times B(\phi \rightarrow K^+K^-)$	$< 1$	$\times 10^{-3}$	CL=90%
$\Gamma_{141}$	$K^+K^-\pi^+\pi^+\pi^-$ nonresonant	$< 3$	$\%$	CL=90%

Fractions of the following modes with resonances have already appeared above as submodes of particular charged-particle modes.

$\Gamma_{142}$	$\phi\pi^+$		$(6.1 \pm 0.6) \times 10^{-3}$	
$\Gamma_{143}$	$\phi\pi^+\pi^0$		$(2.3 \pm 1.0) \%$	
$\Gamma_{144}$	$\phi\rho^+$	$< 1.4$	$\%$	CL=90%
$\Gamma_{145}$	$\phi\pi^+\pi^+\pi^-$	$< 2$	$\times 10^{-3}$	CL=90%
$\Gamma_{146}$	$K^+\bar{K}^*(892)^0$		$(4.2 \pm 0.5) \times 10^{-3}$	
$\Gamma_{147}$	$K^*(892)^+\bar{K}^0$		$(3.1 \pm 1.4) \%$	
$\Gamma_{148}$	$K^*(892)^+\bar{K}^*(892)^0$		$(2.6 \pm 1.1) \%$	

**Doubly Cabibbo suppressed (DC) modes,  
 $\Delta C = 1$  weak neutral current (C1) modes, or  
 Lepton Family number (LF) or Lepton number (L) violating modes**

$\Gamma_{149}$	$K^+\pi^+\pi^-$	DC	$(6.8 \pm 1.5) \times 10^{-4}$	
$\Gamma_{150}$	$K^+\rho^0$	DC	$(2.5 \pm 1.2) \times 10^{-4}$	
$\Gamma_{151}$	$K^*(892)^0\pi^+$	DC	$(3.6 \pm 1.6) \times 10^{-4}$	
$\Gamma_{152}$	$K^+\pi^+\pi^-$ nonresonant	DC	$(2.5 \pm 1.2) \times 10^{-4}$	
$\Gamma_{153}$	$K^+K^+K^-$	DC	$< 1.4$	$\times 10^{-4}$ CL=90%
$\Gamma_{154}$	$\phi K^+$	DC	$< 1.3$	$\times 10^{-4}$ CL=90%
$\Gamma_{155}$	$\pi^+e^+e^-$	C1	$< 5.2$	$\times 10^{-5}$ CL=90%
$\Gamma_{156}$	$\pi^+\mu^+\mu^-$	C1	$< 1.5$	$\times 10^{-5}$ CL=90%
$\Gamma_{157}$	$\rho^+\mu^+\mu^-$	C1	$< 5.6$	$\times 10^{-4}$ CL=90%
$\Gamma_{158}$	$K^+e^+e^-$	[g]	$< 2.0$	$\times 10^{-4}$ CL=90%
$\Gamma_{159}$	$K^+\mu^+\mu^-$	[g]	$< 4.4$	$\times 10^{-5}$ CL=90%
$\Gamma_{160}$	$\pi^+e^\pm\mu^\mp$	LF	[h] $< 3.4$	$\times 10^{-5}$ CL=90%
$\Gamma_{161}$	$\pi^+e^+\mu^-$			
$\Gamma_{162}$	$\pi^+e^-\mu^+$			

$\Gamma_{163}$	$K^+ e^\pm \mu^\mp$	$LF$	$[h] < 6.8$	$\times 10^{-5}$	CL=90%
$\Gamma_{164}$	$K^+ e^+ \mu^-$				
$\Gamma_{165}$	$K^+ e^- \mu^+$				
$\Gamma_{166}$	$\pi^- e^+ e^+$	$L$	$< 9.6$	$\times 10^{-5}$	CL=90%
$\Gamma_{167}$	$\pi^- \mu^+ \mu^+$	$L$	$< 1.7$	$\times 10^{-5}$	CL=90%
$\Gamma_{168}$	$\pi^- e^+ \mu^+$	$L$	$< 5.0$	$\times 10^{-5}$	CL=90%
$\Gamma_{169}$	$\rho^- \mu^+ \mu^+$	$L$	$< 5.6$	$\times 10^{-4}$	CL=90%
$\Gamma_{170}$	$K^- e^+ e^+$	$L$	$< 1.2$	$\times 10^{-4}$	CL=90%
$\Gamma_{171}$	$K^- \mu^+ \mu^+$	$L$	$< 1.2$	$\times 10^{-4}$	CL=90%
$\Gamma_{172}$	$K^- e^+ \mu^+$	$L$	$< 1.3$	$\times 10^{-4}$	CL=90%
$\Gamma_{173}$	$K^*(892)^- \mu^+ \mu^+$	$L$	$< 8.5$	$\times 10^{-4}$	CL=90%

$\Gamma_{174}$  A dummy mode used by the fit.  $(33 \pm 5)$  %

- [a] This is a weighted average of  $D^\pm$  (44%) and  $D^0$  (56%) branching fractions. See " $D^+$  and  $D^0 \rightarrow (\eta \text{ anything}) / (\text{total } D^+ \text{ and } D^0)$ " under " $D^+$  Branching Ratios" in these Particle Listings.
  - [b] This value averages the  $e^+$  and  $\mu^+$  branching fractions, after making a small phase-space adjustment to the  $\mu^+$  fraction to be able to use it as an  $e^+$  fraction; hence our  $\ell^+$  here is really an  $e^+$ .
  - [c] An  $\ell$  indicates an  $e$  or a  $\mu$  mode, not a sum over these modes.
  - [d] The branching fraction for this mode may differ from the sum of the submodes that contribute to it, due to interference effects. See the relevant papers.
  - [e] The two experiments measuring this fraction are in serious disagreement. See the Particle Listings.
  - [f] This value includes only  $\pi^+ \pi^-$  decays of the intermediate resonance, because branching fractions of this resonance are not known.
  - [g] This mode is not a useful test for a  $\Delta C=1$  weak neutral current because both quarks must change flavor in this decay.
  - [h] The value is for the sum of the charge states or particle/antiparticle states indicated.
-

## CONSTRAINED FIT INFORMATION

An overall fit to 30 branching ratios uses 53 measurements and one constraint to determine 19 parameters. The overall fit has a  $\chi^2 = 29.3$  for 35 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 <sub>13</sub>	6										
x <sub>18</sub>	5	2									
x <sub>27</sub>	21	29	8								
x <sub>28</sub>	17	7	31	26							
x <sub>38</sub>	38	16	14	54	44						
x <sub>39</sub>	38	16	14	57	45	96					
x <sub>44</sub>	0	0	0	0	0	0	0				
x <sub>48</sub>	9	4	3	13	10	22	23	0			
x <sub>57</sub>	11	5	4	17	14	29	30	0	18		
x <sub>64</sub>	18	8	7	28	22	47	49	0	11	15	
x <sub>79</sub>	25	11	9	37	30	63	65	0	15	20	
x <sub>86</sub>	6	3	2	9	7	15	16	0	31	37	
x <sub>93</sub>	3	1	1	5	4	8	9	0	29	13	
x <sub>99</sub>	6	3	2	9	7	15	15	0	3	5	
x <sub>100</sub>	4	2	2	6	5	10	11	0	2	3	
x <sub>104</sub>	18	8	7	28	22	47	49	0	11	15	
x <sub>124</sub>	23	10	9	35	28	59	61	0	14	18	
x <sub>174</sub>	-37	-27	-13	-42	-35	-55	-56	-58	-46	-46	
	x <sub>11</sub>	x <sub>13</sub>	x <sub>18</sub>	x <sub>27</sub>	x <sub>28</sub>	x <sub>38</sub>	x <sub>39</sub>	x <sub>44</sub>	x <sub>48</sub>	x <sub>57</sub>	
x <sub>79</sub>	32										
x <sub>86</sub>	8	10									
x <sub>93</sub>	4	6	12								
x <sub>99</sub>	29	10	2	1							
x <sub>100</sub>	8	7	2	1	15						
x <sub>104</sub>	24	32	8	4	8	5					
x <sub>124</sub>	30	40	10	5	9	7	30				
x <sub>174</sub>	-31	-39	-46	-32	-16	-10	-28	-35			
	x <sub>64</sub>	x <sub>79</sub>	x <sub>86</sub>	x <sub>93</sub>	x <sub>99</sub>	x <sub>100</sub>	x <sub>104</sub>	x <sub>124</sub>			



## $D^+$ BRANCHING RATIOS

See the "Note on  $D$  Mesons" above. Some now-obsolete measurements have been omitted from these Listings.

### $c$ -quark decays

#### $\Gamma(c \rightarrow e^+ \text{ anything})/\Gamma(c \rightarrow \text{ anything})$

We only put the average of  $e^+$  and  $\mu^+$  measurements from  $Z^0 \rightarrow c\bar{c}$  decays in the Summary Table; see below.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.103 \pm 0.009</math></b> <sup>+0.009</sup> <sub>-0.008</sub>	378	<sup>3</sup> ABBIENDI	99K OPAL	$Z^0 \rightarrow c\bar{c}$

<sup>3</sup> ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed  $D^*(2010)^+ \rightarrow D^0\pi^+$  decays in  $Z^0 \rightarrow c\bar{c}$ .

#### $\Gamma(c \rightarrow \mu^+ \text{ anything})/\Gamma(c \rightarrow \text{ anything})$

We only put the average of  $e^+$  and  $\mu^+$  measurements from  $Z^0 \rightarrow c\bar{c}$  decays in the Summary Table; see below.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.087 \pm 0.006</math></b> OUR AVERAGE				
$0.095 \pm 0.007$ <sup>+0.014</sup> <sub>-0.013</sub>	2829	ASTIER	00D NOMD	$\nu_\mu \text{ Fe} \rightarrow \mu^- \mu^+ X$
$0.090 \pm 0.007$ <sup>+0.007</sup> <sub>-0.006</sub>	476	<sup>4</sup> ABBIENDI	99K OPAL	$Z^0 \rightarrow c\bar{c}$
$0.086 \pm 0.017$ <sup>+0.008</sup> <sub>-0.007</sub>	69	<sup>5</sup> ALBRECHT	92F ARG	$e^+e^- \approx 10 \text{ GeV}$
$0.078 \pm 0.009 \pm 0.012$		ONG	88 MRK2	$e^+e^- 29 \text{ GeV}$
$0.078 \pm 0.015 \pm 0.02$		BARTEL	87 JADE	$e^+e^- 34.6 \text{ GeV}$
$0.082 \pm 0.012$ <sup>+0.02</sup> <sub>-0.01</sub>		ALTHOFF	84G TASS	$e^+e^- 34.5 \text{ GeV}$

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

$0.089 \pm 0.018 \pm 0.025$		BARTEL	85J JADE	See BARTEL 87
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<sup>4</sup> ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed  $D^*(2010)^+ \rightarrow D^0\pi^+$  decays in  $Z^0 \rightarrow c\bar{c}$ .

<sup>5</sup> ALBRECHT 92F uses the excess of right-sign over wrong-sign leptons in a sample of events tagged by fully reconstructed  $D^*(2010)^+ \rightarrow D^0\pi^+$  decays.

#### $\Gamma(c \rightarrow \ell^+ \text{ anything})/\Gamma(c \rightarrow \text{ anything})$

This is an average (not a sum) of  $e^+$  and  $\mu^+$  measurements.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>0.096 \pm 0.004</math></b> OUR AVERAGE				
$0.0958 \pm 0.0042 \pm 0.0028$	1828	<sup>6</sup> ABREU	000 DLPH	$Z^0 \rightarrow c\bar{c}$
$0.095 \pm 0.006$ <sup>+0.007</sup> <sub>-0.006</sub>	854	<sup>7</sup> ABBIENDI	99K OPAL	$Z^0 \rightarrow c\bar{c}$

<sup>6</sup> ABREU 000 uses leptons opposite fully reconstructed  $D^*(2010)^+$ ,  $D^+$ , or  $D^0$  mesons.

<sup>7</sup> ABBIENDI 99K uses the excess of right-sign over wrong-sign leptons opposite reconstructed  $D^*(2010)^+ \rightarrow D^0\pi^+$  decays in  $Z^0 \rightarrow c\bar{c}$ .

### $\Gamma(c \rightarrow D^*(2010)^+ \text{ anything}) / \Gamma(c \rightarrow \text{ anything})$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.255 ± 0.015 ± 0.008</b>	2371	<sup>8</sup> ABREU	000 DLPH	$Z^0 \rightarrow c\bar{c}$

<sup>8</sup> ABREU 000 uses slow pions opposite fully reconstructed  $D^*(2010)^+$ ,  $D^+$ , or  $D^0$  mesons as a signal of  $D^*(2010)^-$  production.

#### Inclusive modes

### $\Gamma(e^+ \text{ anything}) / \Gamma_{\text{total}}$ $\Gamma_1 / \Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.172 ± 0.019 OUR AVERAGE</b>				

0.20 <sup>+0.09</sup> <sub>-0.07</sub>		AGUILAR-...	87E HYBR	$\pi p, pp$ 360, 400 GeV
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0.170 ± 0.019 ± 0.007	158	BALTRUSAIT..85B	MRK3	$e^+e^-$ 3.77 GeV
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0.168 ± 0.064	23	SCHINDLER	81 MRK2	$e^+e^-$ 3.771 GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.220 <sup>+0.044</sup> <sub>-0.022</sub>		BACINO	80 DLCO	$e^+e^-$ 3.77 GeV
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### $D^+ \text{ and } D^0 \rightarrow (e^+ \text{ anything}) / (\text{total } D^+ \text{ and } D^0)$

If measured at the  $\psi(3770)$ , this quantity is a weighted average of  $D^+$  (44%) and  $D^0$  (56%) branching fractions. Only experiments at  $E_{\text{cm}} = 3.77$  GeV are included in the average here. We don't put this result in the Meson Summary Table.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.110 ± 0.011 OUR AVERAGE</b>				Error includes scale factor of 1.1.

0.117 ± 0.011	295	BALTRUSAIT..85B	MRK3	$e^+e^-$ 3.77 GeV
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0.10 ± 0.032		<sup>9</sup> SCHINDLER	81 MRK2	$e^+e^-$ 3.771 GeV
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0.072 ± 0.028		FELLER	78 MRK1	$e^+e^-$ 3.772 GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.096 ± 0.004 ± 0.011	2207	<sup>10</sup> ALBRECHT	96C ARG	$e^+e^- \approx 10$ GeV
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0.134 ± 0.015 ± 0.010		<sup>11</sup> ABE	93E VNS	$e^+e^-$ 58 GeV
-----------------------	--	-------------------	---------	-----------------

0.098 ± 0.009 <sup>+0.006</sup> <sub>-0.005</sub>	240	<sup>12</sup> ALBRECHT	92F ARG	$e^+e^- \approx 10$ GeV
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0.096 ± 0.007 ± 0.015		<sup>13</sup> ONG	88 MRK2	$e^+e^-$ 29 GeV
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0.116 <sup>+0.011</sup> <sub>-0.009</sub>		<sup>13</sup> PAL	86 DLCO	$e^+e^-$ 29 GeV
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0.091 ± 0.009 ± 0.013		<sup>13</sup> AIHARA	85 TPC	$e^+e^-$ 29 GeV
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0.092 ± 0.022 ± 0.040		<sup>13</sup> ALTHOFF	84J TASS	$e^+e^-$ 34.6 GeV
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0.091 ± 0.013		<sup>13</sup> KOOP	84 DLCO	See PAL 86
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0.08 ± 0.015		<sup>14</sup> BACINO	79 DLCO	$e^+e^-$ 3.772 GeV
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<sup>9</sup> Isolates  $D^+$  and  $D^0 \rightarrow e^+X$  and weights for relative production (44%–56%).

<sup>10</sup> ALBRECHT 96C uses  $e^-$  in the hemisphere opposite to  $D^{*+} \rightarrow D^0\pi^+$  events.

<sup>11</sup> ABE 93E also measures forward-backward asymmetries and fragmentation functions for  $c$  and  $b$  quarks.

<sup>12</sup> ALBRECHT 92F uses the excess of right-sign over wrong-sign leptons in a sample of events tagged by fully reconstructed  $D^*(2010)^+ \rightarrow D^0\pi^+$  decays.

<sup>13</sup> Average BR for charm  $\rightarrow e^+X$ . Unlike at  $E_{\text{cm}} = 3.77$  GeV, the admixture of charmed mesons is unknown.

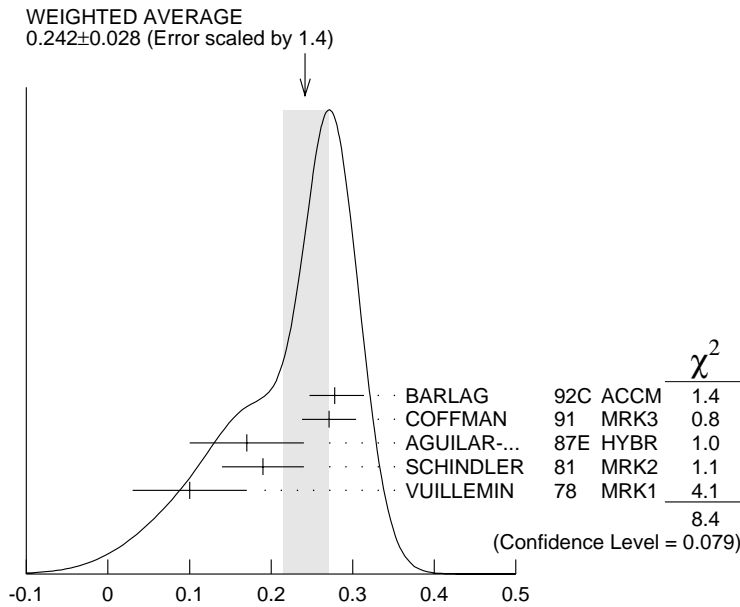
<sup>14</sup> Not independent of BACINO 80 measurements of  $\Gamma(e^+ \text{ anything}) / \Gamma_{\text{total}}$  for the  $D^+$  and  $D^0$  separately.

$\Gamma(K^- \text{ anything})/\Gamma_{\text{total}}$

$\Gamma_2/\Gamma$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.242±0.028 OUR AVERAGE</b>				Error includes scale factor of 1.4. See the ideogram below.
0.278 <sup>+0.036</sup> <sub>-0.031</sub>		<sup>15</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
0.271±0.023±0.024		COFFMAN	91 MRK3	$e^+e^-$ 3.77 GeV
0.17 ±0.07		AGUILAR-...	87E HYBR	$\pi p, pp$ 360, 400 GeV
0.19 ±0.05	26	SCHINDLER	81 MRK2	$e^+e^-$ 3.771 GeV
0.10 ±0.07	3	VUILLEMIN	78 MRK1	$e^+e^-$ 3.772 GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.16 <sup>+0.08</sup> <sub>-0.07</sub>		AGUILAR-...	86B HYBR	See AGUILAR-BENITEZ 87E

<sup>15</sup> BARLAG 92C computes the branching fraction using topological normalization.



$\Gamma(K^- \text{ anything})/\Gamma_{\text{total}}$

$[\Gamma(\bar{K}^0 \text{ anything}) + \Gamma(K^0 \text{ anything})]/\Gamma_{\text{total}}$

$\Gamma_3/\Gamma$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.59 ±0.07 OUR AVERAGE</b>				
0.612±0.065±0.043		COFFMAN	91 MRK3	$e^+e^-$ 3.77 GeV
0.52 ±0.18	15	SCHINDLER	81 MRK2	$e^+e^-$ 3.771 GeV
0.39 ±0.29	3	VUILLEMIN	78 MRK1	$e^+e^-$ 3.772 GeV

**$\Gamma(K^+ \text{ anything})/\Gamma_{\text{total}}$**   **$\Gamma_4/\Gamma$**

<u>VALUE</u>	<u>EVTs</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.058 ± 0.014 OUR AVERAGE</b>				
0.055 ± 0.013 ± 0.009		COFFMAN	91 MRK3	$e^+ e^-$ 3.77 GeV
0.08 <sup>+0.06</sup> <sub>-0.05</sub>		AGUILAR-...	87E HYBR	$\pi p, pp$ 360, 400 GeV
0.06 ± 0.04	12	SCHINDLER	81 MRK2	$e^+ e^-$ 3.771 GeV
0.06 ± 0.06	2	VUILLEMIN	78 MRK1	$e^+ e^-$ 3.772 GeV

**$D^+$  and  $D^0 \rightarrow (\eta \text{ anything}) / (\text{total } D^+ \text{ and } D^0)$**

If measured at the  $\psi(3770)$ , this quantity is a weighted average of  $D^+$  (44%) and  $D^0$  (56%) branching fractions. Only the experiment at  $E_{\text{cm}} = 3.77$  GeV is used.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.13</b>	PARTRIDGE	81 CBAL	$e^+ e^-$ 3.77 GeV

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

<0.02	<sup>16</sup> BRANDELIK	79 DASP	$e^+ e^-$ 4.03 GeV
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<sup>16</sup>The BRANDELIK 79 result is based on the absence of an  $\eta$  signal at  $E_{\text{cm}} = 4.03$  GeV. PARTRIDGE 81 observes a substantially higher  $\eta$  cross section at 4.03 GeV.

**$\Gamma(\phi \text{ anything})/\Gamma_{\text{total}}$**   **$\Gamma_6/\Gamma$**

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.018</b>	90	<sup>17</sup> BAI	00C BES	$e^+ e^- \rightarrow D\bar{D}^*, D^*\bar{D}^*$

<sup>17</sup>BAI 00C finds the average ( $\phi$  anything) branching fraction for the 4.03-GeV mix of  $D^+$  and  $D^0$  mesons to be  $(1.34 \pm 0.52 \pm 0.12)\%$ .

**$\Gamma(\phi e^+ \text{ anything})/\Gamma_{\text{total}}$**   **$\Gamma_7/\Gamma$**

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.016</b>	90	BAI	00C BES	$e^+ e^- \rightarrow D\bar{D}^*, D^*\bar{D}^*$

———— Leptonic and semileptonic modes ————

**$\Gamma(\mu^+ \nu_\mu)/\Gamma_{\text{total}}$**   **$\Gamma_9/\Gamma$**

See the "Note on Pseudoscalar-Meson Decay Constants" in the Listings for the  $\pi^\pm$ .

<u>VALUE</u>	<u>CL%</u>	<u>EVTs</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0008 <sup>+0.0016 +0.0005</sup><sub>-0.0005 -0.0002</sub></b>		1	<sup>18</sup> BAI	98B BES	$e^+ e^- \rightarrow D^{*+} D^-$

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

< 0.00072	90		ADLER	88B MRK3	$e^+ e^-$ 3.77 GeV
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< 0.02	90	0	<sup>19</sup> AUBERT	83 SPEC	$\mu^+ \text{ Fe}$ , 250 GeV
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<sup>18</sup>BAI 98B obtains  $f_D = (300^{+180+80}_{-150-40})$  MeV from this measurement.

<sup>19</sup>AUBERT 83 obtains an upper limit 0.014 assuming the final state contains equal amounts of  $(D^+, D^-)$ ,  $(D^+, \bar{D}^0)$ ,  $(D^-, D^0)$ , and  $(D^0, \bar{D}^0)$ . We quote the limit they get under more general assumptions.

$\Gamma(\bar{K}^0 e^+ \nu_e)/\Gamma_{\text{total}}$   $\Gamma_{10}/\Gamma$

We average our  $\bar{K}^0 e^+ \nu_e$  and  $\bar{K}^0 \mu^+ \nu_\mu$  branching fractions, after multiplying the latter by a phase-space factor of 1.03 to be able to use it with the  $\bar{K}^0 e^+ \nu_e$  fraction. Hence our  $\ell^+$  here is really an  $e^+$ .

VALUE	DOCUMENT ID	COMMENT
<b>0.067±0.008 OUR AVERAGE</b>		
0.066±0.009	PDG	02 Our $\Gamma(\bar{K}^0 e^+ \nu_e)/\Gamma_{\text{total}}$
0.072 <sup>+0.031</sup> <sub>-0.020</sub>	PDG	02 1.03 × our $\Gamma(\bar{K}^0 \mu^+ \nu_\mu)/\Gamma_{\text{total}}$

$\Gamma(\bar{K}^0 e^+ \nu_e)/\Gamma_{\text{total}}$   $\Gamma_{11}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.066±0.009 OUR FIT</b>				
0.06 <sup>+0.022</sup> <sub>-0.013</sub> ±0.007	13	BAI	91	MRK3 $e^+ e^- \approx 3.77$ GeV

$\Gamma(\bar{K}^0 e^+ \nu_e)/\Gamma(\bar{K}^0 \pi^+)$   $\Gamma_{11}/\Gamma_{38}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>2.38±0.31 OUR FIT</b>				
2.60±0.35±0.26	186	<sup>20</sup> BEAN	93C	CLE2 $e^+ e^- \approx \Upsilon(4S)$

<sup>20</sup> BEAN 93C uses  $\bar{K}^0 \mu^+ \nu_\mu$  as well as  $\bar{K}^0 e^+ \nu_e$  events and makes a small phase-space adjustment to the number of the  $\mu^+$  events to use them as  $e^+$  events.

$\Gamma(\bar{K}^0 e^+ \nu_e)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{11}/\Gamma_{39}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.73±0.09 OUR FIT</b>			
0.66±0.09±0.14	ANJOS	91C E691	$\gamma$ Be 80–240 GeV

$\Gamma(\bar{K}^0 \mu^+ \nu_\mu)/\Gamma_{\text{total}}$   $\Gamma_{12}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.07 <sup>+0.028</sup> <sub>-0.016</sub> ±0.012	14	BAI	91	MRK3 $e^+ e^- \approx 3.77$ GeV

$\Gamma(\bar{K}^0 \mu^+ \nu_\mu)/\Gamma(\mu^+ \text{anything})$   $\Gamma_{12}/\Gamma_8$

VALUE	EVTS	DOCUMENT ID	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.76±0.06	84	<sup>21</sup> AOKI	88 $\pi^-$ emulsion

<sup>21</sup> From topological branching ratios in emulsion with an identified muon.

$\Gamma(K^- \pi^+ e^+ \nu_e)/\Gamma_{\text{total}}$   $\Gamma_{13}/\Gamma$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.041<sup>+0.009</sup><sub>-0.007</sub> OUR FIT</b>					
0.035 <sup>+0.012</sup> <sub>-0.007</sub> ±0.004	14	<sup>22</sup> BAI	91	MRK3	$e^+ e^- \approx 3.77$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.057	90	<sup>23</sup> AGUILAR-...	87F	HYBR	$\pi p, p p$ 360, 400 GeV

<sup>22</sup> BAI 91 finds that a fraction  $0.79^{+0.15+0.09}_{-0.17-0.03}$  of combined  $D^+$  and  $D^0$  decays to  $\bar{K} \pi e^+ \nu_e$  (24 events) are  $\bar{K}^*(892) e^+ \nu_e$ .

<sup>23</sup> AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(\bar{K}^*(892)^0 \ell^+ \nu_\ell) / \Gamma_{\text{total}}$   $\Gamma_{26} / \Gamma$

We average our  $\bar{K}^{*0} e^+ \nu_e$  and  $\bar{K}^{*0} \mu^+ \nu_\mu$  branching fractions, after multiplying the latter by a phase-space factor of 1.05 to be able to use it with the  $\bar{K}^{*0} e^+ \nu_e$  fraction. Hence our  $\ell^+$  here is really an  $e^+$ .

VALUE	DOCUMENT ID	COMMENT
<b>0.048 ± 0.004 OUR AVERAGE</b>		
0.048 ± 0.005	PDG	02 Our $\Gamma(\bar{K}^{*0} e^+ \nu_e) / \Gamma_{\text{total}}$
0.047 ± 0.006	PDG	02 1.05 × our $\Gamma(\bar{K}^{*0} \mu^+ \nu_\mu) / \Gamma_{\text{total}}$

$\Gamma(\bar{K}^*(892)^0 e^+ \nu_e) / \Gamma(K^- \pi^+ e^+ \nu_e)$   $\Gamma_{27} / \Gamma_{13}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>1.16<sup>+0.20</sup><sub>-0.24</sub> OUR FIT</b>				
<b>1.0 ± 0.3</b>	35	ADAMOVICH	91	OMEG $\pi^-$ 340 GeV

$\Gamma(\bar{K}^*(892)^0 e^+ \nu_e) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{27} / \Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.53 ± 0.05 OUR FIT</b>				
<b>0.54 ± 0.05 OUR AVERAGE</b>				
0.67 ± 0.09 ± 0.07	710	<sup>24</sup> BEAN	93C	CLE2 $e^+ e^- \approx \Upsilon(4S)$
0.62 ± 0.15 ± 0.09	35	ADAMOVICH	91	OMEG $\pi^-$ 340 GeV
0.55 ± 0.08 ± 0.10	880	ALBRECHT	91	ARG $e^+ e^- \approx 10.4$ GeV
0.49 ± 0.04 ± 0.05		ANJOS	89B	E691 Photoproduction

<sup>24</sup> BEAN 93C uses  $\bar{K}^{*0} \mu^+ \nu_\mu$  as well as  $\bar{K}^{*0} e^+ \nu_e$  events and makes a small phase-space adjustment to the number of the  $\mu^+$  events to use them as  $e^+$  events.

$\Gamma(K^- \pi^+ e^+ \nu_e \text{ nonresonant}) / \Gamma_{\text{total}}$   $\Gamma_{15} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.007</b>	90	<sup>25</sup> ANJOS	89B	E691 Photoproduction

<sup>25</sup> ANJOS 89B assumes a  $\Gamma(D^+ \rightarrow K^- \pi^+ \pi^+) / \Gamma_{\text{total}} = 9.1 \pm 1.3 \pm 0.4\%$ .

$\Gamma(K^- \pi^+ \mu^+ \nu_\mu) / \Gamma_{\text{total}}$   $\Gamma_{16} / \Gamma = (\Gamma_{18} + \frac{2}{3} \Gamma_{28}) / \Gamma$

VALUE	DOCUMENT ID
<b>0.032 ± 0.004 OUR FIT</b>	Error includes scale factor of 1.1.

$\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu) / \Gamma_{\text{total}}$   $\Gamma_{28} / \Gamma$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.045 ± 0.006 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.0325 ± 0.0071 ± 0.0075</b>	224	<sup>26</sup> KODAMA	92C	E653 $\pi^-$ emulsion 600 GeV

<sup>26</sup> KODAMA 92C measures  $\Gamma(D^+ \rightarrow \bar{K}^{*0} \mu^+ \nu_\mu) / \Gamma(D^0 \rightarrow K^- \mu^+ \nu_\mu) = 0.43 \pm 0.09 \pm 0.09$  and then uses  $\Gamma(D^0 \rightarrow K^- \mu^+ \nu_\mu) = (7.0 \pm 0.7) \times 10^{10} \text{ s}^{-1}$  to get the quoted branching fraction. See also the footnote to KODAMA 92C in the next data block.

$\Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{28} / \Gamma_{39}$

Unseen decay modes of the  $\overline{K}^*(892)^0$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.49 ± 0.06 OUR FIT**

**0.53 ± 0.06 OUR AVERAGE**

0.56 ± 0.04 ± 0.06	875	FRABETTI	93E E687	$\gamma$ Be $\overline{E}_\gamma \approx 200$ GeV
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0.46 ± 0.07 ± 0.08	224	<sup>27</sup> KODAMA	92C E653	$\pi^-$ emulsion 600 GeV
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<sup>27</sup>KODAMA 92C uses the same  $\overline{K}^{*0} \mu^+ \nu_\mu$  events normalizing instead with  $D^0 \rightarrow K^- \mu^+ \nu_\mu$  events, as reported in the preceding data block.

$\Gamma(K^- \pi^+ \mu^+ \nu_\mu \text{ nonresonant}) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$   $\Gamma_{18} / \Gamma_{16} = \Gamma_{18} / (\Gamma_{18} + \frac{2}{3} \Gamma_{28})$

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.083 ± 0.029 OUR FIT**

**0.083 ± 0.029**

FRABETTI	93E E687	$< 0.12$ (90% CL)
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$\Gamma(\overline{K}^0 \pi^+ \pi^- e^+ \nu_e) / \Gamma_{\text{total}}$   $\Gamma_{19} / \Gamma$

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

0.022 $^{+0.047}_{-0.006} \pm 0.004$	1	<sup>28</sup> AGUILAR-...	87F HYBR	$\pi p, pp$ 360, 400 GeV
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<sup>28</sup>AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(K^- \pi^+ \pi^0 e^+ \nu_e) / \Gamma_{\text{total}}$   $\Gamma_{20} / \Gamma$

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

0.044 $^{+0.052}_{-0.013} \pm 0.007$	2	<sup>29</sup> AGUILAR-...	87F HYBR	$\pi p, pp$ 360, 400 GeV
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<sup>29</sup>AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma((\overline{K}^*(892)\pi)^0 e^+ \nu_e) / \Gamma_{\text{total}}$   $\Gamma_{21} / \Gamma$

Unseen decay modes of the  $\overline{K}^*(892)$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.012</b>	90	ANJOS	92 E691	Photoproduction
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$\Gamma((\overline{K}\pi\pi)^0 e^+ \nu_e \text{ non-}\overline{K}^*(892)) / \Gamma_{\text{total}}$   $\Gamma_{22} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.009</b>	90	ANJOS	92 E691	Photoproduction
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$\Gamma(K^- \pi^+ \pi^0 \mu^+ \nu_\mu) / \Gamma(K^- \pi^+ \mu^+ \nu_\mu)$   $\Gamma_{23} / \Gamma_{16} = \Gamma_{23} / (\Gamma_{18} + \frac{2}{3} \Gamma_{28})$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.042</b>	90	FRABETTI	93E E687	$\gamma$ Be $\overline{E}_\gamma \approx 200$ GeV
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$\Gamma(\overline{K}_1(1270)^0 \mu^+ \nu_\mu) / \Gamma(\overline{K}^*(892)^0 \mu^+ \nu_\mu)$   $\Gamma_{29} / \Gamma_{28}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<b>&lt; 0.78</b>	95	ABE	99P CDF	$\overline{p}p$ 1.8 TeV
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$\Gamma(\bar{K}^*(1410)^0 \mu^+ \nu_\mu) / \Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu)$   $\Gamma_{30} / \Gamma_{28}$

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

<0.60	95	ABE	99P CDF	$\bar{p}p$ 1.8 TeV
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$\Gamma(\bar{K}_2^*(1430)^0 \mu^+ \nu_\mu) / \Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu)$   $\Gamma_{31} / \Gamma_{28}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
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<0.19	95	ABE	99P CDF	$\bar{p}p$ 1.8 TeV
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$\Gamma(\pi^0 \ell^+ \nu_\ell) / \Gamma(\bar{K}^0 \ell^+ \nu_\ell)$   $\Gamma_{24} / \Gamma_{10}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>0.046 ± 0.014 ± 0.017</b>	100	<sup>30</sup> BARTELT	97 CLE2	$e^+ e^- \approx \Upsilon(4S)$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.085 ± 0.027 ± 0.014	53	<sup>31</sup> ALAM	93 CLE2	See BARTELT 97
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<sup>30</sup> BARTELT 97 thus directly measures the product of ratios squared of CKM matrix elements and form factors at  $q^2=0$ :  $|V_{cd}/V_{cs}|^2 \cdot |f_{\pi^+}^\pi(0)/f_{\pi^+}^K(0)|^2 = 0.046 \pm 0.014 \pm 0.017$ .

<sup>31</sup> ALAM 93 thus directly measures the product of ratios squared of CKM matrix elements and form factors at  $q^2=0$ :  $|V_{cd}/V_{cs}|^2 \cdot |f_{\pi^+}^\pi(0)/f_{\pi^+}^K(0)|^2 = 0.085 \pm 0.027 \pm 0.014$ .

$\Gamma(\pi^+ \pi^- e^+ \nu_e) / \Gamma_{\text{total}}$   $\Gamma_{25} / \Gamma$

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

<0.057	90	<sup>32</sup> AGUILAR-...	87F HYBR	$\pi p, p p$ 360, 400 GeV
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<sup>32</sup> AGUILAR-BENITEZ 87F computes the branching fraction using topological normalization.

$\Gamma(\rho^0 e^+ \nu_e) / \Gamma_{\text{total}}$   $\Gamma_{32} / \Gamma$

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

<0.0037	90	BAI	91 MRK3	$e^+ e^- \approx 3.77$ GeV
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$\Gamma(\rho^0 e^+ \nu_e) / \Gamma(\bar{K}^*(892)^0 e^+ \nu_e)$   $\Gamma_{32} / \Gamma_{27}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>0.045 ± 0.014 ± 0.009</b>	49	<sup>33</sup> AITALA	97 E791	$\pi^-$ nucleus, 500 GeV
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<sup>33</sup> AITALA 97 explicitly subtracts  $D^+ \rightarrow \eta' e^+ \nu_e$  and other backgrounds to get this result.

$\Gamma(\rho^0 \mu^+ \nu_\mu) / \Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu)$   $\Gamma_{33} / \Gamma_{28}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.061 ± 0.014 OUR AVERAGE**

0.051 ± 0.015 ± 0.009	54	<sup>34</sup> AITALA	97 E791	$\pi^-$ nucleus, 500 GeV
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0.079 ± 0.019 ± 0.013	39	<sup>35</sup> FRABETTI	97 E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.044 $^{+0.031}_{-0.025}$ ± 0.014	4	<sup>36</sup> KODAMA	93C E653	$\pi^-$ emulsion 600 GeV
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- <sup>34</sup> AITALA 97 explicitly subtracts  $D^+ \rightarrow \eta' \mu^+ \nu_\mu$  and other backgrounds to get this result.  
<sup>35</sup> Because the reconstruction efficiency for photons is low, this FRABETTI 97 result also includes any  $D^+ \rightarrow \eta' \mu^+ \nu_\mu \rightarrow \gamma \rho^0 \mu^+ \nu_\mu$  events in the numerator.  
<sup>36</sup> This KODAMA 93C result is based on a final signal of  $4.0^{+2.8}_{-2.3} \pm 1.3$  events; the estimates of backgrounds that affect this number are somewhat model dependent.

$\Gamma(\phi e^+ \nu_e)/\Gamma_{\text{total}}$   $\Gamma_{34}/\Gamma$   
 Decay modes of the  $\phi$  not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0209</b>	90	BAI	91	MRK3 $e^+ e^- \approx 3.77$ GeV

$\Gamma(\phi \mu^+ \nu_\mu)/\Gamma_{\text{total}}$   $\Gamma_{35}/\Gamma$   
 Decay modes of the  $\phi$  not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0372</b>	90	BAI	91	MRK3 $e^+ e^- \approx 3.77$ GeV

$\Gamma(\eta \ell^+ \nu_\ell)/\Gamma(\pi^0 \ell^+ \nu_\ell)$   $\Gamma_{36}/\Gamma_{24}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.5</b>	90	BARTELT	97	CLE2 $e^+ e^- \approx \Upsilon(4S)$

$\Gamma(\eta'(958) \mu^+ \nu_\mu)/\Gamma(\bar{K}^*(892)^0 \mu^+ \nu_\mu)$   $\Gamma_{37}/\Gamma_{28}$   
 Decay modes of the  $\eta'(958)$  not included in the search are corrected for.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.20</b>	90	KODAMA	93B	E653 $\pi^-$ emulsion 600 GeV

————— Hadronic modes with a  $\bar{K}$  or  $\bar{K}K\bar{K}$  —————

$\Gamma(\bar{K}^0 \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{38}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>0.0277 \pm 0.0018</math> OUR FIT</b>				
<b><math>0.032 \pm 0.004</math> OUR AVERAGE</b>				
$0.032 \pm 0.005 \pm 0.002$	161	ADLER	88C	MRK3 $e^+ e^-$ 3.77 GeV
$0.033 \pm 0.009$	36	<sup>37</sup> SCHINDLER	81	MRK2 $e^+ e^-$ 3.771 GeV
$0.033 \pm 0.013$	17	<sup>38</sup> PERUZZI	77	MRK1 $e^+ e^-$ 3.77 GeV

- <sup>37</sup> SCHINDLER 81 (MARK-2) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.14 \pm 0.03$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.  
<sup>38</sup> PERUZZI 77 (MARK-1) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.14 \pm 0.05$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.

$\Gamma(\bar{K}^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{38}/\Gamma_{39}$   
 It is generally assumed for modes such as  $D^+ \rightarrow \bar{K}^0 \pi^+$  that  
 $\Gamma(D^+ \rightarrow \bar{K}^0 \pi^+) = 2\Gamma(D^+ \rightarrow K_S^0 \pi^+)$ ;  
 it is the latter  $\Gamma$  that is actually measured. BIGI 95 points out that interference between Cabibbo-allowed and doubly Cabibbo-suppressed amplitudes, where both occur, could invalidate this assumption by a few percent.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b><math>0.306 \pm 0.006</math> OUR FIT</b>				
<b><math>0.307 \pm 0.005</math> OUR AVERAGE</b>				
$0.3060 \pm 0.0046 \pm 0.0032$	10.6k	LINK	02B	FOCS $\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
$0.348 \pm 0.024 \pm 0.022$	473	<sup>39</sup> BISHAI	97	CLE2 $e^+ e^- \approx \Upsilon(4S)$
$0.274 \pm 0.030 \pm 0.031$	264	ANJOS	90C	E691 Photoproduction

<sup>39</sup> See BISHAI 97 for an isospin analysis of  $D^+ \rightarrow \bar{K} \pi$  amplitudes.

$\Gamma(K^- \pi^+ \pi^+)/\Gamma_{\text{total}}$   $\Gamma_{39}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.091±0.006 OUR FIT</b>				
<b>0.091±0.007 OUR AVERAGE</b>				
0.093±0.006±0.008	1502	<sup>40</sup> BALEST	94 CLE2	$e^+ e^- \approx \Upsilon(4S)$
0.091±0.013±0.004	1164	ADLER	88C MRK3	$e^+ e^-$ 3.77 GeV
0.091±0.019	239	<sup>41</sup> SCHINDLER	81 MRK2	$e^+ e^-$ 3.771 GeV
0.086±0.020	85	<sup>42</sup> PERUZZI	77 MRK1	$e^+ e^-$ 3.77 GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.064 <sup>+0.015</sup> <sub>-0.014</sub>		<sup>43</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
0.063 <sup>+0.028</sup> <sub>-0.014</sub> ±0.011	8	<sup>43</sup> AGUILAR-...	87F HYBR	$\pi p, p p$ 360, 400 GeV

<sup>40</sup> BALEST 94 measures the ratio of  $D^+ \rightarrow K^- \pi^+ \pi^+$  and  $D^0 \rightarrow K^- \pi^+$  branching fractions to be  $2.35 \pm 0.16 \pm 0.16$  and uses their absolute measurement of the  $D^0 \rightarrow K^- \pi^+$  fraction (AKERIB 93).

<sup>41</sup> SCHINDLER 81 (MARK-2) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.38 \pm 0.05$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.

<sup>42</sup> PERUZZI 77 (MARK-1) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.36 \pm 0.06$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.

<sup>43</sup> AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\bar{K}^*(892)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{79}/\Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>0.212±0.016 OUR FIT</b>				
<b>0.210±0.015 OUR AVERAGE</b>				
0.206±0.009±0.014		FRABETTI	94G E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
0.255±0.014±0.050		ANJOS	93 E691	$\gamma$ Be 90–260 GeV
0.21 ±0.06 ±0.06		ALVAREZ	91B NA14	Photoproduction
0.20 ±0.02 ±0.11		ADLER	87 MRK3	$e^+ e^-$ 3.77 GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.053	90	SCHINDLER	81 MRK2	$e^+ e^-$ 3.771 GeV

$\Gamma(\bar{K}_0^*(1430)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{88}/\Gamma_{39}$

Unseen decay modes of the  $\bar{K}_0^*(1430)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.41 ±0.04 OUR AVERAGE</b>			
0.458±0.035±0.094	FRABETTI	94G E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
0.400±0.031±0.027	ANJOS	93 E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^*(1680)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{89}/\Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(1680)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.160±0.032 OUR AVERAGE</b> Error includes scale factor of 1.1.			
0.182±0.023±0.028	FRABETTI	94G E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
0.113±0.015±0.050	ANJOS	93 E691	$\gamma$ Be 90–260 GeV

$\Gamma(K^- \pi^+ \pi^+ \text{ nonresonant})/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{43}/\Gamma_{39}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.95 ± 0.07 OUR AVERAGE</b>			
0.998 ± 0.037 ± 0.072	FRABETTI	94G E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
0.838 ± 0.088 ± 0.275	ANJOS	93 E691	$\gamma$ Be 90–260 GeV
0.79 ± 0.07 ± 0.15	ADLER	87 MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^0 \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{44}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.097 ± 0.030 OUR FIT</b>				Error includes scale factor of 1.1.
<b>0.107 ± 0.029 OUR AVERAGE</b>				

0.102 ± 0.025 ± 0.016	159	ADLER	88C MRK3	$e^+ e^-$ 3.77 GeV
0.19 ± 0.12	10	<sup>44</sup> SCHINDLER	81 MRK2	$e^+ e^-$ 3.771 GeV

<sup>44</sup>SCHINDLER 81 (MARK-2) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.78 \pm 0.48$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.

$\Gamma(\bar{K}^0 \rho^+)/\Gamma(\bar{K}^0 \pi^+ \pi^0)$   $\Gamma_{45}/\Gamma_{44}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.68 ± 0.08 ± 0.12</b>	ADLER	87 MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^*(892)^0 \pi^+)/\Gamma(\bar{K}^0 \pi^+ \pi^0)$   $\Gamma_{79}/\Gamma_{44}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.20 ± 0.06 OUR FIT</b>			
<b>0.57 ± 0.18 ± 0.18</b>	ADLER	87 MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^0 \pi^+ \pi^0 \text{ nonresonant})/\Gamma(\bar{K}^0 \pi^+ \pi^0)$   $\Gamma_{47}/\Gamma_{44}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.13 ± 0.07 ± 0.08</b>	ADLER	87 MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^- \pi^+ \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{48}/\Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.064 ± 0.011 OUR FIT</b>				
<b>0.058 ± 0.012 ± 0.012</b>	142	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

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

0.034 <sup>+0.056</sup> <sub>-0.070</sub>		<sup>45</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
0.022 <sup>+0.047</sup> <sub>-0.006</sub> ± 0.004	1	<sup>45</sup> AGUILAR-...	87F HYBR	$\pi p, p p$ 360, 400 GeV
0.063 <sup>+0.014</sup> <sub>-0.013</sub> ± 0.012	175	BALTRUSAIT..86E	MRK3	See COFFMAN 92B

<sup>45</sup>AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(K^- \pi^+ \pi^+ \pi^0)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{48}/\Gamma_{39}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.71 ± 0.12 OUR FIT</b>				
<b>0.76 ± 0.11 ± 0.12</b>	91	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.69 ± 0.10 ± 0.16		ANJOS	89E E691	See ANJOS 92C
0.57 <sup>+0.65</sup> <sub>-0.17</sub>	1	AGUILAR-...	83B HYBR	$\pi^- p$ , 360 GeV

$\Gamma(\bar{K}^*(892)^0 \rho^+ \text{ total})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{80}/\Gamma_{48}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.33 ± 0.165 ± 0.12</b>	<sup>46</sup> ANJOS	92C E691	$\gamma$ Be 90–260 GeV

<sup>46</sup> See, however, the next entry, where the two experiments disagree completely.

$\Gamma(\bar{K}^*(892)^0 \rho^+ \text{ S-wave})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{81}/\Gamma_{48}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included. The two experiments here disagree completely.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.26 ± 0.25 OUR AVERAGE</b>	Error includes scale factor of 3.1.		
0.15 ± 0.075 ± 0.045	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
0.833 ± 0.116 ± 0.165	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^*(892)^0 \rho^+ \text{ P-wave})/\Gamma_{\text{total}}$   $\Gamma_{82}/\Gamma$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.001</b>	90	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

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

<0.005	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV
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$\Gamma(\bar{K}^*(892)^0 \rho^+ \text{ D-wave})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{83}/\Gamma_{48}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.15 ± 0.09 ± 0.045</b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^*(892)^0 \rho^+ \text{ D-wave longitudinal})/\Gamma_{\text{total}}$   $\Gamma_{84}/\Gamma$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.007</b>	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}_1(1400)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{86}/\Gamma_{48}$

Unseen decay modes of the  $\bar{K}_1(1400)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.77 ± 0.20 OUR FIT</b>			
<b>0.907 ± 0.218 ± 0.180</b>	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^- \rho^+ \pi^+ \text{ total})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{94}/\Gamma_{48}$

This includes  $\bar{K}^*(892)^0 \rho^+$ , etc. The next entry gives the specifically 3-body fraction.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.48 ± 0.13 ± 0.09</b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(K^- \rho^+ \pi^+ \text{ 3-body})/\Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{95}/\Gamma_{48}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.17 ± 0.06 OUR AVERAGE</b>			
0.18 ± 0.08 ± 0.04	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
0.159 ± 0.065 ± 0.060	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^*(892)^0 \pi^+ \pi^0 \text{ total}) / \Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{90} / \Gamma_{48}$

This includes  $\bar{K}^*(892)^0 \rho^+$ , *etc.* The next two entries give the specifically 3-body fraction. Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>1.05 ± 0.11 ± 0.08</b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^*(892)^0 \pi^+ \pi^0 \text{ 3-body}) / \Gamma_{\text{total}}$   $\Gamma_{91} / \Gamma$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

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

<0.008                      90            <sup>47</sup> COFFMAN            92B MRK3     $e^+ e^-$  3.77 GeV

<sup>47</sup> See, however, the next entry: ANJOS 92C sees a large signal in this channel.

$\Gamma(\bar{K}^*(892)^0 \pi^+ \pi^0 \text{ 3-body}) / \Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{91} / \Gamma_{48}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.66 ± 0.09 ± 0.17</b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(K^*(892)^- \pi^+ \pi^+ \text{ 3-body}) / \Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{93} / \Gamma_{48}$

Unseen decay modes of the  $K^*(892)^-$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.32 ± 0.14 OUR FIT**    Error includes scale factor of 1.1.

**0.24 ± 0.12 ± 0.09**                      ANJOS                      92C E691                       $\gamma$  Be 90–260 GeV

$\Gamma(K^- \pi^+ \pi^+ \pi^0 \text{ nonresonant}) / \Gamma_{\text{total}}$   $\Gamma_{56} / \Gamma$

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

<0.002                      90            <sup>48</sup> ANJOS                      92C E691                       $\gamma$  Be 90–260 GeV

<sup>48</sup> Whereas ANJOS 92C finds no signal here, COFFMAN 92B finds a fairly large one; see the next entry.

$\Gamma(K^- \pi^+ \pi^+ \pi^0 \text{ nonresonant}) / \Gamma(K^- \pi^+ \pi^+ \pi^0)$   $\Gamma_{56} / \Gamma_{48}$

VALUE	DOCUMENT ID	TECN	COMMENT
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**0.184 ± 0.070 ± 0.050**                      COFFMAN                      92B MRK3                       $e^+ e^-$  3.77 GeV

$\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{57} / \Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.070 ± 0.009 OUR FIT**

**0.071 ± 0.016 OUR AVERAGE**

0.066 ± 0.015 ± 0.005            168            ADLER                      88C MRK3                       $e^+ e^-$  3.77 GeV

0.12 ± 0.05                      21            <sup>49</sup> SCHINDLER            81 MRK2                       $e^+ e^-$  3.771 GeV

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

0.042 <sup>+0.019</sup> <sub>-0.017</sub>                      50 BARLAG                      92C ACCM                       $\pi^-$  Cu 230 GeV

0.243 <sup>+0.064</sup> <sub>-0.041</sub> ± 0.041            11            <sup>50</sup> AGUILAR-...            87F HYBR                       $\pi p, pp$  360, 400 GeV

<sup>49</sup> SCHINDLER 81 (MARK-2) measures  $\sigma(e^+ e^- \rightarrow \psi(3770)) \times$  branching fraction to be  $0.51 \pm 0.08$  nb. We use the MARK-3 (ADLER 88C) value of  $\sigma = 4.2 \pm 0.6 \pm 0.3$  nb.

<sup>50</sup> AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{57} / \Gamma_{39}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.78 ± 0.10 OUR FIT</b>				
<b>0.77 ± 0.07 ± 0.11</b>	229	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^0 a_1(1260)^+) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{77} / \Gamma_{57}$

Unseen decay modes of the  $a_1(1260)^+$  are included, assuming that the  $a_1(1260)^+$  decays entirely to  $\rho\pi$  [or at least to  $(\pi\pi)_{I=1} \pi$ ].

VALUE	DOCUMENT ID	TECN	COMMENT
<b>1.15 ± 0.19 OUR AVERAGE</b>	Error includes scale factor of 1.1.		
1.66 ± 0.28 ± 0.40	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
1.078 ± 0.114 ± 0.140	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^0 a_2(1320)^+) / \Gamma_{\text{total}}$   $\Gamma_{78} / \Gamma$

Unseen decay modes of the  $a_2(1320)^+$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 0.003</b>	90	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.008	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}_1(1270)^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{85} / \Gamma$

Unseen decay modes of the  $\bar{K}_1(1270)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt; 0.007</b>	90	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.011	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}_1(1400)^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{86} / \Gamma$

Unseen decay modes of the  $\bar{K}_1(1400)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.009	90	<sup>51</sup> ANJOS	92C E691	$\gamma$ Be 90–260 GeV
<sup>51</sup> ANJOS 92C sees no evidence for $\bar{K}_1(1400)^0 \pi^+$ in either the $\bar{K}^0 \pi^+ \pi^+ \pi^-$ or $K^- \pi^+ \pi^+ \pi^0$ channels, whereas COFFMAN 92B finds the $\bar{K}_1(1400)^0 \pi^+$ branching fraction to be large; see the next entry.				

$\Gamma(\bar{K}_1(1400)^0 \pi^+) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{86} / \Gamma_{57}$

Unseen decay modes of the  $\bar{K}_1(1400)^0$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.70 ± 0.17 OUR FIT</b>			
<b>0.623 ± 0.106 ± 0.180</b>	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^*(1410)^0 \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{87} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
< 0.007	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^*(892)^- \pi^+ \pi^+ \text{total}) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{92} / \Gamma_{57}$

Unseen decay modes of the  $K^*(892)^-$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
$0.41 \pm 0.14$	14	ALEEV	94 BIS2	$nN$ 20–70 GeV

$\Gamma(K^*(892)^- \pi^+ \pi^+ \text{3-body}) / \Gamma_{\text{total}}$   $\Gamma_{93} / \Gamma$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>0.021 \pm 0.009</math> OUR FIT</b>				
$< 0.013$	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^*(892)^- \pi^+ \pi^+ \text{3-body}) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{93} / \Gamma_{57}$

Unseen decay modes of the  $K^*(892)^-$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.29 \pm 0.13</math> OUR FIT</b>	Error includes scale factor of 1.1.		
<b><math>0.50 \pm 0.09 \pm 0.21</math></b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^0 \rho^0 \pi^+ \text{total}) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{96} / \Gamma_{57}$

This includes  $\bar{K}^0 a_1(1260)^+$ . The next two entries give the specifically 3-body reaction.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b><math>0.60 \pm 0.10 \pm 0.17</math></b>	90	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^0 \rho^0 \pi^+ \text{3-body}) / \Gamma_{\text{total}}$   $\Gamma_{97} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 0.004$	90	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(\bar{K}^0 \rho^0 \pi^+ \text{3-body}) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{97} / \Gamma_{57}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.07 \pm 0.04 \pm 0.06</math></b>	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^0 f_0(980) \pi^+) / \Gamma_{\text{total}}$   $\Gamma_{98} / \Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$< 0.005$	90	ANJOS	92C E691	$\gamma$ Be 90–260 GeV

$\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^- \text{nonresonant}) / \Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{63} / \Gamma_{57}$

VALUE	DOCUMENT ID	TECN	COMMENT
<b><math>0.12 \pm 0.06</math> OUR AVERAGE</b>			
$0.10 \pm 0.04 \pm 0.06$	ANJOS	92C E691	$\gamma$ Be 90–260 GeV
$0.17 \pm 0.056 \pm 0.100$	COFFMAN	92B MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^- \pi^+ \pi^+ \pi^+ \pi^-) / \Gamma_{\text{total}}$   $\Gamma_{64} / \Gamma$

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

$0.0037^{+0.0012}_{-0.0010}$	<sup>52</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
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<sup>52</sup> BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(K^- \pi^+ \pi^+ \pi^+ \pi^-) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{64} / \Gamma_{39}$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.080 ± 0.009 OUR FIT**

**0.083 ± 0.009 OUR AVERAGE**

$0.077 \pm 0.008 \pm 0.010$	239	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV
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$0.09 \pm 0.01 \pm 0.01$	113	ANJOS	90D E691	Photoproduction
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$\Gamma(\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-) / \Gamma(K^- \pi^+ \pi^+ \pi^-)$   $\Gamma_{99} / \Gamma_{64}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**1.1 ± 0.4 OUR FIT** Error includes scale factor of 1.8.

<b>1.25 ± 0.12 ± 0.23</b>	ANJOS	90D E691	Photoproduction
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$\Gamma(\bar{K}^*(892)^0 \rho^0 \pi^+) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{100} / \Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.032<sup>+0.019</sup><sub>-0.017</sub> OUR FIT** Error includes scale factor of 1.8.

<b>0.023 ± 0.010 ± 0.006</b>	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV
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$\Gamma(\bar{K}^*(892)^0 \rho^0 \pi^+) / \Gamma(\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{100} / \Gamma_{99}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.36<sup>+0.24</sup><sub>-0.20</sub> OUR FIT** Error includes scale factor of 1.8.

<b>0.75 ± 0.17 ± 0.19</b>	ANJOS	90D E691	Photoproduction
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$\Gamma(\bar{K}^*(892)^0 \pi^+ \pi^+ \pi^- \text{no-}\rho) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{101} / \Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.048 ± 0.015 ± 0.011</b>	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV
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$\Gamma(K^- \rho^0 \pi^+ \pi^+) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{68} / \Gamma_{39}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.034 ± 0.009 ± 0.005</b>	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV
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$\Gamma(K^- \pi^+ \pi^+ \pi^+ \pi^- \text{nonresonant}) / \Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{69} / \Gamma_{39}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>&lt;0.026</b>	90	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV
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$\Gamma(K^- \pi^+ \pi^+ \pi^0 \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{70}/\Gamma$

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

<0.015		53 BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
$0.022^{+0.047}_{-0.008} \pm 0.004$	1	53 AGUILAR-...	87F HYBR	$\pi p, pp$ 360, 400 GeV

<sup>53</sup>AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{71}/\Gamma$

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

$0.099^{+0.036}_{-0.070}$		54 BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
$0.044^{+0.052}_{-0.013} \pm 0.007$	2	54 AGUILAR-...	87F HYBR	$\pi p, pp$ 360, 400 GeV

<sup>54</sup>AGUILAR-BENITEZ 87F and BARLAG 92C compute the branching fraction by topological normalization.

$\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^+ \pi^- \pi^-)/\Gamma_{\text{total}}$   $\Gamma_{72}/\Gamma$

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

$0.0008 \pm 0.0007$	55 BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
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<sup>55</sup>BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(K^- \pi^+ \pi^+ \pi^+ \pi^- \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{73}/\Gamma$

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

$0.0020 \pm 0.0018$	56 BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV
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<sup>56</sup>BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(\bar{K}^0 \bar{K}^0 K^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{74}/\Gamma_{39}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.20 ± 0.09 OUR AVERAGE** Error includes scale factor of 2.4.

$0.14 \pm 0.04 \pm 0.02$	39	ALBRECHT	94i ARG	$e^+ e^- \approx 10$ GeV
$0.34 \pm 0.07$	70	AMMAR	91 CLEO	$e^+ e^- \approx 10.5$ GeV

$\Gamma(K^+ K^- \bar{K}^0 \pi^+)/\Gamma(\bar{K}^0 \pi^+ \pi^+ \pi^-)$   $\Gamma_{75}/\Gamma_{57}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>0.0077 ± 0.0015 ± 0.0009</b>	35	LINK	01C FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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———— Pionic modes ————

$\Gamma(\pi^+ \pi^0)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{103}/\Gamma_{39}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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<b>0.028 ± 0.006 ± 0.005</b>	34	SELEN	93 CLE2	$e^+ e^- \approx \gamma(4S)$
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$\Gamma(\pi^+ \pi^+ \pi^-) / \Gamma(K^- \pi^+ \pi^+)$

$\Gamma_{104} / \Gamma_{39}$

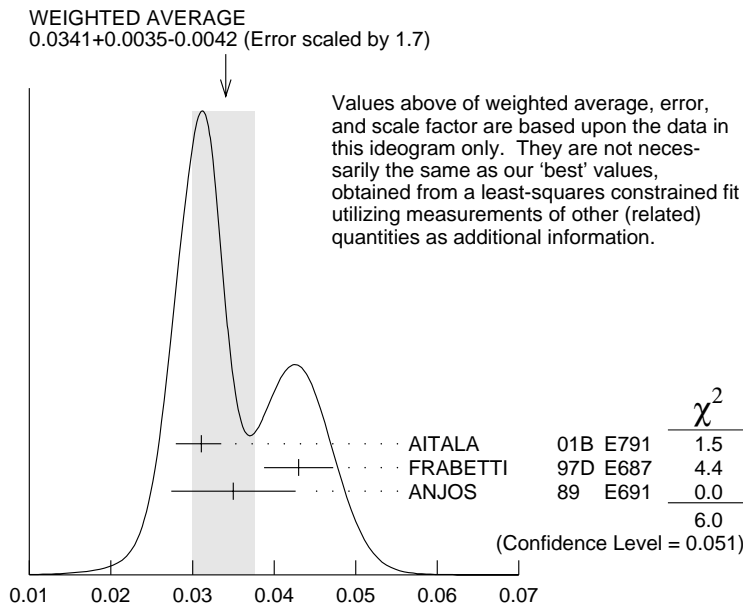
VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
<b>0.034 ± 0.004 OUR FIT</b>				Error includes scale factor of 2.0.

**0.0341<sup>+0.0035</sup><sub>-0.0042</sub> OUR AVERAGE** Error includes scale factor of 1.7. See the ideogram below.

0.0311 ± 0.0018 <sup>+0.0016</sup> <sub>-0.0026</sub>	1172	AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
0.043 ± 0.003 ± 0.003	236	FRABETTI	97D E687	$\gamma$ Be $\approx$ 200 GeV
0.035 ± 0.007 ± 0.003	83	ANJOS	89 E691	Photoproduction

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

0.032 ± 0.011 ± 0.003	20	ADAMOVICH	93 WA82	$\pi^-$ 340 GeV
0.042 ± 0.016 ± 0.010	57	BALTRUSAIT..85E	MRK3	$e^+ e^-$ 3.77 GeV



$\Gamma(\pi^+ \pi^+ \pi^-) / \Gamma(K^- \pi^+ \pi^+)$

$\Gamma(\sigma \pi^+) / \Gamma(\pi^+ \pi^+ \pi^-)$

$\Gamma_{105} / \Gamma_{104}$

Unseen decay modes of the  $\sigma$  are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.695 ± 0.135 ± 0.032</b>	57 AITALA	01B E791	$\pi^-$ nucleus, 500 GeV

<sup>57</sup> See AITALA 01B for the magnitude and phase of this amplitude relative to the  $\rho^0 \pi^+$  amplitude. The branching ratio given here is 3/2 the paper's value, to allow for  $\pi^0 \pi^0$  decays.

$\Gamma(\rho^0 \pi^+)/\Gamma(\pi^+ \pi^+ \pi^-)$   $\Gamma_{106}/\Gamma_{104}$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.336±0.032±0.022</b>	AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.289±0.055±0.058	<sup>58</sup> FRABETTI	97D E687	$\gamma$ Be $\approx$ 200 GeV
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<sup>58</sup> FRABETTI 97D also includes  $f_2(1270)\pi^+$  and  $f_0(980)\pi^+$  modes in the fit, but the resulting decay fractions are not statistically significant.

$\Gamma(\rho^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{106}/\Gamma_{39}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$<0.015$	90	ANJOS	89 E691 Photoproduction
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$\Gamma(f_0(980)\pi^+ \times B(f_0 \rightarrow \pi^+ \pi^-))/\Gamma(\pi^+ \pi^+ \pi^-)$   $\Gamma_{107}/\Gamma_{104}$

This includes only the  $\pi^+ \pi^-$  decays of the  $f_0(980)$ , because branching fractions of this resonance are not known.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.062±0.013±0.004</b>	<sup>59</sup> AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
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<sup>59</sup> See AITALA 01B for the magnitude and phase of this amplitude relative to the  $\rho^0 \pi^+$  amplitude.

$\Gamma(f_2(1270)\pi^+)/\Gamma(\pi^+ \pi^+ \pi^-)$   $\Gamma_{123}/\Gamma_{104}$

Unseen decay modes of the  $f_2(1270)$  are included.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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<b>0.343±0.044±0.007</b>	<sup>60</sup> AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
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<sup>60</sup> See AITALA 01B for the magnitude and phase of this amplitude relative to the  $\rho^0 \pi^+$  amplitude.

$\Gamma(f_0(1370)\pi^+)/\Gamma(\pi^+ \pi^+ \pi^-)$   $\Gamma_{109}/\Gamma_{104}$

This includes only the  $\pi^+ \pi^-$  decays of the  $f_0(1370)$ , because branching fractions of this resonance are not known.

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

0.023±0.015±0.008	<sup>61</sup> AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
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<sup>61</sup> This AITALA 01B result does not have enough statistical significance to advance it to the Summary Tables.

$\Gamma(\rho(1450)^0 \pi^+)/\Gamma(\pi^+ \pi^+ \pi^-)$   $\Gamma_{110}/\Gamma_{104}$

This includes only the  $\pi^+ \pi^-$  decays of the  $\rho(1450)$ , because branching fractions of this resonance are not known.

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

0.007±0.007±0.003	<sup>62</sup> AITALA	01B E791	$\pi^-$ nucleus, 500 GeV
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<sup>62</sup> This AITALA 01B result does not have enough statistical significance to advance it to the Summary Tables.

$\Gamma(\pi^+\pi^+\pi^-\text{ nonresonant})/\Gamma(\pi^+\pi^+\pi^-)$   $\Gamma_{111}/\Gamma_{104}$

The big difference between the results here of AITALA 01B and FRABETTI 97D is the addition of the  $\sigma\pi^+$  channel to the AITALA 01B fit.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.078±0.060±0.027</b>	<sup>63</sup> AITALA	01B E791	$\pi^-$ nucleus, 500 GeV

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

0.589±0.105±0.081	<sup>64</sup> FRABETTI	97D E687	$\gamma$ Be $\approx$ 200 GeV
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<sup>63</sup> See AITALA 01B for the magnitude and phase of this amplitude relative to the  $\rho^0\pi^+$  amplitude.

<sup>64</sup> FRABETTI 97D also includes  $f_2(1270)\pi^+$  and  $f_0(980)\pi^+$  modes in the fit, but the resulting decay fractions are not statistically significant.

$\Gamma(\pi^+\pi^+\pi^-\text{ nonresonant})/\Gamma(K^-\pi^+\pi^+)$   $\Gamma_{111}/\Gamma_{39}$

VALUE	DOCUMENT ID	TECN	COMMENT
0.027±0.007±0.002	ANJOS	89 E691	Photoproduction

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

$\Gamma(\pi^+\pi^+\pi^-\pi^0)/\Gamma_{\text{total}}$   $\Gamma_{112}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
0.019 <sup>+0.015</sup> <sub>-0.012</sub>	<sup>65</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

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

<sup>65</sup> BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(\pi^+\pi^+\pi^-\pi^0)/\Gamma(K^-\pi^+\pi^+)$   $\Gamma_{112}/\Gamma_{39}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.4	90	ANJOS	89E E691	Photoproduction

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

$\Gamma(\eta\pi^+)/\Gamma(\phi\pi^+)$   $\Gamma_{117}/\Gamma_{142}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.49±0.08</b>	275	JESSOP	98 CLE2	$e^+e^- \approx \gamma(4S)$

$\Gamma(\eta\pi^+)/\Gamma(K^-\pi^+\pi^+)$   $\Gamma_{117}/\Gamma_{39}$

Unseen decay modes of the  $\eta$  are included.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.083±0.023±0.014		99	DAOUDI	92 CLE2	See JESSOP 98
<0.12	90		ANJOS	89E E691	Photoproduction

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

$\Gamma(\omega\pi^+)/\Gamma(K^-\pi^+\pi^+)$   $\Gamma_{119}/\Gamma_{39}$

Unseen decay modes of the  $\omega$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.08</b>	90	ANJOS	89E E691	Photoproduction

$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{115}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
0.0010 <sup>+0.0008</sup> <sub>-0.0007</sub>	<sup>66</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

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

<sup>66</sup> BARLAG 92C computes the branching fraction using topological normalization.

$$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-)/\Gamma(K^-\pi^+\pi^+) \quad \Gamma_{115}/\Gamma_{39}$$

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.023±0.004±0.002</b>		58	FRABETTI	97C E687	$\gamma$ Be, $\bar{E}_\gamma \approx 200$ GeV

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

<0.019	90	ANJOS	89 E691	Photoproduction
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$$\Gamma(\eta\rho^+)/\Gamma(\phi\pi^+) \quad \Gamma_{120}/\Gamma_{142}$$

Unseen decay modes of the  $\eta$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.11</b>	90	JESSOP	98 CLE2	$e^+e^- \approx \Upsilon(4S)$

$$\Gamma(\eta\rho^+)/\Gamma(K^-\pi^+\pi^+) \quad \Gamma_{120}/\Gamma_{39}$$

Unseen decay modes of the  $\eta$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.13</b>	90	DAOUDI	92 CLE2	See JESSOP 98

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

$$\Gamma(\pi^+\pi^+\pi^+\pi^-\pi^-\pi^0)/\Gamma_{\text{total}} \quad \Gamma_{116}/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
$0.0029^{+0.0029}_{-0.0020}$	<sup>67</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

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

<sup>67</sup> BARLAG 92C computes the branching fraction using topological normalization.

$$\Gamma(\eta'(958)\pi^+)/\Gamma(\phi\pi^+) \quad \Gamma_{121}/\Gamma_{142}$$

Unseen decay modes of the  $\eta'(958)$  are included.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.82±0.14</b>	126	JESSOP	98 CLE2	$e^+e^- \approx \Upsilon(4S)$

$$\Gamma(\eta'(958)\pi^+)/\Gamma(K^-\pi^+\pi^+) \quad \Gamma_{121}/\Gamma_{39}$$

Unseen decay modes of the  $\eta'(958)$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.1	90	DAOUDI	92 CLE2	See JESSOP 98
<0.1	90	ALVAREZ	91 NA14	Photoproduction
<0.13	90	ANJOS	91B E691	$\gamma$ Be, $\bar{E}_\gamma \approx 145$ GeV

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

$$\Gamma(\eta'(958)\rho^+)/\Gamma(\phi\pi^+) \quad \Gamma_{122}/\Gamma_{142}$$

Unseen decay modes of the  $\eta'(958)$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.86</b>	90	JESSOP	98 CLE2	$e^+e^- \approx \Upsilon(4S)$

$$\Gamma(\eta'(958)\rho^+)/\Gamma(K^-\pi^+\pi^+) \quad \Gamma_{122}/\Gamma_{39}$$

Unseen decay modes of the  $\eta'(958)$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<0.17	90	DAOUDI	92 CLE2	See JESSOP 98

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

————— **Hadronic modes with a  $K\bar{K}$  pair** —————

**$\Gamma(K^+\bar{K}^0)/\Gamma(\bar{K}^0\pi^+)$**

**$\Gamma_{124}/\Gamma_{38}$**

It is generally assumed for modes such as  $D^+ \rightarrow \bar{K}^0\pi^+$  that

$$\Gamma(D^+ \rightarrow \bar{K}^0\pi^+) = 2\Gamma(D^+ \rightarrow K_S^0\pi^+);$$

it is the latter  $\Gamma$  that is actually measured. BIGI 95 points out that interference between Cabibbo-allowed and doubly Cabibbo-suppressed amplitudes, where both occur, could invalidate this assumption by a few percent.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.211 ± 0.018 OUR FIT** Error includes scale factor of 1.3.

**0.263 ± 0.035 OUR AVERAGE**

0.25 ± 0.04 ± 0.02	129	FRABETTI	95 E687	$\gamma$ Be $\bar{E}_\gamma \approx 200$ GeV
0.271 ± 0.065 ± 0.039	69	ANJOS	90C E691	$\gamma$ Be
0.317 ± 0.086 ± 0.048	31	BALTRUSAIT..85E	MRK3	$e^+e^-$ 3.77 GeV
0.25 ± 0.15	6	SCHINDLER	81 MRK2	$e^+e^-$ 3.771 GeV

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

0.1996 ± 0.0119 ± 0.0096	949	<sup>68</sup> LINK	02B FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$
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0.222 ± 0.041 ± 0.029	70	<sup>69</sup> BISHAI	97 CLE2	$e^+e^- \approx \gamma(4S)$
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<sup>68</sup>This LINK 02B result is redundant with a result in the next datablock.

<sup>69</sup>This BISHAI 97 result is redundant with results elsewhere in the Listings.

**$\Gamma(K^+\bar{K}^0)/\Gamma(K^-\pi^+\pi^+)$**

**$\Gamma_{124}/\Gamma_{39}$**

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.064 ± 0.005 OUR FIT** Error includes scale factor of 1.3.

**0.062 ± 0.004 OUR AVERAGE**

0.0604 ± 0.0035 ± 0.0030	949	LINK	02B FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$
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0.077 ± 0.014 ± 0.007	70	<sup>70</sup> BISHAI	97 CLE2	$e^+e^- \approx \gamma(4S)$
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<sup>70</sup>See BISHAI 97 for an isospin analysis of  $D^+ \rightarrow K\bar{K}$  amplitudes.

**$\Gamma(K^+K^-\pi^+)/\Gamma(K^-\pi^+\pi^+)$**

**$\Gamma_{125}/\Gamma_{39}$**

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.097 ± 0.006 OUR AVERAGE**

0.093 ± 0.010 <sup>+0.008</sup> / <sub>-0.006</sub>		JUN	00 SELX	$\Sigma^-$ nucleus, 600 GeV
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0.0976 ± 0.0042 ± 0.0046		FRABETTI	95B E687	Dalitz plot analysis
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**$\Gamma(\phi\pi^+)/\Gamma(K^-\pi^+\pi^+)$**

**$\Gamma_{142}/\Gamma_{39}$**

Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
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**0.068 ± 0.005 OUR AVERAGE**

0.058 ± 0.006 ± 0.006		FRABETTI	95B E687	Dalitz plot analysis
0.062 ± 0.017 ± 0.006	19	ADAMOVICH	93 WA82	$\pi^-$ 340 GeV
0.077 ± 0.011 ± 0.005	128	DAOUDI	92 CLE2	$e^+e^- \approx 10.5$ GeV
0.098 ± 0.032 ± 0.014	12	ALVAREZ	90C NA14	Photoproduction
0.071 ± 0.008 ± 0.007	84	ANJOS	88 E691	Photoproduction
0.084 ± 0.021 ± 0.011	21	BALTRUSAIT..85E	MRK3	$e^+e^-$ 3.77 GeV

$\Gamma(K^+ \bar{K}^*(892)^0)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{146}/\Gamma_{39}$

Unseen decay modes of the  $\bar{K}^*(892)^0$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.047±0.005 OUR AVERAGE</b>		Error includes scale factor of 1.2.		
0.044±0.003±0.004		<sup>71</sup> FRABETTI	95B E687	Dalitz plot analysis
0.058±0.009±0.006	73	ANJOS	88 E691	Photoproduction
0.048±0.021±0.011	14	BALTRUSAIT..85E	MRK3	$e^+ e^-$ 3.77 GeV

<sup>71</sup> See FRABETTI 95B for evidence also of  $\bar{K}_0^*(1430)^0 K^+$  in the  $D^+ \rightarrow K^+ K^- \pi^+$  Dalitz plot.

$\Gamma(K^+ K^- \pi^+ \text{nonresonant})/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{128}/\Gamma_{39}$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.050±0.009 OUR AVERAGE</b>				
0.049±0.008±0.006	95	ANJOS	88 E691	Photoproduction
0.059±0.026±0.009	37	BALTRUSAIT..85E	MRK3	$e^+ e^-$ 3.77 GeV

$\Gamma(K^*(892)^+ \bar{K}^0)/\Gamma(\bar{K}^0 \pi^+)$   $\Gamma_{147}/\Gamma_{38}$

Unseen decay modes of the  $K^*(892)^+$  are included.

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.1±0.3±0.4</b>	67	FRABETTI	95 E687	$\gamma$ Be $\bar{E}_\gamma \approx 200$ GeV

$\Gamma(\phi \pi^+ \pi^0)/\Gamma_{\text{total}}$   $\Gamma_{143}/\Gamma$

Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.023±0.010</b>	<sup>72</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

<sup>72</sup> BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(\phi \pi^+ \pi^0)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{143}/\Gamma_{39}$

Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.58	90	ALVAREZ	90C NA14	Photoproduction
<0.28	90	ANJOS	89E E691	Photoproduction

$\Gamma(\phi \rho^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{144}/\Gamma_{39}$

Unseen decay modes of the  $\phi$  are included.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.16</b>	90	DAOUDI	92 CLE2	$e^+ e^- \approx 10.5$ GeV

$\Gamma(K^+ K^- \pi^+ \pi^0 \text{non-}\phi)/\Gamma_{\text{total}}$   $\Gamma_{134}/\Gamma$

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.015<sup>+0.007</sup><sub>-0.006</sub></b>	<sup>73</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

<sup>73</sup> BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(K^+ K^- \pi^+ \pi^0 \text{non-}\phi)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{134}/\Gamma_{39}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
<0.25	90	ANJOS	89E E691	Photoproduction

$\Gamma(K^+\bar{K}^0\pi^+\pi^-)/\Gamma(\bar{K}^0\pi^+\pi^+\pi^-)$   $\Gamma_{135}/\Gamma_{57}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.0562±0.0039±0.0040</b>	469	LINK	01C FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(K^+\bar{K}^0\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{135}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.02</b>	90	ALBRECHT	92B ARG	$e^+e^- \simeq 10.4$ GeV

$\Gamma(K^0K^-\pi^+\pi^+)/\Gamma(\bar{K}^0\pi^+\pi^+\pi^-)$   $\Gamma_{136}/\Gamma_{57}$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.0768±0.0041±0.0032</b>	670	LINK	01C FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

$\Gamma(K^0K^-\pi^+\pi^+)/\Gamma_{\text{total}}$   $\Gamma_{136}/\Gamma$

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.01 ±0.005±0.003</b>	ALBRECHT	92B ARG	$e^+e^- \simeq 10.4$ GeV
<b>&lt;0.003</b>	<sup>74</sup> BARLAG	92C ACCM	$\pi^-$ Cu 230 GeV

<sup>74</sup>BARLAG 92C computes the branching fraction using topological normalization.

$\Gamma(K^*(892)^+\bar{K}^*(892)^0)/\Gamma_{\text{total}}$   $\Gamma_{148}/\Gamma$

Unseen decay modes of the  $K^*(892)$ 's are included.

VALUE	DOCUMENT ID	TECN	COMMENT
<b>0.026±0.008±0.007</b>	ALBRECHT	92B ARG	$e^+e^- \simeq 10.4$ GeV

$\Gamma(K^0K^-\pi^+\pi^+ \text{non-}K^{*+}\bar{K}^{*0})/\Gamma_{\text{total}}$   $\Gamma_{138}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.0079</b>	90	ALBRECHT	92B ARG	$e^+e^- \simeq 10.4$ GeV

$\Gamma(\phi\pi^+\pi^+\pi^-)/\Gamma_{\text{total}}$   $\Gamma_{145}/\Gamma$

Unseen decay modes of the  $\phi$  are included.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.002</b>	90	0	ANJOS	88 E691	Photoproduction

$\Gamma(\phi\pi^+\pi^+\pi^-)/\Gamma(K^-\pi^+\pi^+)$   $\Gamma_{145}/\Gamma_{39}$

Unseen decay modes of the  $\phi$  are included.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.031</b>	90	ALVAREZ	90C NA14	Photoproduction

$\Gamma(\phi\pi^+\pi^+\pi^-)/\Gamma(\phi\pi^+)$   $\Gamma_{145}/\Gamma_{142}$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.6</b>	90	FRABETTI	92 E687	$\gamma$ Be



$\Gamma(K^+ K^- \pi^+ \pi^+ \pi^- \text{ nonresonant})/\Gamma_{\text{total}}$   $\Gamma_{141}/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.03</b>	90	12	ANJOS	88 E691	Photoproduction

————— Rare or forbidden modes —————

$\Gamma(K^+ \pi^+ \pi^-)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{149}/\Gamma_{39}$

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.0075 ± 0.0016 OUR AVERAGE</b>					
0.0077 ± 0.0017 ± 0.0008		59	AITALA	97C E791	$\pi^-$ nucleus, 500 GeV
0.0072 ± 0.0023 ± 0.0017		21	FRABETTI	95E E687	$\gamma$ Be, $\bar{E}_\gamma = 220$ GeV

$\Gamma(K^+ \rho^0)/\Gamma(K^+ \pi^+ \pi^-)$   $\Gamma_{150}/\Gamma_{149}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.37 ± 0.14 ± 0.07</b>		AITALA	97C E791	$\pi^-$ nucleus, 500 GeV

$\Gamma(K^+ \rho^0)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{150}/\Gamma_{39}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>• • • We do not use the following data for averages, fits, limits, etc. • • •</b>				
<0.0067	90	FRABETTI	95E E687	$\gamma$ Be, $\bar{E}_\gamma = 220$ GeV

$\Gamma(K^*(892)^0 \pi^+)/\Gamma(K^+ \pi^+ \pi^-)$   $\Gamma_{151}/\Gamma_{149}$

Unseen decay modes of the  $K^*(892)^0$  are included.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.53 ± 0.21 ± 0.02</b>		AITALA	97C E791	$\pi^-$ nucleus, 500 GeV

$\Gamma(K^*(892)^0 \pi^+)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{151}/\Gamma_{39}$

Unseen decay modes of the  $K^*(892)^0$  are included.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>• • • We do not use the following data for averages, fits, limits, etc. • • •</b>				
<0.0021	90	FRABETTI	95E E687	$\gamma$ Be, $\bar{E}_\gamma = 220$ GeV

$\Gamma(K^+ \pi^+ \pi^- \text{ nonresonant})/\Gamma(K^+ \pi^+ \pi^-)$   $\Gamma_{152}/\Gamma_{149}$

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.36 ± 0.14 ± 0.07</b>		AITALA	97C E791	$\pi^-$ nucleus, 500 GeV

$\Gamma(K^+ K^+ K^-)/\Gamma(K^- \pi^+ \pi^+)$   $\Gamma_{153}/\Gamma_{39}$

A doubly Cabibbo-suppressed decay with no simple spectator process possible.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;0.0016</b>	90		75 FRABETTI	95F E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV

- • • We do not use the following data for averages, fits, limits, etc. • • •
- 0.057 ± 0.020 ± 0.007      13      ADAMOVICH    93    WA82     $\pi^-$     340 GeV
- <sup>75</sup> Using the  $\phi\pi^+$  mode to normalize, FRABETTI 95F gets  $\Gamma(K^+ K^+ K^-)/\Gamma(\phi\pi^+) < 0.025$ .

$\Gamma(\phi K^+)/\Gamma(\phi\pi^+)$   $\Gamma_{154}/\Gamma_{142}$

A doubly Cabibbo-suppressed decay with no simple spectator process possible.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;0.021</b>	90		FRABETTI	95F E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV

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

$0.058^{+0.032}_{-0.026} \pm 0.007$		4	<sup>76</sup> ANJOS	92D E691	$\gamma$ Be, $\bar{E}_\gamma = 145$ GeV
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<sup>76</sup> The evidence of ANJOS 92D is a small excess of events ( $4.5^{+2.4}_{-2.0}$ ).

$\Gamma(\pi^+ e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_{155}/\Gamma$

A test for the  $\Delta C = 1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;5.2 × 10<sup>-5</sup></b>	90		AITALA	99G E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<1.1 × 10 <sup>-4</sup>	90		FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
<6.6 × 10 <sup>-5</sup>	90		AITALA	96 E791	$\pi^- N$ 500 GeV
<2.5 × 10 <sup>-3</sup>	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV
<2.6 × 10 <sup>-3</sup>	90	39	HAAS	88 CLEO	$e^+ e^-$ 10 GeV

$\Gamma(\pi^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{156}/\Gamma$

A test for the  $\Delta C = 1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.5 × 10<sup>-5</sup></b>	90		AITALA	99G E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<8.9 × 10 <sup>-5</sup>	90		FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
<1.8 × 10 <sup>-5</sup>	90		AITALA	96 E791	$\pi^- N$ 500 GeV
<2.2 × 10 <sup>-4</sup>	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV
<5.9 × 10 <sup>-3</sup>	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV
<2.9 × 10 <sup>-3</sup>	90	36	HAAS	88 CLEO	$e^+ e^-$ 10 GeV

$\Gamma(\rho^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{157}/\Gamma$

A test for the  $\Delta C = 1$  weak neutral current. Allowed by higher-order electroweak interactions.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;5.6 × 10<sup>-4</sup></b>	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV

$\Gamma(K^+ e^+ e^-)/\Gamma_{\text{total}}$   $\Gamma_{158}/\Gamma$

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;2.0 × 10<sup>-4</sup></b>	90	AITALA	99G E791	$\pi^- N$ 500 GeV
<b>&lt;2.0 × 10<sup>-4</sup></b>	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV

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

<4.8 × 10 <sup>-3</sup>	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV
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$\Gamma(K^+ \mu^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{159}/\Gamma$

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<4.4 \times 10^{-5}$	90		AITALA	99G E791	$\pi^- N$ 500 GeV
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
$<9.7 \times 10^{-5}$	90		FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.2 \times 10^{-4}$	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV
$<9.2 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^+ e^\pm \mu^\mp)/\Gamma_{\text{total}}$   $\Gamma_{160}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<3.4 \times 10^{-5}$	90	AITALA	99G E791	$\pi^- N$ 500 GeV

$\Gamma(\pi^+ e^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{161}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<1.1 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.3 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(\pi^+ e^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{162}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<1.3 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.3 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^+ e^\pm \mu^\mp)/\Gamma_{\text{total}}$   $\Gamma_{163}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
$<6.8 \times 10^{-5}$	90	AITALA	99G E791	$\pi^- N$ 500 GeV

$\Gamma(K^+ e^+ \mu^-)/\Gamma_{\text{total}}$   $\Gamma_{164}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<1.3 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.4 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^+ e^- \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{165}/\Gamma$

A test of lepton-family-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
$<1.2 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.4 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

**$\Gamma(\pi^- e^+ e^+)/\Gamma_{\text{total}}$**   **$\Gamma_{166}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;9.6 \times 10^{-5}</math></b>	90	AITALA	99G E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.1 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<4.8 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

**$\Gamma(\pi^- \mu^+ \mu^+)/\Gamma_{\text{total}}$**   **$\Gamma_{167}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;1.7 \times 10^{-5}</math></b>	90		AITALA	99G E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<8.7 \times 10^{-5}$	90		FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<2.2 \times 10^{-4}$	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV
$<6.8 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

**$\Gamma(\pi^- e^+ \mu^+)/\Gamma_{\text{total}}$**   **$\Gamma_{168}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;5.0 \times 10^{-5}</math></b>	90	AITALA	99G E791	$\pi^- N$ 500 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<1.1 \times 10^{-4}$	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
$<3.7 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

**$\Gamma(\rho^- \mu^+ \mu^+)/\Gamma_{\text{total}}$**   **$\Gamma_{169}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;5.6 \times 10^{-4}</math></b>	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV

**$\Gamma(K^- e^+ e^+)/\Gamma_{\text{total}}$**   **$\Gamma_{170}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;1.2 \times 10^{-4}</math></b>	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$<9.1 \times 10^{-3}$	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

**$\Gamma(K^- \mu^+ \mu^+)/\Gamma_{\text{total}}$**   **$\Gamma_{171}/\Gamma$**

A test of lepton-number conservation.

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>&lt;1.2 \times 10^{-4}</math></b>	90		FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<3.2 \times 10^{-4}$	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV
$<4.3 \times 10^{-3}$	90		WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^- e^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{172}/\Gamma$

A test of lepton-number conservation.

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<b>&lt;1.3 × 10<sup>-4</sup></b>	90	FRABETTI	97B E687	$\gamma$ Be, $\bar{E}_\gamma \approx 220$ GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
<4.0 × 10 <sup>-3</sup>	90	WEIR	90B MRK2	$e^+ e^-$ 29 GeV

$\Gamma(K^*(892)^- \mu^+ \mu^+)/\Gamma_{\text{total}}$   $\Gamma_{173}/\Gamma$

A test of lepton-number conservation.

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
<b>&lt;8.5 × 10<sup>-4</sup></b>	90	0	KODAMA	95 E653	$\pi^-$ emulsion 600 GeV

**$D^\pm$  CP-VIOLATING DECAY-RATE ASYMMETRIES**

**$A_{CP}(K_S^0 \pi^\pm)$  in  $D^\pm \rightarrow K_S^0 \pi^\pm$**

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>-0.016 ± 0.015 ± 0.009</b>	10.6k	<sup>77</sup> LINK	02B FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

<sup>77</sup> LINK 02B measures  $N(D^+ \rightarrow K_S^0 \pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

**$A_{CP}(K_S^0 K^\pm)$  in  $D^\pm \rightarrow K_S^0 K^\pm$**

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>+0.071 ± 0.061 ± 0.012</b>	949	<sup>78</sup> LINK	02B FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV

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

+0.069 ± 0.060 ± 0.015	949	<sup>79</sup> LINK	02B FOCS	$\gamma$ nucleus, $\bar{E}_\gamma \approx 180$ GeV
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<sup>78</sup> LINK 02B measures  $N(D^+ \rightarrow K_S^0 K^+)/N(D^+ \rightarrow K_S^0 \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

<sup>79</sup> LINK 02B measures  $N(D^+ \rightarrow K_S^0 K^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

**$A_{CP}(K^+ K^- \pi^\pm)$  in  $D^\pm \rightarrow K^+ K^- \pi^\pm$**

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.002 ± 0.011 OUR AVERAGE</b>				
+0.006 ± 0.011 ± 0.005	14k	<sup>80</sup> LINK	00B FOCS	
-0.014 ± 0.029		<sup>80</sup> AITALA	97B E791	-0.062 < $A_{CP}$ < +0.034 (90% CL)
-0.031 ± 0.068		<sup>80</sup> FRABETTI	94I E687	-0.14 < $A_{CP}$ < +0.081 (90% CL)

<sup>80</sup> FRABETTI 94I, AITALA 98C, and LINK 00B measure  $N(D^+ \rightarrow K^- K^+ \pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

### $A_{CP}(K^\pm K^{*0})$ in $D^+ \rightarrow K^+ \bar{K}^{*0}$ , $D^- \rightarrow K^- K^{*0}$

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	DOCUMENT ID	TECN	COMMENT
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**-0.02 ± 0.05 OUR AVERAGE**

-0.010 ± 0.050      <sup>81</sup> AITALA      97B E791      -0.092 <  $A_{CP}$  < +0.072 (90% CL)

-0.12 ± 0.13      <sup>81</sup> FRABETTI      94I E687      -0.33 <  $A_{CP}$  < +0.094 (90% CL)

<sup>81</sup> FRABETTI 94I and AITALA 97B measure  $N(D^+ \rightarrow K^+ \bar{K}^{*0})/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

### $A_{CP}(\phi\pi^\pm)$ in $D^\pm \rightarrow \phi\pi^\pm$

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	DOCUMENT ID	TECN	COMMENT
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**-0.014 ± 0.033 OUR AVERAGE**

-0.028 ± 0.036      <sup>82</sup> AITALA      97B E791      -0.087 <  $A_{CP}$  < +0.031 (90% CL)

+0.066 ± 0.086      <sup>82</sup> FRABETTI      94I E687      -0.075 <  $A_{CP}$  < +0.21 (90% CL)

<sup>82</sup> FRABETTI 94I and AITALA 97B measure  $N(D^+ \rightarrow \phi\pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

### $A_{CP}(\pi^+ \pi^- \pi^\pm)$ in $D^\pm \rightarrow \pi^+ \pi^- \pi^\pm$

This is the difference between  $D^+$  and  $D^-$  partial widths for these modes divided by the sum of the widths.

VALUE	DOCUMENT ID	TECN	COMMENT
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**-0.017 ± 0.042**      <sup>83</sup> AITALA      97B E791      -0.086 <  $A_{CP}$  < +0.052 (90% CL)

<sup>83</sup> AITALA 97B measure  $N(D^+ \rightarrow \pi^+ \pi^- \pi^+)/N(D^+ \rightarrow K^- \pi^+ \pi^+)$ , the ratio of numbers of events observed, and similarly for the  $D^-$ .

## $D^\pm$ PRODUCTION CROSS SECTION AT $\psi(3770)$

A compilation of the cross sections for the direct production of  $D^\pm$  mesons at or near the  $\psi(3770)$  peak in  $e^+ e^-$  production.

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

4.2 ± 0.6 ± 0.3      <sup>84</sup> ADLER      88C MRK3       $e^+ e^-$  3.768 GeV

5.5 ± 1.0      <sup>85</sup> PARTRIDGE      84 CBAL       $e^+ e^-$  3.771 GeV

6.00 ± 0.72 ± 1.02      <sup>86</sup> SCHINDLER      80 MRK2       $e^+ e^-$  3.771 GeV

9.1 ± 2.0      <sup>87</sup> PERUZZI      77 MRK1       $e^+ e^-$  3.774 GeV

<sup>84</sup> This measurement compares events with one detected  $D$  to those with two detected  $D$  mesons, to determine the the absolute cross section. ADLER 88C measure the ratio of cross sections (neutral to charged) to be  $1.36 \pm 0.23 \pm 0.14$ . This measurement does not include the decays of the  $\psi(3770)$  not associated with charmed particle production.

<sup>85</sup> This measurement comes from a scan of the  $\psi(3770)$  resonance and a fit to the cross section. PARTRIDGE 84 measures  $6.4 \pm 1.15$  nb for the cross section. We take the phase space division of neutral and charged  $D$  mesons in  $\psi(3770)$  decay to be 1.33, and we assume that the  $\psi(3770)$  is an isosinglet to evaluate the cross sections. The noncharm decays (e.g. radiative) of the  $\psi(3770)$  are included in this measurement and may amount to a few percent correction.

<sup>86</sup> This measurement comes from a scan of the  $\psi(3770)$  resonance and a fit to the cross section. SCHINDLER 80 assume the phase space division of neutral and charged  $D$

mesons in  $\psi(3770)$  decay to be 1.33, and that the  $\psi(3770)$  is an isosinglet. The noncharm decays (e.g. radiative) of the  $\psi(3770)$  are included in this measurement and may amount to a few percent correction.

<sup>87</sup> This measurement comes from a scan of the  $\psi(3770)$  resonance and a fit to the cross section. The phase space division of neutral and charged  $D$  mesons in  $\psi(3770)$  decay is taken to be 1.33, and  $\psi(3770)$  is assumed to be an isosinglet. The noncharm decays (e.g. radiative) of the  $\psi(3770)$  are included in this measurement and may amount to a few percent correction. We exclude this measurement from the average because of uncertainties in the contamination from  $\tau$  lepton pairs. Also see RAPIDIS 77.

## $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$ FORM FACTORS

$r_V \equiv V(0)/A_1(0)$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.82 ± 0.09 OUR AVERAGE</b>				
1.45 ± 0.23 ± 0.07	763	ADAMOVICH	99 BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.90 ± 0.11 ± 0.09	3000	<sup>88</sup> AITALA	98B E791	$\bar{K}^*(892)^0 e^+ \nu_e$
1.84 ± 0.11 ± 0.09	3034	AITALA	98F E791	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.74 ± 0.27 ± 0.28	874	FRABETTI	93E E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
2.00 $^{+0.34}_{-0.32}$ ± 0.16	305	KODAMA	92 E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
2.0 ± 0.6 ± 0.3	183	ANJOS	90E E691	$\bar{K}^*(892)^0 e^+ \nu_e$

<sup>88</sup> This is slightly different from the AITALA 98B value: see ref. [5] in AITALA 98F.

$r_2 \equiv A_2(0)/A_1(0)$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.78 ± 0.07 OUR AVERAGE</b>				
1.00 ± 0.15 ± 0.03	763	ADAMOVICH	99 BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.71 ± 0.08 ± 0.09	3000	AITALA	98B E791	$\bar{K}^*(892)^0 e^+ \nu_e$
0.75 ± 0.08 ± 0.09	3034	AITALA	98F E791	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.78 ± 0.18 ± 0.10	874	FRABETTI	93E E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.82 $^{+0.22}_{-0.23}$ ± 0.11	305	KODAMA	92 E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.0 ± 0.5 ± 0.2	183	ANJOS	90E E691	$\bar{K}^*(892)^0 e^+ \nu_e$

$r_3 \equiv A_3(0)/A_1(0)$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

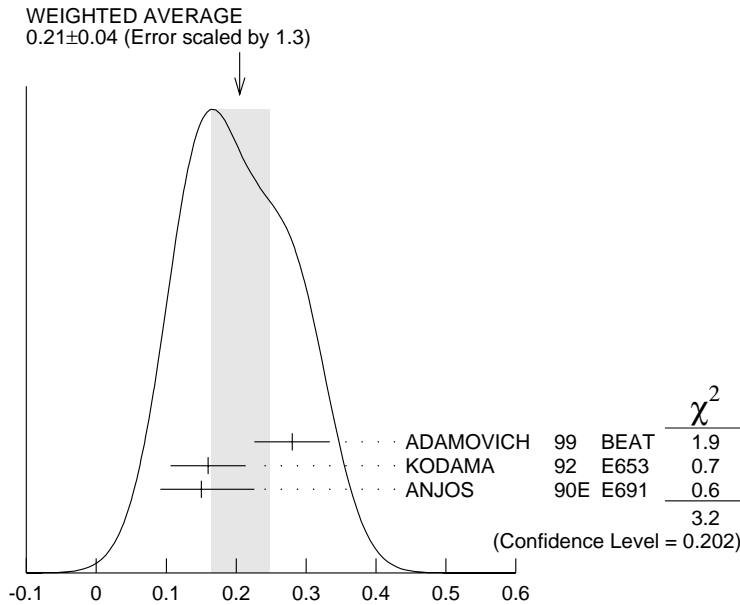
<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>0.04 ± 0.33 ± 0.29</b>	3034	AITALA	98F E791	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$

$\Gamma_L/\Gamma_T$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>1.14 ± 0.08 OUR AVERAGE</b>				
1.09 ± 0.10 ± 0.02	763	ADAMOVICH	99 BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.20 ± 0.13 ± 0.13	874	FRABETTI	93E E687	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.18 ± 0.18 ± 0.08	305	KODAMA	92 E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
1.8 $^{+0.6}_{-0.4}$ ± 0.3	183	ANJOS	90E E691	$\bar{K}^*(892)^0 e^+ \nu_e$

$\Gamma_+/\Gamma_-$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
<b>0.21±0.04 OUR AVERAGE</b>		Error includes scale factor of 1.3. See the ideogram below.		
0.28±0.05±0.02	763	ADAMOVICH 99	BEAT	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.16±0.05±0.02	305	KODAMA 92	E653	$\bar{K}^*(892)^0 \mu^+ \nu_\mu$
0.15 <sup>+0.07</sup> <sub>-0.05</sub> ±0.03	183	ANJOS 90E	E691	$\bar{K}^*(892)^0 e^+ \nu_e$



$\Gamma_+/\Gamma_-$  in  $D^+ \rightarrow \bar{K}^*(892)^0 \ell^+ \nu_\ell$

**$D^\pm$  REFERENCES**

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AITALA 01B	PRL 86 770	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
LINK 01C	PRL 87 162001	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
ABREU 000	EPJ C12 209	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ASTIER 00D	PL B486 35	P. Astier <i>et al.</i>	(CERN NOMAD Collab.)
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LINK 00B	PL B491 232	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
Also 00D	PL B495 443 (errata)	J.M. Link <i>et al.</i>	(FNAL FOCUS Collab.)
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ABE 99P	PR D60 092005	F. Abe <i>et al.</i>	(CDF Collab.)
ADAMOVICH 99	EPJ C6 35	M. Adamovich <i>et al.</i>	(CERN BEATRICE Collab.)
AITALA 99G	PL B462 401	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
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AITALA 98F	PL B440 435	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
BAI 98B	PL B429 188	J.Z. Bai <i>et al.</i>	(BEP C BES Collab.)
JESSOP 98	PR D58 052002	C.P. Jessop <i>et al.</i>	(CLEO Collab.)
AITALA 97	PL B397 325	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
AITALA 97B	PL B403 377	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)



AITALA	97C	PL B404 187	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
BARTELT	97	PL B405 373	J. Bartelt <i>et al.</i>	(CLEO Collab.)
BISHAI	97	PRL 78 3261	M. Bishai <i>et al.</i>	(CLEO Collab.)
FRABETTI	97	PL B391 235	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	97B	PL B398 239	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	97C	PL B401 131	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	97D	PL B407 79	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
AITALA	96	PRL 76 364	E.M. Aitala <i>et al.</i>	(FNAL E791 Collab.)
ALBRECHT	96C	PL B374 249	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BIGI	95	PL B349 363	I.I. Bigi, H. Yamamoto	(NDAM, HARV)
FRABETTI	95	PL B346 199	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	95B	PL B351 591	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	95E	PL B359 403	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	95F	PL B363 259	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
KODAMA	95	PL B345 85	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
ALBRECHT	94I	ZPHY C64 375	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALEEV	94	PAN 57 1370	A.N. Alev <i>et al.</i>	(Serpukhov BIS-2 Collab.)
		Translated from YF 57 1443.		
BALEST	94	PRL 72 2328	R. Balest <i>et al.</i>	(CLEO Collab.)
FRABETTI	94D	PL B323 459	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	94G	PL B331 217	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
FRABETTI	94I	PR D50 R2953	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
ABE	93E	PL B313 288	K. Abe <i>et al.</i>	(VENUS Collab.)
ADAMOVICH	93	PL B305 177	M.I. Adamovich <i>et al.</i>	(CERN WA82 Collab.)
AKERIB	93	PRL 71 3070	D.S. Akerib <i>et al.</i>	(CLEO Collab.)
ALAM	93	PRL 71 1311	M.S. Alam <i>et al.</i>	(CLEO Collab.)
ANJOS	93	PR D48 56	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
BEAN	93C	PL B317 647	A. Bean <i>et al.</i>	(CLEO Collab.)
FRABETTI	93E	PL B307 262	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
KODAMA	93B	PL B313 260	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
KODAMA	93C	PL B316 455	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
SELEN	93	PRL 71 1973	M.A. Selen <i>et al.</i>	(CLEO Collab.)
ALBRECHT	92B	ZPHY C53 361	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	92F	PL B278 202	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ANJOS	92	PR D45 R2177	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	92C	PR D46 1941	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	92D	PRL 69 2892	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
BARLAG	92C	ZPHY C55 383	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
Also	90D	ZPHY C48 29	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
COFFMAN	92B	PR D45 2196	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
DAOUDI	92	PR D45 3965	M. Daoudi <i>et al.</i>	(CLEO Collab.)
FRABETTI	92	PL B281 167	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
KODAMA	92	PL B274 246	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
KODAMA	92C	PL B286 187	K. Kodama <i>et al.</i>	(FNAL E653 Collab.)
ADAMOVICH	91	PL B268 142	M.I. Adamovich <i>et al.</i>	(WA82 Collab.)
ALBRECHT	91	PL B255 634	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALVAREZ	91	PL B255 639	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ALVAREZ	91B	ZPHY C50 11	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
AMMAR	91	PR D44 3383	R. Ammar <i>et al.</i>	(CLEO Collab.)
ANJOS	91B	PR D43 R2063	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	91C	PRL 67 1507	J.C. Anjos <i>et al.</i>	(FNAL-TPS Collab.)
BAI	91	PRL 66 1011	Z. Bai <i>et al.</i>	(Mark III Collab.)
COFFMAN	91	PL B263 135	D.M. Coffman <i>et al.</i>	(Mark III Collab.)
FRABETTI	91	PL B263 584	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
ALVAREZ	90	ZPHY C47 539	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ALVAREZ	90C	PL B246 261	M.P. Alvarez <i>et al.</i>	(CERN NA14/2 Collab.)
ANJOS	90C	PR D41 2705	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	90D	PR D42 2414	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	90E	PRL 65 2630	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
BARLAG	90C	ZPHY C46 563	S. Barlag <i>et al.</i>	(ACCMOR Collab.)
WEIR	90B	PR D41 1384	A.J. Weir <i>et al.</i>	(Mark II Collab.)
ANJOS	89	PRL 62 125	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	89B	PRL 62 722	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ANJOS	89E	PL B223 267	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
ADLER	88B	PRL 60 1375	J. Adler <i>et al.</i>	(Mark III Collab.)
ADLER	88C	PRL 60 89	J. Adler <i>et al.</i>	(Mark III Collab.)
ALBRECHT	88I	PL B210 267	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ANJOS	88	PRL 60 897	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)
AOKI	88	PL B209 113	S. Aoki <i>et al.</i>	(WA75 Collab.)
HAAS	88	PRL 60 1614	P. Haas <i>et al.</i>	(CLEO Collab.)
ONG	88	PRL 60 2587	R.A. Ong <i>et al.</i>	(Mark II Collab.)

RAAB	88	PR D37 2391	J.R. Raab <i>et al.</i>	(FNAL E691 Collab.)
ADAMOVICH	87	EPL 4 887	M.I. Adamovich <i>et al.</i>	(Photon Emulsion Collab.)
ADLER	87	PL B196 107	J. Adler <i>et al.</i>	(Mark III Collab.)
AGUILAR-...	87E	ZPHY C36 551	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
Also	88B	ZPHY C40 321	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
AGUILAR-...	87F	ZPHY C36 559	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
Also	88	ZPHY C38 520 erratum	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
BARTEL	87	ZPHY C33 339	W. Bartel <i>et al.</i>	(JADE Collab.)
AGUILAR-...	86B	ZPHY C31 491	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
BALTRUSAIT...	86E	PRL 56 2140	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
PAL	86	PR D33 2708	T. Pal <i>et al.</i>	(DELCO Collab.)
AIHARA	85	ZPHY C27 39	H. Aihara <i>et al.</i>	(TPC Collab.)
BALTRUSAIT...	85B	PRL 54 1976	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BALTRUSAIT...	85E	PRL 55 150	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BARTEL	85J	PL 163B 277	W. Bartel <i>et al.</i>	(JADE Collab.)
ADAMOVICH	84	PL 140B 119	M.I. Adamovich <i>et al.</i>	(CERN WA58 Collab.)
ALTHOFF	84G	ZPHY C22 219	M. Althoff <i>et al.</i>	(TASSO Collab.)
ALTHOFF	84J	PL 146B 443	M. Althoff <i>et al.</i>	(TASSO Collab.)
DERRICK	84	PRL 53 1971	M. Derrick <i>et al.</i>	(HRS Collab.)
KOOP	84	PRL 52 970	D.E. Koop <i>et al.</i>	(DELCO Collab.)
PARTRIDGE	84	Thesis CALT-68-1150	R.A. Partridge	(Crystal Ball Collab.)
AGUILAR-...	83B	PL 123B 98	M. Aguilar-Benitez <i>et al.</i>	(LEBC-EHS Collab.)
AUBERT	83	NP B213 31	J.J. Aubert <i>et al.</i>	(EMC Collab.)
PARTRIDGE	81	PRL 47 760	R. Partridge <i>et al.</i>	(Crystal Ball Collab.)
SCHINDLER	81	PR D24 78	R.H. Schindler <i>et al.</i>	(Mark II Collab.)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB) J
BACINO	80	PRL 45 329	W.J. Bacino <i>et al.</i>	(DELCO Collab.)
SCHINDLER	80	PR D21 2716	R.H. Schindler <i>et al.</i>	(Mark II Collab.)
ZHOLENTZ	80	PL 96B 214	A.A. Zholents <i>et al.</i>	(NOVO)
Also	81	SJNP 34 814	A.A. Zholents <i>et al.</i>	(NOVO)
		Translated from YAF 34	1471.	
BACINO	79	PRL 43 1073	W.J. Bacino <i>et al.</i>	(DELCO Collab.)
BRANDELIK	79	PL 80B 412	R. Brandelik <i>et al.</i>	(DASP Collab.)
FELLER	78	PRL 40 274	J.M. Feller <i>et al.</i>	(Mark I Collab.)
VUILLEMIN	78	PRL 41 1149	V. Vuillemin <i>et al.</i>	(Mark I Collab.)
GOLDHABER	77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	I. Peruzzi <i>et al.</i>	(Mark I Collab.)
PICCOLO	77	PL 70B 260	M. Piccolo <i>et al.</i>	(Mark I Collab.)
RAPIDIS	77	PRL 39 526	P.A. Rapidis <i>et al.</i>	(Mark I Collab.)
PERUZZI	76	PRL 37 569	I. Peruzzi <i>et al.</i>	(Mark I Collab.)

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