

$\eta(1760)$

$$I^G(J^{PC}) = 0^+(0^{-+})$$

OMITTED FROM SUMMARY TABLE

Seen by DM2 in the $\rho\rho$ system (BISELLO 89B). Structure in this region has been reported before in the same system (BALTRUSAITIS 86B) and in the $\omega\omega$ system (BALTRUSAITIS 85C, BISELLO 87).

$\eta(1760)$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
1751 ± 15 OUR AVERAGE				
1768 ⁺²⁴ ₋₂₅ ± 10	465	¹ ZHANG	12A BELL	$e^+e^- \rightarrow e^+e^-\eta'\pi^+\pi^-$
1744 ± 10 ± 15	1045	² ABLIKIM	06H BES	$J/\psi \rightarrow \gamma\omega\omega$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
1703 ⁺¹² ₋₁₁ ± 2		³ ZHANG	12A BELL	$e^+e^- \rightarrow e^+e^-\eta'\pi^+\pi^-$
1760 ± 11	320	⁴ BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$

¹ From a single-resonance fit.

² From a partial wave analysis including $\eta(1760)$, $f_0(1710)$, $f_2(1640)$, and $f_2(1910)$.

³ From a two-resonance fit.

⁴ Estimated by us from various fits. Systematic uncertainties not estimated.

$\eta(1760)$ WIDTH

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
240 ± 30 OUR AVERAGE				
224 ⁺⁶² ₋₅₆ ± 25	465	⁵ ZHANG	12A BELL	$e^+e^- \rightarrow e^+e^-\eta'\pi^+\pi^-$
244 ⁺²⁴ ₋₂₁ ± 25	1045	⁶ ABLIKIM	06H BES	$J/\psi \rightarrow \gamma\omega\omega$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
42 ⁺³⁶ ₋₂₂ ± 15		⁷ ZHANG	12A BELL	$e^+e^- \rightarrow e^+e^-\eta'\pi^+\pi^-$
60 ± 16	320	⁸ BISELLO	89B DM2	$J/\psi \rightarrow 4\pi\gamma$

⁵ From a single-resonance fit.

⁶ From a partial wave analysis including $\eta(1760)$, $f_0(1710)$, $f_2(1640)$, and $f_2(1910)$.

⁷ From a two-resonance fit.

⁸ Estimated by us from various fits. Systematic uncertainties not estimated.

$\eta(1760)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 4π	
Γ_2 $2\pi^+ 2\pi^-$	seen
Γ_3 $\pi^+ \pi^- 2\pi^0$	seen
Γ_4 $\rho^0 \rho^0$	seen
Γ_5 $\rho^+ \rho^-$	seen
Γ_6 $\omega\omega$	seen
Γ_7 $\eta' \pi^+ \pi^-$	seen
Γ_8 $\gamma\gamma$	seen

$\eta(1760)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

$$\Gamma(\eta' \pi^+ \pi^-) \times \Gamma(\gamma\gamma)/\Gamma_{\text{total}} \qquad \Gamma_7\Gamma_8/\Gamma$$

VALUE (eV)	EVTS	DOCUMENT ID	TECN	COMMENT
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$28.2^{+7.9}_{-7.5} \pm 3.7$	465	⁹ ZHANG	12A BELL	$e^+ e^- \rightarrow e^+ e^- \eta' \pi^+ \pi^-$
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• • • We do not use the following data for averages, fits, limits, etc. • • •

$3.0^{+2.0}_{-1.2} \pm 0.8$	52	¹⁰ ZHANG	12A BELL	$e^+ e^- \rightarrow e^+ e^- \eta' \pi^+ \pi^-$
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$18^{+13}_{-10} \pm 5$	315	¹¹ ZHANG	12A BELL	$e^+ e^- \rightarrow e^+ e^- \eta' \pi^+ \pi^-$
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⁹ From a single-resonance fit.

¹⁰ From a two-resonance fit. For constructive interference with the $X(1835)$.

¹¹ From a two-resonance fit. For destructive interference with the $X(1835)$.

$\eta(1760)$ BRANCHING RATIOS

$$\Gamma(2\pi^+ 2\pi^-)/\Gamma_{\text{total}} \qquad \Gamma_2/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	BISELLO	89B DM2	$J/\psi \rightarrow \gamma 2\pi^+ 2\pi^-$
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$$\Gamma(\pi^+ \pi^- 2\pi^0)/\Gamma_{\text{total}} \qquad \Gamma_3/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	BISELLO	89B DM2	$J/\psi \rightarrow \gamma \pi^+ \pi^- 2\pi^0$
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$$\Gamma(\rho^0 \rho^0)/\Gamma_{\text{total}} \qquad \Gamma_4/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	BISELLO	89B DM2	$J/\psi \rightarrow \gamma \rho^0 \rho^0$
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seen	BALTRUSAIT..86	MRK3	$J/\psi \rightarrow \gamma \rho^0 \rho^0$
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$$\Gamma(\rho^+ \rho^-)/\Gamma_{\text{total}} \qquad \Gamma_5/\Gamma$$

VALUE	DOCUMENT ID	TECN	COMMENT
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seen	BISELLO	89B DM2	$J/\psi \rightarrow \gamma \rho^+ \rho^-$
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seen	BALTRUSAIT..86	MRK3	$J/\psi \rightarrow \gamma \rho^+ \rho^-$
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$\Gamma(\omega\omega)/\Gamma_{\text{total}}$				Γ_6/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	BISELLO 87	DM2	$J/\psi \rightarrow \omega\omega$	
seen	BALTRUSAIT..85C	MRK3	$J/\psi \rightarrow \gamma\omega\omega$	

$\Gamma(\gamma\gamma)/\Gamma(\omega\omega)$				Γ_8/Γ_6
VALUE	CL%	DOCUMENT ID	TECN	COMMENT
$<2.48 \times 10^{-3}$	90	¹² ABLIKIM 180	BES3	$\psi(2S) \rightarrow \pi^+\pi^-\gamma\gamma\gamma$

¹² Using results from ABLIKIM 06H.

$\eta(1760)$ REFERENCES

ABLIKIM 180	PR D97 072014	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ZHANG 12A	PR D86 052002	C.C. Zhang <i>et al.</i>	(BELLE Collab.)
ABLIKIM 06H	PR D73 112007	M. Ablikim <i>et al.</i>	(BES Collab.)
BISELLO 89B	PR D39 701	G. Busetto <i>et al.</i>	(DM2 Collab.)
BISELLO 87	PL B192 239	D. Bisello <i>et al.</i>	(PADO, CLER, FRAS+)
BALTRUSAIT... 86	PR D33 629	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BALTRUSAIT... 86B	PR D33 1222	R.M. Baltrusaitis <i>et al.</i>	(Mark III Collab.)
BALTRUSAIT... 85C	PRL 55 1723	R.M. Baltrusaitis <i>et al.</i>	(CIT, UCSC+)