

$f_0(2020)$

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

Needs confirmation.

 $f_0(2020)$ T-MATRIX POLE \sqrt{s} Note that $\Gamma = -2 \text{Im}(\sqrt{s})$.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
(1870–2080) – i (120–240) OUR ESTIMATE			
(2038 ± 48) – i (156 ± 41)	¹ RODAS	22	RVUE $J/\psi(1S) \rightarrow \gamma (\pi\pi, K\bar{K})$
(1925 ± 25) – i (160 ± 18)	SARANTSEV	21	RVUE $J/\psi(1S) \rightarrow \gamma (\pi\pi, K\bar{K}, \eta\eta, \omega\phi)$
(1910 ± 50) – i (199 ± 40)	² ROPERTZ	18	RVUE $\bar{B}_s^0 \rightarrow J/\psi(\pi^+\pi^-/K^+K^-)$
(1992 ± 16) – i (221 ± 30)	³ BARBERIS	00C	450 $pp \rightarrow p_f 4\pi p_s$
(2020 ± 35) – i (205 ± 25)	BARBERIS	97B	OMEG 450 $pp \rightarrow pp 2(\pi^+\pi^-)$

¹ T-matrix pole from coupled channel K-matrix fit to data on $J/\psi \rightarrow \gamma\pi^0\pi^0$ (ABLIKIM 15AE) and $J/\psi \rightarrow \gamma K_S^0 K_S^0$ (ABLIKIM 18AA).

² T-matrix pole of 3 channel unitary model fit to data from AAIJ 14BR and AAIJ 17V extracted using Pade approximants.

³ Average between $\pi^+\pi^-2\pi^0$ and $2(\pi^+\pi^-)$.

 $f_0(2020)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1982 ± 3⁺⁵⁴₋₀		¹ ABLIKIM	22C BES3	$J/\psi \rightarrow \gamma\eta'\eta' \rightarrow 4/5\gamma 2(\pi^+\pi^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2010 ± 6 ⁺⁶ ₋₄		² ABLIKIM	22AS BES3	$J/\psi(1S) \rightarrow \gamma\eta\eta'$
2037 ± 8	80k	³ UMAN	06 E835	5.2 $\bar{p}p \rightarrow \eta\eta\pi^0$
2040 ± 38		ANISOVICH	00J SPEC	
2010 ± 60		ALDE	98 GAM4	100 $\pi^-p \rightarrow \pi^0\pi^0 n$

¹ From a partial wave analysis of the systems (γX), with $X \rightarrow \eta'\eta'$, and ($\eta' X$), with $X \rightarrow \gamma\eta'$ in the decay $J/\psi \rightarrow \gamma\eta'\eta'$. The intermediate resonance X is parametrized by a constant-width, relativistic Breit-Wigner.

² From a Breit-Wigner fit involving 9 resonances and a resonating exotic $\eta_1(1855) \rightarrow \eta\eta'$ P -wave.

³ Statistical error only.

 $f_0(2020)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
436 ± 4⁺⁴⁶₋₄₉		¹ ABLIKIM	22C BES3	$J/\psi \rightarrow \gamma\eta'\eta' \rightarrow 4/5\gamma 2(\pi^+\pi^-)$

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

$203 \pm 9^{+13}_{-11}$		² ABLIKIM	22AS	BES3	$J/\psi(1S) \rightarrow \gamma\eta\eta'$
296 ± 17	80k	³ UMAN	06	E835	$5.2 \bar{p}p \rightarrow \eta\eta\pi^0$
405 ± 40		ANISOVICH	00J	SPEC	
240 ± 100		ALDE	98	GAM4	$100 \pi^- p \rightarrow \pi^0 \pi^0 n$

¹From a partial wave analysis of the systems (γX), with $X \rightarrow \eta'\eta'$, and ($\eta' X$), with $X \rightarrow \gamma\eta'$ in the decay $J/\psi \rightarrow \gamma\eta'\eta'$. The intermediate resonance X is parametrized by a constant-width, relativistic Breit-Wigner.

²From a Breit-Wigner fit involving 9 resonances and a resonating exotic $\eta_1(1855) \rightarrow \eta\eta'$ P -wave.

³Statistical error only.

$f_0(2020)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $\rho\pi\pi$	seen
Γ_2 $\pi^0\pi^0$	seen
Γ_3 $\rho\rho$	seen
Γ_4 $\omega\omega$	seen
Γ_5 $\eta\eta$	seen
Γ_6 $\eta'\eta'$	seen

$f_0(2020)$ BRANCHING RATIOS

$\Gamma(\rho\rho)/\Gamma(\omega\omega)$				Γ_3/Γ_4
VALUE	DOCUMENT ID	TECN	COMMENT	

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

~ 3	BARBERIS	00F	450	$pp \rightarrow p_f \omega \omega p_s$
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$\Gamma(\eta\eta)/\Gamma_{\text{total}}$				Γ_5/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	UMAN	06	E835	$5.2 \bar{p}p \rightarrow \eta\eta\pi^0$

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$				Γ_6/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	¹ ABLIKIM	22C	BES3	$J/\psi \rightarrow \gamma\eta'\eta' \rightarrow 4/5\gamma 2(\pi^+\pi^-)$

¹From a partial wave analysis of the systems (γX), with $X \rightarrow \eta'\eta'$, and ($\eta' X$), with $X \rightarrow \gamma\eta'$ in the decay $J/\psi \rightarrow \gamma\eta'\eta'$. The intermediate resonance X is parametrized by a constant-width, relativistic Breit-Wigner.

$f_0(2020)$ REFERENCES

ABLIKIM	22AS	PR D106 072012	M. Ablikim <i>et al.</i>	(BESIII Collab.)
Also		PR D107 079901 (errat.)	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	22C	PR D105 072002	M. Ablikim <i>et al.</i>	(BESIII Collab.)
RODAS	22	EPJ C82 80	A. Rodas <i>et al.</i>	(JPAC Collab.)
SARANTSEV	21	PL B816 136227	A.V. Sarantsev <i>et al.</i>	(BONN, PNPI)
ABLIKIM	18AA	PR D98 072003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ROPERTZ	18	EPJ C78 1000	S. Ropertz, C. Hanhart, B. Kubis	(BONN, JULI)

AAIJ	17V	JHEP 1708 037	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABLIKIM	15AE	PR D92 052003	M. Ablikim <i>et al.</i>	(BESIII Collab.)
AAIJ	14BR	PR D89 092006	R. Aaij <i>et al.</i>	(LHCb Collab.)
UMAN	06	PR D73 052009	I. Uman <i>et al.</i>	(FNAL E835)
ANISOVICH	00J	PL B491 47	A.V. Anisovich <i>et al.</i>	(RAL, LOQM, PNPI+)
BARBERIS	00C	PL B471 440	D. Barberis <i>et al.</i>	(WA 102 Collab.)
BARBERIS	00F	PL B484 198	D. Barberis <i>et al.</i>	(WA 102 Collab.)
ALDE	98	EPJ A3 361	D. Alde <i>et al.</i>	(GAM4 Collab.)
Also		PAN 62 405	D. Alde <i>et al.</i>	(GAMS Collab.)
		Translated from YAF 62 446.		
BARBERIS	97B	PL B413 217	D. Barberis <i>et al.</i>	(WA 102 Collab.)
