$f_0(2020)$

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

Needs confirmation.

$f_0(2020)$ T-MATRIX POLE $\sqrt{s}$

Note that $\Gamma = -2\ \mathrm{Im}(\sqrt{s})$.

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
(1870–2080) − *i* (120–240) OUR ESTIMATE				
$(2038 \pm 48) - i\ (156 \pm 41)$	[1] RODAS	22	RVUE	$J/\psi(1S) \to \gamma\ (\pi\pi,\ K\overline{K})$
$(1925 \pm 25) - i\ (160 \pm 18)$	SARANTSEV	21	RVUE	$J/\psi(1S) \to \gamma\ (\pi\pi,\ K\overline{K},\ \eta\eta,\ \omega\phi)$
$(1910 \pm 50) - i\ (199 \pm 40)$	[2] ROPERTZ	18	RVUE	$\overline{B}{}^0_s \to J/\psi(\pi^+\pi^-/K^+K^-)$
$(1992 \pm 16) - i\ (221 \pm 30)$	[3] BARBERIS	00C		450 $pp \to p_f 4\pi p_s$
$(2020 \pm 35) - i(205 \pm 25)$	BARBERIS	97B	OMEG	450 $pp \to pp2(\pi^+\pi^-)$

[1] T-matrix pole from coupled channel K-matrix fit to data on $J/\psi \to \gamma\pi^0\pi^0$ (ABLIKIM 15AE) and $J/\psi \to \gamma K^0_S K^0_S$ (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*
$1982 \pm\ 3^{+54}_{-\ 0}$		[1] ABLIKIM	22C	BES3	$J/\psi \to \gamma\eta'\eta' \to 4/5\gamma 2(\pi^+\pi^-)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$2010 \pm\ 6^{+\ 6}_{-\ 4}$		[2] ABLIKIM	22AS	BES3	$J/\psi(1S) \to \gamma\eta\eta'$
$2037 \pm\ 8$	80k	[3] UMAN	06	E835	5.2 $\overline{p}p \to \eta\eta\pi^0$
2040 ± 38		ANISOVICH	00J	SPEC	
2010 ± 60		ALDE	98	GAM4	100 $\pi^- p \to \pi^0\pi^0 n$

[1] From a partial wave analysis of the systems (γX), with $X \to \eta'\eta'$, and $(\eta' X)$, with $X \to \gamma\eta'$ in the decay $J/\psi \to \gamma\eta'\eta'$. 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 $\eta_1(1855) \to \eta\eta'$ P-wave.

[3] Statistical error only.

$f_0(2020)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
$436 \pm\ 4^{+46}_{-49}$		[1] ABLIKIM	22C	BES3	$J/\psi \to \gamma\eta'\eta' \to 4/5\gamma 2(\pi^+\pi^-)$

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

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

[1] From a partial wave analysis of the systems (γX), with $X \to \eta'\eta'$, and $(\eta' X)$, with $X \to \gamma\eta'$ in the decay $J/\psi \to \gamma\eta'\eta'$. 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 $\eta_1(1855) \to \eta\eta'$ P-wave.

[3] Statistical 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		COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
~ 3	BARBERIS	00F	$450\ pp \to p_f\omega\omega p_s$

$\Gamma(\eta\eta)/\Gamma_{\text{total}}$ Γ_5/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	UMAN	06	E835	$5.2\ \overline{p}p \to \eta\eta\pi^0$

$\Gamma(\eta'\eta')/\Gamma_{\text{total}}$ Γ_6/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	[1] ABLIKIM	22C	BES3	$J/\psi \to \gamma\eta'\eta' \to 4/5\gamma 2(\pi^+\pi^-)$

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

$f_0(2020)$ REFERENCES

ABLIKIM	22AS	PR D106 072012	M. Ablikim *et al.*	(BESIII Collab.)
Also		PR D107 079901 (errat.)	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	22C	PR D105 072002	M. Ablikim *et al.*	(BESIII Collab.)
RODAS	22	EPJ C82 80	A. Rodas *et al.*	(JPAC Collab.)
SARANTSEV	21	PL B816 136227	A.V. Sarantsev *et al.*	(BONN, PNPI)
ABLIKIM	18AA	PR D98 072003	M. Ablikim *et al.*	(BESIII Collab.)
ROPERTZ	18	EPJ C78 1000	S. Ropertz, C. Hanhart, B. Kubis	(BONN, JULI)
AAIJ	17V	JHEP 1708 037	R. Aaij *et al.*	(LHCb Collab.)
ABLIKIM	15AE	PR D92 052003	M. Ablikim *et al.*	(BESIII Collab.)
AAIJ	14BR	PR D89 092006	R. Aaij *et al.*	(LHCb Collab.)
UMAN	06	PR D73 052009	I. Uman *et al.*	(FNAL E835)
ANISOVICH	00J	PL B491 47	A.V. Anisovich *et al.*	(RAL, LOQM, PNPI+)
BARBERIS	00C	PL B471 440	D. Barberis *et al.*	(WA 102 Collab.)
BARBERIS	00F	PL B484 198	D. Barberis *et al.*	(WA 102 Collab.)
ALDE	98	EPJ A3 361	D. Alde *et al.*	(GAM4 Collab.)
Also		PAN 62 405	D. Alde *et al.*	(GAMS Collab.)
		Translated from YAF 62 446.		
BARBERIS	97B	PL B413 217	D. Barberis *et al.*	(WA 102 Collab.)