$h_c(1P)$

$I^G(J^{PC}) = 0^-(1^{+-})$

Quantum numbers are quark model prediction, $C = -$ established by $\eta_c\gamma$ decay.

$h_c(1P)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
3525.37±0.14 OUR AVERAGE		Error includes scale factor of 1.2.			
3525.32±0.06±0.15	23k	ABLIKIM	22AQ	BES3	$\psi(2S) \to \pi^0$ hadrons; $\pi^0\gamma(\eta_c)$
3525.20±0.18±0.12	1282	[1] DOBBS	08A	CLEO	$\psi(2S) \to \pi^0\eta_c\gamma$
3525.8 ±0.2 ±0.2	13	ANDREOTTI	05B	E835	$\overline{p}p \to \eta_c\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
3525.31±0.11±0.14	832	[2,3] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma$ hadrons
3525.40±0.13±0.18	3679	[2] ABLIKIM	10B	BES3	$\psi(2S) \to \pi^0\gamma\eta_c$
3525.6 ±0.5	92	ADAMS	09	CLEO	$\psi(2S) \to 2(\pi^+\pi^-\pi^0)$
3524.4 ±0.6 ±0.4	168	[4] ROSNER	05	CLEO	$\psi(2S) \to \pi^0\eta_c\gamma$
3527 ±8	42	ANTONIAZZI	94	E705	300 $\pi^\pm$, pLi $\to J/\psi\pi^0 X$
3526.28±0.18±0.19	59	[5] ARMSTRONG	92D	E760	$\overline{p}p \to J/\psi\pi^0$
3525.4 ±0.8 ±0.4	5	BAGLIN	86	SPEC	$\overline{p}p \to J/\psi X$

[1] Combination of exclusive and inclusive analyses for the reaction $\psi(2S) \to \pi^0 h_c \to \pi^0\eta_c\gamma$. This result is the average of DOBBS 08A and ROSNER 05.
[2] Superseded by ABLIKIM 22AQ
[3] With floating width.
[4] Superseded by DOBBS 08A.
[5] Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $\psi(2S)$ mass from AULCHENKO 03.

$h_c(1P)$ WIDTH

VALUE (MeV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$\mathbf{0.78^{+0.27}_{-0.24}\pm0.12}$		23k	ABLIKIM	22AQ	BES3	$\psi(2S) \to \pi^0$ hadrons; $\pi^0\gamma(\eta_c)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.70±0.28±0.22		832	[1,2] ABLIKIM	12N	BES3	$\psi(2S) \to \pi^0\gamma$ hadrons
< 1.44	90	3679	[3] ABLIKIM	10B	BES3	$\psi(2S) \to \pi^0\gamma\eta_c$
< 1		13	ANDREOTTI	05B	E835	$\overline{p}p \to \eta_c\gamma$
< 1.1	90	59	ARMSTRONG	92D	E760	$\overline{p}p \to J/\psi\pi^0$

[1] Superseded by ABLIKIM 22AQ
[2] With floating mass.
[3] The central value is $\Gamma = 0.73 \pm 0.45 \pm 0.28$ MeV.

$h_c(1P)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$J/\psi(1S)\pi^0$	$< 5 \times 10^{-4}$	CL=90%
Γ_2	$J/\psi(1S)\pi\pi$	$< 9 \times 10^{-5}$	CL=90%
Γ_3	$J/\psi(1S)\pi^+\pi^-$	$< 9 \times 10^{-4}$	CL=90%
Γ_4	$p\overline{p}$	$< 4 \times 10^{-5}$	CL=90%
Γ_5	$p\overline{p}\pi^0$	$< 8 \times 10^{-4}$	CL=90%
Γ_6	$p\overline{p}\pi^+\pi^-$	$(3.3 \pm 0.6) \times 10^{-3}$	
Γ_7	$p\overline{p}\pi^0\pi^0$	$< 6 \times 10^{-4}$	CL=90%
Γ_8	$p\overline{p}\pi^+\pi^-\pi^0$	$(4.4 \pm 1.3) \times 10^{-3}$	
Γ_9	$p\overline{p}\eta$	$(7.4 \pm 2.2) \times 10^{-4}$	
Γ_{10}	$\pi^+\pi^-\pi^0$	$(1.57 \pm 0.13) \times 10^{-3}$	
Γ_{11}	$\pi^+\pi^-\eta$	$< 5 \times 10^{-4}$	CL=90%
Γ_{12}	$\pi^+\pi^-\pi^0\eta$	$(8.3 \pm 2.4) \times 10^{-3}$	
Γ_{13}	$2\pi^+2\pi^-\pi^0\eta$	$(7.2 \pm 1.7) \times 10^{-3}$	
Γ_{14}	$2\pi^+2\pi^-\pi^0$	$(9.4 \pm 1.7) \times 10^{-3}$	
Γ_{15}	$2\pi^+2\pi^-\eta$	$< 6 \times 10^{-4}$	CL=90%
Γ_{16}	$3\pi^+3\pi^-\pi^0$	$(9.1 \pm 1.5) \times 10^{-3}$	
Γ_{17}	$2\pi^+2\pi^-\omega$	$(3.9 \pm 1.0) \times 10^{-3}$	
Γ_{18}	$K^+K^-\pi^+\pi^-$	$< 7 \times 10^{-4}$	CL=90%
Γ_{19}	$K^+K^-\pi^+\pi^-\pi^0$	$(3.8 \pm 0.8) \times 10^{-3}$	
Γ_{20}	$K^+K^-\pi^+\pi^-\eta$	$< 2.7 \times 10^{-3}$	CL=90%
Γ_{21}	$K^+K^-\pi^0$	$(3.8 \pm 0.9) \times 10^{-4}$	
Γ_{22}	$K^+K^-\pi^0\eta$	$< 2.4 \times 10^{-3}$	CL=90%
Γ_{23}	$K^+K^-\eta$	$(3.6 \pm 1.2) \times 10^{-4}$	
Γ_{24}	$2K^+2K^-\pi^0$	$< 2.8 \times 10^{-4}$	CL=90%
Γ_{25}	$K^0_S K^\pm\pi^\mp$	$(7.1 \pm 1.9) \times 10^{-4}$	
Γ_{26}	$K^0_S K^\pm\pi^\mp\pi^+\pi^-$	$(3.2 \pm 1.0) \times 10^{-3}$	
	Radiative decays		
Γ_{27}	$\gamma\eta$	$(3.8 \pm 0.6) \times 10^{-4}$	
Γ_{28}	$\gamma\eta'(958)$	$(1.41 \pm 0.15) \times 10^{-3}$	
Γ_{29}	$\gamma\pi^0$	$< 5 \times 10^{-5}$	
Γ_{30}	$\gamma\eta_c(1S)$	(64 ± 5) %	S=1.2
Γ_{31}	$\gamma\pi^+\pi^-$	$(3.0 \pm 0.7) \times 10^{-4}$	
Γ_{32}	$\gamma\pi^+\pi^-\eta$	$(3.5 \pm 0.6) \times 10^{-3}$	
Γ_{33}	$\gamma 2\pi^+2\pi^-$	$(2.18 \pm 0.30) \times 10^{-3}$	
Γ_{34}	$\gamma p\overline{p}$	$(3.3 \pm 0.7) \times 10^{-4}$	
Γ_{35}	$e^+e^-\eta_c(1S)$	$(3.8 \pm 0.8) \times 10^{-3}$	
Γ_{36}	$\gamma f_2(1270) \to \gamma\pi^+\pi^-$	$(1.8 \pm 0.4) \times 10^{-4}$	

FIT INFORMATION

A multiparticle fit to $\eta_c(1S)$, $J/\psi(1S)$, $\psi(2S)$, $h_c(1P)$, and $B^\pm$ with the total width, 10 combinations of partial widths obtained from integrated cross section, and 38 branching ratios uses 115 measurements to determine 19 parameters. The overall fit has a $\chi^2 = 215.4$ for 96 degrees of freedom.

$h_c(1P)$ PARTIAL WIDTHS

—— $h_c(1P)$ $\Gamma(i)\Gamma(\overline{p}p)/\Gamma(\text{total})$ ——

$\Gamma(\gamma\eta_c(1S)) \times \Gamma(p\overline{p})/\Gamma_{\text{total}}$ **$\Gamma_{30}\Gamma_4/\Gamma$**

VALUE (eV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
12.0 ± 4.5	13	[1] ANDREOTTI	05B	E835	$\overline{p}p \to \eta_c\gamma$

[1] Assuming $\Gamma = 1$ MeV.

$h_c(1P)$ BRANCHING RATIOS

$\Gamma(J/\psi(1S)\pi^0)/\Gamma(\gamma\eta_c(1S))$ **Γ_1/Γ_{30}**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7 \times 10^{-4}$	90	[1] ABLIKIM	22N	BES3	$e^+e^- \to \pi^+\pi^- h_c$

[1] ABLIKIM 22N reports $[\Gamma(h_c(1P) \to J/\psi(1S)\pi^0)/\Gamma(h_c(1P) \to \gamma\eta_c(1S))]$ / $[B(\eta_c \to K^+K^-\pi^0)] < 7.5 \times 10^{-2}$ which we multiply by our best value $B(\eta_c \to K^+K^-\pi^0) = 1/6\ B(\eta_c(1S) \to K\overline{K}\pi) = 1/6\ (5.9 \times 10^{-2})$.

$\Gamma(J/\psi(1S)\pi\pi)/\Gamma(J/\psi(1S)\pi^0)$ **Γ_2/Γ_1**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.18	90	ARMSTRONG	92D	E760	$\overline{p}p \to J/\psi\pi^0$

$\Gamma(J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}$ **Γ_3/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<9 \times 10^{-4}$	90	[1] ABLIKIM	24BY	BES3	$\psi(2S) \to \pi^0\pi^+\pi^- J/\psi$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$<2.7 \times 10^{-3}$	90	[2] ABLIKIM	18M	BES3	$\psi(2S) \to \pi^0\pi^+\pi^- J/\psi$

[1] ABLIKIM 24BY reports $[\Gamma(h_c(1P) \to J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 6.7 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

[2] ABLIKIM 18M reports $[\Gamma(h_c(1P) \to J/\psi(1S)\pi^+\pi^-)/\Gamma_{\text{total}}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 2.0 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(p\overline{p})/\Gamma_{\text{total}}$ **Γ_4/Γ**

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4 \times 10^{-5}$	90	[1] ABLIKIM	24R	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24R reports $[\Gamma(h_c(1P) \to p\overline{p})/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 3.22 \times 10^{-8}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(p\overline{p}\pi^0)/\Gamma_{total}$ — Γ_5/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<8 × 10^{-4}	90	[1] ABLIKIM	22M	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 22M reports $[\Gamma(h_c(1P) \to p\overline{p}\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 5.67 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(p\overline{p}\pi^+\pi^-)/\Gamma_{total}$ — Γ_6/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.3±0.5±0.2	230	[1] ABLIKIM	19AG	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 19AG reports $[\Gamma(h_c(1P) \to p\overline{p}\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (2.49 \pm 0.27 \pm 0.28) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(p\overline{p}\pi^0\pi^0)/\Gamma_{total}$ — Γ_7/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<6 × 10^{-4}	90	12	[1] ABLIKIM	20AH	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to p\overline{p}\pi^0\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 4.4 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(p\overline{p}\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_8/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
4.4±1.2±0.3	86	[1] ABLIKIM	22M	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 22M reports $[\Gamma(h_c(1P) \to p\overline{p}\pi^+\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (3.30 \pm 0.71 \pm 0.59) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(p\overline{p}\eta)/\Gamma_{total}$ — Γ_9/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
7.4±2.1±0.5	20	[1] ABLIKIM	22M	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 22M reports $[\Gamma(h_c(1P) \to p\overline{p}\eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (5.51 \pm 1.50 \pm 0.46) \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(\pi^+\pi^-\pi^0)/\Gamma_{total}$ — Γ_{10}/Γ

VALUE (units 10^{-3})	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
1.57±0.06±0.11		472	[1] ABLIKIM	24BF	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

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

1.9 ±0.5 ±0.1		101	[2,3] ABLIKIM	19AG	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
<2.6	90		[4] ADAMS	09	CLEO	$\psi(2S) \to \pi^0 \gamma \eta_c$

[1] ABLIKIM 24BF reports $(1.36 \pm 0.16 \pm 0.14) \times 10^{-3}$ from a measurement of $[\Gamma(h_c(1P) \to \pi^+\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (8.6 \pm 1.3) \times 10^{-4}$, which we rescale to our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] ABLIKIM 19AG reports $[\Gamma(h_c(1P) \to \pi^+\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (1.38 \pm 0.35 \pm 0.17) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[3] Superseded by ABLIKIM 24BF.

[4] ADAMS 09 reports $[\Gamma(h_c(1P) \to \pi^+\pi^-\pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 0.19 \times 10^{-5}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(\pi^+\pi^-\eta)/\Gamma_{total}$ — Γ_{11}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<5 × 10^{-4}	90	44.5	[1] ABLIKIM	24BF	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24BF reports $< 4.0 \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \to \pi^+\pi^-\eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (8.6 \pm 1.3) \times 10^{-4}$, which we rescale to our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(\pi^+\pi^-\pi^0\eta)/\Gamma_{total}$ — Γ_{12}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
8.3±2.3±0.6	35	[1] ABLIKIM	20AH	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to \pi^+\pi^-\pi^0\eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (6.2 \pm 1.6 \pm 0.7) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(2\pi^+2\pi^-\pi^0\eta)/\Gamma_{total}$ — Γ_{13}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
7.2±1.7±0.5	[1] ABLIKIM	24R	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24R reports $[\Gamma(h_c(1P) \to 2\pi^+2\pi^-\pi^0\eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (5.33 \pm 1.10 \pm 0.56) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(2\pi^+2\pi^-\pi^0)/\Gamma_{total}$ — Γ_{14}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
0.94±0.17 OUR AVERAGE					
0.86±0.16±0.06	254	[1] ABLIKIM	19AG	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
$2.5\ ^{+0.9}_{-0.7} \pm 0.2$	92	[2] ADAMS	09	CLEO	$\psi(2S) \to \pi^0 \gamma \eta_c$

[1] ABLIKIM 19AG reports $[\Gamma(h_c(1P) \to 2\pi^+ 2\pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (6.40 \pm 0.81 \pm 0.87) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] ADAMS 09 reports $[\Gamma(h_c(1P) \to 2\pi^+ 2\pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (1.88^{+0.48}_{-0.45}{}^{+0.47}_{-0.30}) \times 10^{-5}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(2\pi^+ 2\pi^- \eta)/\Gamma_{total}$ — Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<6 \times 10^{-4}$	90	[1] ABLIKIM	24R	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24R reports $[\Gamma(h_c(1P) \to 2\pi^+ 2\pi^- \eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 4.53 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(3\pi^+ 3\pi^- \pi^0)/\Gamma_{total}$ — Γ_{16}/Γ

VALUE (units 10^{-3})	CL%	DOCUMENT ID		TECN	COMMENT
$9.1 \pm 1.3 \pm 0.6$		[1] ABLIKIM	24R	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<10	90	[2] ABLIKIM	19AG	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
<34	90	[3] ADAMS	09	CLEO	$\psi(2S) \to \pi^0 \gamma \eta_c$

[1] ABLIKIM 24R reports $[\Gamma(h_c(1P) \to 3\pi^+ 3\pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (6.79 \pm 0.83 \pm 0.56) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] ABLIKIM 19AG reports $[\Gamma(h_c(1P) \to 3\pi^+ 3\pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 7.5 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$. Superseded by ABLIKIM 24R.

[3] ADAMS 09 reports $[\Gamma(h_c(1P) \to 3\pi^+ 3\pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 2.5 \times 10^{-5}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(2\pi^+ 2\pi^- \omega)/\Gamma_{total}$ — Γ_{17}/Γ

VALUE (units 10^{-3})	DOCUMENT ID		TECN	COMMENT
$3.9 \pm 0.9 \pm 0.3$	[1] ABLIKIM	24R	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24R reports $[\Gamma(h_c(1P) \to 2\pi^+ 2\pi^- \omega)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (2.93 \pm 0.63 \pm 0.26) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(K^+ K^- \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{18}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<7 \times 10^{-4}$	90	[1] ABLIKIM	19AG	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 19AG reports $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^+ \pi^-)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] < 0.5 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(K^+ K^- \pi^+ \pi^- \pi^0)/\Gamma_{total}$ — Γ_{19}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
3.8±0.8±0.3	80	[1] ABLIKIM 20AH	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^+ \pi^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] = (2.8 \pm 0.5 \pm 0.3) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(K^+ K^- \pi^+ \pi^- \eta)/\Gamma_{total}$ — Γ_{20}/Γ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.7 \times 10^{-3}$	90	24	[1] ABLIKIM 20AH	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^+ \pi^- \eta)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] < 2.0 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(K^+ K^- \pi^0)/\Gamma_{total}$ — Γ_{21}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
3.8±0.9±0.3		62	[1] ABLIKIM 24BF	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6	90	20	[2,3] ABLIKIM 20AH	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 24BF reports $(3.26 \pm 0.84 \pm 0.36) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = (8.6 \pm 1.3) \times 10^{-4}$, which we rescale to our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value. Significance 3.5σ.

[2] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] < 4.8 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

[3] Superseded by ABLIKIM 24BF.

$\Gamma(K^+ K^- \pi^0 \eta)/\Gamma_{total}$ — Γ_{22}/Γ

VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
$<2.4 \times 10^{-3}$	90	20	[1] ABLIKIM 20AH	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \rightarrow K^+ K^- \pi^0 \eta)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] < 1.8 \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \rightarrow h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(K^+ K^- \eta)/\Gamma_{total}$ — Γ_{23}/Γ

VALUE (units 10^{-4})	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
3.6±1.2±0.3		32	[1] ABLIKIM 24BF	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<10	90	18	[2,3] ABLIKIM 20AH	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 24BF reports $(3.13 \pm 1.08 \pm 0.38) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \to K^+ K^- \eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (8.6 \pm 1.3) \times 10^{-4}$, which we rescale to our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value. Significance 3.3σ.

[2] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to K^+ K^- \eta)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 7.5 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

[3] Superseded by ABLIKIM 24BF.

$\Gamma(2K^+ 2K^- \pi^0)/\Gamma_{total}$ — Γ_{24}/Γ

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<2.8 × 10⁻⁴	90	11	[1] ABLIKIM	20AH	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to 2K^+ 2K^- \pi^0)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 2.1 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

$\Gamma(K^0_S K^\pm \pi^\mp)/\Gamma_{total}$ — Γ_{25}/Γ

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
7.1±1.8±0.5		[1] ABLIKIM	24Y	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<6	90	[2,3] ABLIKIM	20AH	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24Y reports $[\Gamma(h_c(1P) \to K^0_S K^\pm \pi^\mp)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (5.3 \pm 1.3 \pm 0.4) \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to K^0_S K^\pm \pi^\mp)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] < 4.8 \times 10^{-7}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = 7.4 \times 10^{-4}$.

[3] Superseded by ABLIKIM 24Y.

$\Gamma(K^0_S K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{total}$ — Γ_{26}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.2±1.0±0.2	41	[1] ABLIKIM	20AH	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 20AH reports $[\Gamma(h_c(1P) \to K^0_S K^\pm \pi^\mp \pi^+ \pi^-)/\Gamma_{total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (2.4 \pm 0.7 \pm 0.3) \times 10^{-6}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

RADIATIVE DECAYS

$\Gamma(\gamma\eta)/\Gamma_{total}$ — Γ_{27}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.8±0.6 OUR AVERAGE					
3.8±0.6±0.3		[1] ABLIKIM	24BJ	BES3	$\psi(2S) \to \pi^0 h_c(1P)$
4.7±1.5±1.4	18	ABLIKIM	16I	BES3	$\psi(2S) \to \pi^0 \gamma\eta$

[1] ABLIKIM 24BJ reports $(3.77 \pm 0.55 \pm 0.29) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \to \gamma\eta)/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma\eta'(958))/\Gamma_{\rm total}$ — Γ_{28}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
1.41±0.15 OUR AVERAGE					
$1.40 \pm 0.11 \pm 0.11$		[1] ABLIKIM	24BJ	BES3	$\psi(2S) \to \pi^0 \gamma\eta'$
$1.52 \pm 0.27 \pm 0.29$	44	ABLIKIM	16I	BES3	$\psi(2S) \to \pi^0 \gamma\eta'(958)$

[1] ABLIKIM 24BJ reports $(1.40 \pm 0.11 \pm 0.11) \times 10^{-3}$ from a measurement of $[\Gamma(h_c(1P) \to \gamma\eta'(958))/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma\pi^0)/\Gamma_{\rm total}$ — Γ_{29}/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
$<5 \times 10^{-5}$	[1] ABLIKIM	24BJ	BES3	$\psi(2S) \to \pi^0 h_c(1P)$

[1] ABLIKIM 24BJ reports $< 5.0 \times 10^{-5}$ from a measurement of $[\Gamma(h_c(1P) \to \gamma\pi^0)/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma\eta_c(1S))/\Gamma_{\rm total}$ — Γ_{30}/Γ

VALUE (units 10^{-2})	EVTS	DOCUMENT ID		TECN	COMMENT
64± 5 OUR FIT Error includes scale factor of 1.2.					
57± 5 OUR AVERAGE					
$57 \pm 4 \pm 4$	23k	[1] ABLIKIM	22AQ	BES3	$\psi(2S) \to \pi^0$ hadrons; $\pi^0\gamma(\eta_c)$
$56 \pm 6 \pm 4$		[2] DOBBS	08A	CLEO	$\psi(2S) \to \pi^0 \eta_c \gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$62 \pm 9 \pm 4$	3679	[3,4] ABLIKIM	10B	BES3	$\psi(2S) \to \pi^0 \eta_c \gamma$
$56 \pm 7 \pm 4$	1282	[5] DOBBS	08A	CLEO	$\psi(2S) \to \pi^0 \eta_c \gamma$
$54 \pm 14 \pm 4$	168	[6] ROSNER	05	CLEO	$\psi(2S) \to \pi^0 \eta_c \gamma$

[1] ABLIKIM 22AQ reports $[\Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.22^{+0.27}_{-0.26} \pm 0.19) \times 10^{-4}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[2] Average of DOBBS 08A and ROSNER 05. DOBBS 08A reports $[\Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.16 \pm 0.30 \pm 0.37) \times 10^{-4}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[3] ABLIKIM 10B reports $[\Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.58 \pm 0.40 \pm 0.50) \times 10^{-4}$ which we divide by our best (shown rounded) value $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[4] Superseded by ABLIKIM 22AQ

[5] DOBBS 08A reports $[\Gamma(h_c(1P) \to \gamma\eta_c(1S))/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)] = (4.19 \pm 0.32 \pm 0.45) \times 10^{-4}$ which we divide by our best (shown rounded) value

B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

[6] ROSNER 05 reports $[\Gamma(h_c(1P) \rightarrow \gamma\eta_c(1S))/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)] = (4.0 \pm 0.8 \pm 0.7) \times 10^{-4}$ which we divide by our best (shown rounded) value B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$. Our first error is their experiment's error and our second error is the systematic error from using our best (shown rounded) value.

$\Gamma(\gamma\pi^+\pi^-)/\Gamma_{total}$ — Γ_{31}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.1±0.5±0.4	127 ± 22	[1] ABLIKIM	25G	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 25G reports $(3.06 \pm 0.54 \pm 0.43) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \rightarrow \gamma\pi^+\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)]$ assuming B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma\pi^+\pi^-\eta)/\Gamma_{total}$ — Γ_{32}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
3.5±0.5±0.4	192 ± 27	[1] ABLIKIM	25G	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 25G reports $(3.52 \pm 0.50 \pm 0.38) \times 10^{-3}$ from a measurement of $[\Gamma(h_c(1P) \rightarrow \gamma\pi^+\pi^-\eta)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)]$ assuming B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma 2\pi^+ 2\pi^-)/\Gamma_{total}$ — Γ_{33}/Γ

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
2.19±0.20±0.22	495 ± 45	[1] ABLIKIM	25G	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 25G reports $(2.19 \pm 0.20 \pm 0.22) \times 10^{-3}$ from a measurement of $[\Gamma(h_c(1P) \rightarrow \gamma 2\pi^+ 2\pi^-)/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)]$ assuming B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(\gamma p\overline{p})/\Gamma_{total}$ — Γ_{34}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
3.3±0.5±0.4	127 ± 20	[1] ABLIKIM	25G	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 25G reports $(3.34 \pm 0.53 \pm 0.40) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \rightarrow \gamma p\overline{p})/\Gamma_{total}] \times [B(\psi(2S) \rightarrow h_c(1P)\pi^0)]$ assuming B($\psi(2S) \rightarrow h_c(1P)\pi^0$) = $(7.4 \pm 0.5) \times 10^{-4}$.

$\Gamma(e^+e^-\eta_c(1S))/\Gamma(\gamma\eta_c(1S))$ — Γ_{35}/Γ_{30}

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
5.9±1.0±0.4	961	[1] ABLIKIM	24CC	BES3	$\psi(3686) \rightarrow \pi^0 h_c$, $e^+e^- \rightarrow \pi^+\pi^- h_c$

[1] Average between $\pi^0 h_c$ $(4.6 \pm 1.2 \pm 0.5) \times 10^{-3}$ and $\pi^+\pi^- h_c$ $(8.9 \pm 1.8 \pm 0.9) \times 10^{-3}$.

$\Gamma(\gamma f_2(1270) \rightarrow \gamma\pi^+\pi^-)/\Gamma_{total}$ — Γ_{36}/Γ

VALUE (units 10^{-4})	EVTS	DOCUMENT ID		TECN	COMMENT
1.81±0.35±0.22	72 ± 14	[1] ABLIKIM	25G	BES3	$\psi(2S) \rightarrow \pi^0 h_c(1P)$

[1] ABLIKIM 25G reports $(1.81 \pm 0.35 \pm 0.22) \times 10^{-4}$ from a measurement of $[\Gamma(h_c(1P) \to \gamma f_2(1270) \to \gamma\pi^+\pi^-)/\Gamma_{\rm total}] \times [B(\psi(2S) \to h_c(1P)\pi^0)]$ assuming $B(\psi(2S) \to h_c(1P)\pi^0) = (7.4 \pm 0.5) \times 10^{-4}$.

$h_c(1P)$ REFERENCES

ABLIKIM	25G	PRL 134 241902	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24BF	PR D110 032023	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24BJ	JHEP 2408 180	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24BY	PR D110 112010	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24CC	PR D110 L111101	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24R	PR D109 072018	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	24Y	PR D110 012007	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	22AQ	PR D106 072007	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	22M	JHEP 2205 108	M. Ablikim *et al.*	(BESIII Collab.)
Also		JHEP 2303 022 (errat.)	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	22N	JHEP 2205 003	M. Ablikim	(BESIII Collab.)
ABLIKIM	20AH	PR D102 112007	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	19AG	PR D99 072008	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	18M	PR D97 052008	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	16I	PRL 116 251802	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	12N	PR D86 092009	M. Ablikim *et al.*	(BESIII Collab.)
ABLIKIM	10B	PRL 104 132002	M. Ablikim *et al.*	(BESIII Collab.)
ADAMS	09	PR D80 051106	G.S. Adams *et al.*	(CLEO Collab.)
DOBBS	08A	PRL 101 182003	S. Dobbs *et al.*	(CLEO Collab.)
ANDREOTTI	05B	PR D72 032001	M. Andreotti *et al.*	(FNAL E835 Collab.)
ROSNER	05	PRL 95 102003	J.L. Rosner *et al.*	(CLEO Collab.)
AULCHENKO	03	PL B573 63	V.M. Aulchenko *et al.*	(KEDR Collab.)
ANTONIAZZI	94	PR D50 4258	L. Antoniazzi *et al.*	(E705 Collab.)
ARMSTRONG	93B	PR D47 772	T.A. Armstrong *et al.*	(FNAL E760 Collab.)
ARMSTRONG	92D	PRL 69 2337	T.A. Armstrong *et al.*	(FNAL, FERR, GENO+)
BAGLIN	86	PL B171 135	C. Baglin *et al.*	(LAPP, CERN, TORI, STRB+)