$\eta'(958)$

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

$\eta'(958)$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
957.78±0.14 OUR AVERAGE					
957.9 ±0.2 ±0.6	4800	WURZINGER	96	SPEC	1.68 $p d \to {}^3\mathrm{He}\eta'$
959 ±1	630	BELADIDZE	92C	VES	36 $\pi^- \mathrm{Be} \to \pi^- \eta' \eta \mathrm{Be}$
958 ±1	340	ARMSTRONG	91B	OMEG	300 $p p \to p p \eta \pi^+ \pi^-$
958.2 ±0.4	622	AUGUSTIN	90	DM2	$J/\psi \to \gamma \eta \pi^+ \pi^-$
957.8 ±0.2	2420	AUGUSTIN	90	DM2	$J/\psi \to \gamma \gamma \pi^+ \pi^-$
956.3 ±1.0	143	GIDAL	87	MRK2	$e^+ e^- \to e^+ e^- \eta \pi^+ \pi^-$
957.46±0.33		DUANE	74	MMS	$\pi^- p \to n \mathrm{MM}$
958.2 ±0.5	1414	DANBURG	73	HBC	2.2 $K^- p \to \Lambda X^0$
958 ±1	400	JACOBS	73	HBC	2.9 $K^- p \to \Lambda X^0$
956.1 ±1.1	3415	BASILE	71	CNTR	1.6 $\pi^- p \to n X^0$
957.4 ±1.4	535	BASILE	71	CNTR	1.6 $\pi^- p \to n X^0$
957 ±1		RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\eta'(958)$ WIDTH

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*
0.202±0.016 OUR FIT Error includes scale factor of 1.3.						
0.30 ±0.09 OUR AVERAGE						
0.40 ±0.22	4800	WURZINGER	96	SPEC		1.68 $p d \to {}^3\mathrm{He}\eta'$
0.28 ±0.10	1000	BINNIE	79	MMS	0	$\pi^- p \to n \mathrm{MM}$

$\eta'(958)$ DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	$\pi^+ \pi^- \eta$	(43.8 ±1.5) %	S=1.1
Γ_2	$\rho^0 \gamma$	(30.2 ±1.3) %	S=1.1
Γ_3	$\pi^0 \pi^0 \eta$	(20.8 ±1.3) %	S=1.2
Γ_4	$\omega \gamma$	(3.02±0.30) %	
Γ_5	$\gamma \gamma$	(2.11±0.13) %	S=1.2
Γ_6	$3\pi^0$	(1.55±0.26) $\times 10^{-3}$	
Γ_7	$\mu^+ \mu^- \gamma$	(1.03±0.26) $\times 10^{-4}$	
Γ_8	$\pi^+ \pi^- \pi^0$	< 5 %	CL=90%
Γ_9	$\pi^0 \rho^0$	< 4 %	CL=90%
Γ_{10}	$\pi^+ \pi^-$	< 2 %	CL=90%
Γ_{11}	$\pi^0 e^+ e^-$	< 1.3 %	CL=90%
Γ_{12}	$\eta e^+ e^-$	< 1.1 %	CL=90%

Γ_{13}	$\pi^+\pi^+\pi^-\pi^-$	$<$ 1	%	CL=90%
Γ_{14}	$\pi^+\pi^+\pi^-\pi^-$ neutrals	$<$ 1	%	CL=95%
Γ_{15}	$\pi^+\pi^+\pi^-\pi^-\pi^0$	$<$ 1	%	CL=90%
Γ_{16}	6π	$<$ 1	%	CL=90%
Γ_{17}	$\pi^+\pi^-e^+e^-$	$<$ 6	$\times 10^{-3}$	CL=90%
Γ_{18}	$\pi^0\pi^0$	$<$ 9	$\times 10^{-4}$	CL=90%
Γ_{19}	$\pi^0\gamma\gamma$	$<$ 8	$\times 10^{-4}$	CL=90%
Γ_{20}	$4\pi^0$	$<$ 5	$\times 10^{-4}$	CL=90%
Γ_{21}	3γ	$<$ 1.0	$\times 10^{-4}$	CL=90%
Γ_{22}	$\mu^+\mu^-\pi^0$	$<$ 6.0	$\times 10^{-5}$	CL=90%
Γ_{23}	$\mu^+\mu^-\eta$	$<$ 1.5	$\times 10^{-5}$	CL=90%
Γ_{24}	$\pi^+\pi^-\gamma$(including $\rho^0\gamma$)			
Γ_{25}	e^+e^-	$<$ 2.1	$\times 10^{-7}$	CL=90%

CONSTRAINED FIT INFORMATION

An overall fit to the total width, a partial width, 2 combinations of partial widths obtained from integrated cross section, and 16 branching ratios uses 46 measurements and one constraint to determine 7 parameters. The overall fit has a $\chi^2 = 34.2$ for 40 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\left\langle\delta p_i \delta p_j\right\rangle/(\delta p_i{\cdot}\delta p_j)$, in percent, from the fit to parameters p_i, including 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_2	−49					
x_3	−63	−35				
x_4	−27	−25	34			
x_5	−22	−13	27	8		
x_6	−23	−13	36	12	10	
Γ	35	−11	−21	−3	−83	−7
	x_1	x_2	x_3	x_4	x_5	x_6

	Mode	Rate (MeV)	Scale factor
Γ_1	$\pi^+\pi^-\eta$	0.088 $\pm$0.009	1.2
Γ_2	$\rho^0\gamma$	0.061 $\pm$0.005	1.3
Γ_3	$\pi^0\pi^0\eta$	0.042 $\pm$0.004	1.5
Γ_4	$\omega\gamma$	0.0061 $\pm$0.0008	1.2
Γ_5	$\gamma\gamma$	0.00427$\pm$0.00019	1.1
Γ_6	$3\pi^0$	(3.1 $\pm$0.6) $\times 10^{-4}$	1.1

$\eta'(958)$ PARTIAL WIDTHS

$\Gamma(\gamma\gamma)$ Γ_5

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
4.27±0.19 OUR FIT Error includes scale factor of 1.1.					
4.34±0.25 OUR AVERAGE					
4.53±0.29±0.51	266	KARCH	92	CBAL	$e^+e^- \to e^+e^-\eta\pi^0\pi^0$
3.62±0.14±0.48		[1] BEHREND	91	CELL	$e^+e^- \to e^+e^-\eta'(958)$
4.6 ±1.1 ±0.6	23	BARU	90	MD1	$e^+e^- \to e^+e^-\pi^+\pi^-\gamma$
4.57±0.25±0.44		BUTLER	90	MRK2	$e^+e^- \to e^+e^-\eta'(958)$
4.94±0.23±0.72	547	[2] ROE	90	ASP	$e^+e^- \to e^+e^-2\gamma$
3.8 ±0.7 ±0.6	34	AIHARA	88C	TPC	$e^+e^- \to e^+e^-\eta\pi^+\pi^-$
4.8 ±0.5 ±0.5	136	[2] WILLIAMS	88	CBAL	$e^+e^- \to e^+e^-2\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
4.7 ±0.6 ±0.9	143	[3] GIDAL	87	MRK2	$e^+e^- \to e^+e^-\eta\pi^+\pi^-$
4.0 ±0.9		[4] BARTEL	85E	JADE	$e^+e^- \to e^+e^-2\gamma$

[1] Using B($\eta' \to \rho(770)\gamma$) = (30.1 ± 1.4)%.
[2] Using B($\eta' \to \gamma\gamma$) = (2.17 ± 0.17)%.
[3] Superseded by BUTLER 90.
[4] Systematic error not evaluated.

$\eta'(958)$ $\Gamma(i)\Gamma(\gamma\gamma)/\Gamma(\text{total})$

This combination of a partial width with the partial width into $\gamma\gamma$ and with the total width is obtained from the integrated cross section into channel(i) in the $\gamma\gamma$ annihilation.

$\Gamma(\gamma\gamma) \times \Gamma(\rho^0\gamma)/\Gamma_{\text{total}}$ $\Gamma_5\Gamma_2/\Gamma$

VALUE (keV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.29±0.06 OUR FIT Error includes scale factor of 1.2.					
1.26±0.07 OUR AVERAGE Error includes scale factor of 1.2.					
1.09±0.04±0.13		BEHREND	91	CELL	$e^+e^- \to e^+e^-\rho(770)^0\gamma$
1.35±0.09±0.21		AIHARA	87	TPC	$e^+e^- \to e^+e^-\rho\gamma$
1.13±0.04±0.13	867	ALBRECHT	87B	ARG	$e^+e^- \to e^+e^-\rho\gamma$
1.53±0.09±0.21		ALTHOFF	84E	TASS	$e^+e^- \to e^+e^-\rho\gamma$
1.14±0.08±0.11	243	BERGER	84B	PLUT	$e^+e^- \to e^+e^-\rho\gamma$
1.73±0.34±0.35	95	JENNI	83	MRK2	$e^+e^- \to e^+e^-\rho\gamma$
1.49±0.13±0.027	213	BARTEL	82B	JADE	$e^+e^- \to e^+e^-\rho\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.85±0.31±0.24	43	BEHREND	83B	CELL	$e^+e^- \to e^+e^-\rho\gamma$

$\Gamma(\gamma\gamma) \times \Gamma(\pi^0\pi^0\eta)/\Gamma_{\rm total}$ — $\Gamma_5\Gamma_3/\Gamma$

VALUE (keV)	DOCUMENT ID		TECN	COMMENT
0.89±0.07 OUR FIT Error includes scale factor of 1.1.				
0.93±0.06±0.11	[5] KARCH	92	CBAL	$e^+e^- \to e^+e^-\eta\pi^0\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.95±0.05±0.08	[6] KARCH	90	CBAL	$e^+e^- \to e^+e^-\eta\pi^0\pi^0$
1.00±0.08±0.10	[5,6] ANTREASYAN	87	CBAL	$e^+e^- \to e^+e^-\eta\pi^0\pi^0$

[5] Using BR($\eta \to 2\gamma$)=(38.9 ± 0.5)%.
[6] Superseded by KARCH 92.

$\eta'(958)$ α PARAMETER

$|\text{MATRIX ELEMENT}|^2 = (1 + \alpha y)^2 + cx^2$

VALUE	DOCUMENT ID		TECN	COMMENT
−0.058±0.013	[7] ALDE	86	GAM2	38 $\pi^- p \to n\eta 2\pi^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
−0.08 ±0.03	[7] KALBFLEISCH	74	RVUE	$\eta' \to \eta\pi^+\pi^-$

[7] May not necessarily be the same for $\eta' \to \eta\pi^+\pi^-$ and $\eta' \to \eta\pi^0\pi^0$.

$\eta'(958)$ BRANCHING RATIOS

$\Gamma(\pi^+\pi^-\eta(\text{neutral decay}))/\Gamma_{\rm total}$ — $0.709\Gamma_1/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.310±0.011 OUR FIT Error includes scale factor of 1.1.					
0.314±0.026	281	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\Gamma(\pi^+\pi^-\text{neutrals})/\Gamma_{\rm total}$ — $(0.709\Gamma_1+0.291\Gamma_3+0.9\Gamma_4)/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.398±0.009 OUR FIT Error includes scale factor of 1.1.					
0.36 ±0.05 OUR AVERAGE					
0.4 ±0.1	39	LONDON	66	HBC	2.24 $K^- p \to \Lambda\pi^+\pi^-$ neutrals
0.35 ±0.06	33	BADIER	65B	HBC	3 $K^- p$

$\Gamma(\pi^+\pi^-\eta(\text{charged decay}))/\Gamma_{\rm total}$ — $0.291\Gamma_1/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.127±0.004 OUR FIT Error includes scale factor of 1.1.					
0.116±0.013 OUR AVERAGE					
0.123±0.014	107	RITTENBERG	69	HBC	1.7–2.7 $K^- p$
0.10 ±0.04	10	LONDON	66	HBC	2.24 $K^- p \to \Lambda\pi^+\pi^-\pi^+\pi^-\pi^0$
0.07 ±0.04	7	BADIER	65B	HBC	3 $K^- p$

$[\Gamma(\pi^0\pi^0\eta(\text{charged decay})) + \Gamma(\omega(\text{charged decay})\gamma)]/\Gamma_{\rm total}$ — $(0.291\Gamma_3+0.9\Gamma_4)/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.088±0.005 OUR FIT Error includes scale factor of 1.2.					
0.045±0.029	42	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\Gamma(\text{neutrals})/\Gamma_{\text{total}}$ — $(0.709\Gamma_3+0.09\Gamma_4+\Gamma_5)/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.171±0.009 OUR FIT	Error includes scale factor of 1.2.				
0.187±0.017 OUR AVERAGE					
0.185±0.022	535	BASILE	71	CNTR	1.6 $\pi^- p \rightarrow nX^0$
0.189±0.026	123	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\Gamma(\rho^0\gamma)/\Gamma_{\text{total}}$ — Γ_2/Γ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.302±0.013 OUR FIT	Error includes scale factor of 1.1.				
0.319±0.030 OUR AVERAGE					
0.329±0.033	298	RITTENBERG	69	HBC	1.7–2.7 $K^- p$
0.2 ±0.1	20	LONDON	66	HBC	2.24 $K^- p \rightarrow \Lambda\pi^+\pi^-\gamma$
0.34 ±0.09	35	BADIER	65B	HBC	3 $K^- p$

$\Gamma(\rho^0\gamma)/\Gamma(\pi\pi\eta)$ — $\Gamma_2/(\Gamma_1+\Gamma_3)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.468±0.029 OUR FIT	Error includes scale factor of 1.1.			
0.31 ±0.15	DAVIS	68	HBC	5.5 $K^- p$

$\Gamma(\pi^0 e^+ e^-)/\Gamma_{\text{total}}$ — Γ_{11}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.013	90	RITTENBERG	65	HBC	2.7 $K^- p$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.011	90	RITTENBERG	65	HBC	2.7 $K^- p$

$\Gamma(\pi^0\rho^0)/\Gamma_{\text{total}}$ — Γ_9/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.04	90	RITTENBERG	65	HBC	2.7 $K^- p$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.006	90	RITTENBERG	65	HBC	2.7 $K^- p$

$\Gamma(6\pi)/\Gamma_{\text{total}}$ — Γ_{16}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	90	LONDON	66	HBC	Compilation

$\Gamma(\omega\gamma)/\Gamma(\pi^+\pi^-\eta)$ — Γ_4/Γ_1

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.069±0.008 OUR FIT	Error includes scale factor of 1.1.				
0.068±0.013	68	ZANFINO	77	ASPK	8.4 $\pi^- p$

$\Gamma(\rho^0\gamma)/[\Gamma(\pi^+\pi^-\eta)+\Gamma(\pi^0\pi^0\eta)+\Gamma(\omega\gamma)]$ — $\Gamma_2/(\Gamma_1+\Gamma_3+\Gamma_4)$

VALUE	DOCUMENT ID		TECN	COMMENT
0.447±0.028 OUR FIT	Error includes scale factor of 1.1.			
0.25 ±0.14	DAUBER	64	HBC	1.95 $K^- p$

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.0211±0.0013 OUR FIT Error includes scale factor of 1.2.					
0.0196±0.0015 OUR AVERAGE					
0.0200±0.0018		[8] STANTON	80	SPEC	8.45 $\pi^- p \rightarrow n\pi^+\pi^- 2\gamma$
0.025 ±0.007		DUANE	74	MMS	$\pi^- p \rightarrow n$MM
0.0171±0.0033	68	DALPIAZ	72	CNTR	1.6 $\pi^- p \rightarrow nX^0$
0.020 $^{+0.008}_{-0.006}$	31	HARVEY	71	OSPK	3.65 $\pi^- p \rightarrow nX^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.018 ±0.002	6000	[9] APEL	79	NICE	15–40 $\pi^- p \rightarrow n2\gamma$

[8] Includes APEL 79 result.
[9] Data is included in STANTON 80 evaluation.

$\Gamma(e^+e^-)/\Gamma_{\text{total}}$ — Γ_{25}/Γ

VALUE (units 10^{-7})	CL%	DOCUMENT ID		TECN	COMMENT
<2.1	90	VOROBYEV	88	ND	$e^+e^- \rightarrow \pi^+\pi^-\eta$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.02	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.08	95	DANBURG	73	HBC	2.2 $K^- p \rightarrow \Lambda X^0$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.05	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.09	95	DANBURG	73	HBC	2.2 $K^- p \rightarrow \Lambda X^0$

$\Gamma(\pi^+\pi^+\pi^-\pi^-\,\text{neutrals})/\Gamma_{\text{total}}$ — Γ_{14}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	95	DANBURG	73	HBC	2.2 $K^- p \rightarrow \Lambda X^0$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.01	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\Gamma(\pi^+\pi^+\pi^-\pi^-\pi^0)/\Gamma_{\text{total}}$ — Γ_{15}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

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

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.01	90	RITTENBERG	69	HBC	1.7–2.7 $K^- p$

$\Gamma(\rho^0\gamma)/\Gamma(\pi^+\pi^-\gamma(\text{including}\,\rho^0\gamma))$ — Γ_2/Γ_{24}

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.15±0.10	473	DANBURG	73	HBC	2.2 $K^- p \to \Lambda X^0$
1.01±0.15	137	JACOBS	73	HBC	2.9 $K^- p \to \Lambda X^0$
0.94±0.20		AGUILAR-...	70D	HBC	3.9–4.6 $K^- p$

$\Gamma(\pi^0\pi^0\eta(3\pi^0\,\text{decay}))/\Gamma_{\text{total}}$ — $0.319\Gamma_3/\Gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.066±0.004 OUR FIT Error includes scale factor of 1.2.					
0.11 ±0.06	4	BENSINGER	70	DBC	2.2 $\pi^+ d$

$\Gamma(\rho^0\gamma)/\Gamma(\pi^+\pi^-\eta(\text{neutral decay}))$ — $\Gamma_2/0.709\Gamma_1$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.97±0.07 OUR FIT Error includes scale factor of 1.1.					
1.01±0.09 OUR AVERAGE					
1.07±0.17		BELADIDZE	92C	VES	36 π^- Be $\to \pi^- \eta' \eta$ Be
0.92±0.14	473	DANBURG	73	HBC	2.2 $K^- p \to \Lambda X^0$
1.11±0.18	192	JACOBS	73	HBC	2.9 $K^- p \to \Lambda X^0$

$\Gamma(\gamma\gamma)/\Gamma(\pi^0\pi^0\eta(\text{neutral decay}))$ — $\Gamma_5/0.709\Gamma_3$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.143±0.010 OUR FIT Error includes scale factor of 1.6.					
0.188±0.058	16	APEL	72	OSPK	3.8 $\pi^- p \to n X^0$

$\Gamma(\mu^+\mu^-\gamma)/\Gamma(\gamma\gamma)$ — Γ_7/Γ_5

VALUE (units 10^{-3})	EVTS	DOCUMENT ID		TECN	COMMENT
4.9±1.2	33	VIKTOROV	80	CNTR	25,33 $\pi^- p \to 2\mu\gamma$

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<1.5	90	DZHELYADIN	81	CNTR	30 $\pi^- p \to \eta' n$

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

VALUE (units 10^{-5})	CL%	DOCUMENT ID		TECN	COMMENT
<6.0	90	DZHELYADIN	81	CNTR	30 $\pi^- p \to \eta' n$

$\Gamma(3\pi^0)/\Gamma(\pi^0\pi^0\eta)$ — Γ_6/Γ_3

VALUE (units 10^{-4})	DOCUMENT ID		TECN	COMMENT
74±12 OUR FIT				
74±12 OUR AVERAGE				
74±15	ALDE	87B	GAM2	38 $\pi^- p \to n 6\gamma$
75±18	BINON	84	GAM2	30–40 $\pi^- p \to n 6\gamma$

$\Gamma(\gamma\gamma)/\Gamma(\pi^0\pi^0\eta)$ — Γ_5/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
0.102±0.007 OUR FIT Error includes scale factor of 1.6.				
0.105±0.010 OUR AVERAGE Error includes scale factor of 1.9.				
0.091±0.009	AMSLER	93	CBAR	0.0 $\overline{p}p$
0.112±0.002±0.006	ALDE	87B	GAM2	38 $\pi^- p \to n 2\gamma$

$\Gamma(\omega\gamma)/\Gamma(\pi^0\pi^0\eta)$ — Γ_4/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
0.145±0.014 OUR FIT				
0.147±0.016	ALDE	87B	GAM2	38 $\pi^- p \rightarrow n 4\gamma$

$\Gamma(3\gamma)/\Gamma(\pi^0\pi^0\eta)$ — Γ_{21}/Γ_3

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<4.6	90	ALDE	87B	GAM2	38 $\pi^- p \rightarrow n 3\gamma$

$\Gamma(\pi^0\gamma\gamma)/\Gamma(\pi^0\pi^0\eta)$ — Γ_{19}/Γ_3

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<37	90	ALDE	87B	GAM2	38 $\pi^- p \rightarrow n 4\gamma$

$\Gamma(\pi^0\pi^0)/\Gamma(\pi^0\pi^0\eta)$ — Γ_{18}/Γ_3

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<45	90	ALDE	87B	GAM2	38 $\pi^- p \rightarrow n 4\gamma$

$\Gamma(4\pi^0)/\Gamma(\pi^0\pi^0\eta)$ — Γ_{20}/Γ_3

VALUE (units 10^{-4})	CL%	DOCUMENT ID		TECN	COMMENT
<23	90	ALDE	87B	GAM2	38 $\pi^- p \rightarrow n 8\gamma$

$\eta'(958)$ *C*-NONCONSERVING DECAY PARAMETER

See the note on η decay parameters in the Stable Particle Particle Listings for definition of this parameter.

DECAY ASYMMETRY PARAMETER FOR $\pi^+\pi^-\gamma$

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
−0.01 ±0.04 OUR AVERAGE					
−0.019±0.056		AIHARA	87	TPC	$2\gamma \rightarrow \pi^+\pi^-\gamma$
−0.069±0.078	295	GRIGORIAN	75	STRC	2.1 $\pi^- p$
0.00 ±0.10	103	KALBFLEISCH	75	HBC	2.18 $K^- p \rightarrow \Lambda\pi^+\pi^-\gamma$
0.07 ±0.08	152	RITTENBERG	65	HBC	2.1–2.7 $K^- p$

$\eta'(958)$ REFERENCES

WURZINGER	96	PL B374 283	+Siebert+	(BONN, ORSAY, SACL, CRAC)
AMSLER	93	ZPHY C58 175	+Armstrong, Merkel+	(Crystal Barrel Collab.)
BELADIDZE	92C	SJNP 55 1535	+Bityukov, Borisov	(SERP, TBIL)
		Translated from YAF 55 2748.		
KARCH	92	ZPHY C54 33	+Antreasyan, Bartels+	(Crystal Ball Collab.)
ARMSTRONG	91B	ZPHY C52 389	+Barnes+	(ATHU, BARI, BIRM, CERN, CDEF)
BEHREND	91	ZPHY C49 401	+Criegee, Field, Franke+	(CELLO Collab.)
AUGUSTIN	90	PR D42 10	+Cosme+	(DM2 Collab.)
BARU	90	ZPHY C48 581	+Blinov, Blinov+	(MD-1 Collab.)
BUTLER	90	PR D42 1368	+Boyer+	(Mark II Collab.)
KARCH	90	PL B249 353	+Antreasyan, Bartels+	(Crystal Ball Collab.)
ROE	90	PR D41 17	+Bartha, Burke, Garbincius+	(ASP Collab.)
AIHARA	88C	PR D38 1	+Alston-Garnjost+	(TPC-2γ Collab.)
VOROBYEV	88	SJNP 48 273	+Golubev, Dolinsky, Druzhinin+	(NOVO)
		Translated from YAF 48 436.		

WILLIAMS	88	PR D38 1365	+Antreasyan, Bartels, Besset+	(Crystal Ball Collab.)	
AIHARA	87	PR D35 2650	+Alston-Garnjost+	(TPC-2γ Collab.)	JP
ALBRECHT	87B	PL B199 457	+Andam, Binder+	(ARGUS Collab.)	
ALDE	87B	ZPHY C36 603	+Binon, Bricman+	(LANL, BELG, SERP, LAPP)	
ANTREASYAN	87	PR D36 2633	+Bartels, Besset+	(Crystal Ball Collab.)	
GIDAL	87	PRL 59 2012	+Boyer, Butler, Cords, Abrams+	(LBL, SLAC, HARV)	
ALDE	86	PL B177 115	+Binon, Bricman+	(SERP, BELG, LANL, LAPP)	
BARTEL	85E	PL 160B 421	+Becker, Cords, Felst+	(JADE Collab.)	
ALTHOFF	84E	PL 147B 487	+Braunschweig, Kirschfink, Luebelsmeyer+	(TASSO Collab.)	
BERGER	84B	PL 142B 125		(PLUTO Collab.)	
BINON	84	PL 140B 264	+Donskov, Duteil+	(SERP, BELG, LAPP, CERN)	
BEHREND	83B	PL 125B 518	+D'Agostini+	(CELLO Collab.)	
Also	82C	PL 114B 378	Behrend, Chen, Fenner, Field+	(CELLO Collab.)	
JENNI	83	PR D27 1031	+Burke, Telnov, Abrams, Blocker+	(SLAC, LBL)	
BARTEL	82B	PL 113B 190	+Cords+	(JADE Collab.)	
DZHELYADIN	81	PL 105B 239	+Golovkin, Konstantinov, Kubarovski+	(SERP)	
STANTON	80	PL 92 B 353	+Edwards, Legacey+	(OSU, CARL, MCGI, TNTO)	
VIKTOROV	80	SJNP 32 520	+Golovkin, Dzhelyadin, Zaitsev, Mukhin+	(SERP)	
		Translated from YAF 32 1005.			
APEL	79	PL 83B 131	+Augenstein, Bertolucci	(KARLK, KARLE, PISA, SERP, WIEN)	
BINNIE	79	PL 83B 141	+Carr, Debenham, Jones, Karami, Keyne+	(LOIC)	
ZANFINO	77	PRL 38 930	+Brockman+	(CARL, MCGI, OHIO, TNTO)	
GRIGORIAN	75	NP B91 232	+Ladage, Mellema, Rudnick+	(UCLA)	
KALBFLEISCH	75	PR D11 987	+Strand, Chapman	(BNL, MICH)	
DUANE	74	PRL 32 425	+Binnie, Camilleri, Carr+	(LOIC, SHMP)	
KALBFLEISCH	74	PR D10 916		(BNL)	
DANBURG	73	PR D8 3744	+Kalbfleisch, Borenstein, Chapman+	(BNL, MICH)	JP
JACOBS	73	PR D8 18	+Chang, Gauthier+	(BRAN, UMD, SYRA, TUFTS)	JP
APEL	72	PL 40B 680	+Auslander, Muller, Bertolucci+	(KARLK, KARLE, PISA)	
DALPIAZ	72	PL 42B 377	+Frabetti, Massam, Navarria, Zichichi	(CERN)	
BASILE	71	NC 3A 371	+Bollini, Dalpiaz, Frabetti+	(CERN, BGNA, STRB)	
HARVEY	71	PRL 27 885	+Marquit, Peterson, Rhoades+	(MINN, MICH)	
AGUILAR-...	70D	PRL 25 1635	Aguilar-Benitez, Bassano, Samios, Barnes+	(BNL)	
BENSINGER	70	PL 33B 505	+Erwin, Thompson, Walker	(WISC)	
RITTENBERG	69	Thesis UCRL 18863		(LRL)	I
DAVIS	68	PL 27B 532	+Ammar, Mott, Dagan, Derrick+	(NWES, ANL)	
LONDON	66	PR 143 1034	+Rau, Goldberg, Lichtman+	(BNL, SYRA)	IJP
BADIER	65B	PL 17 337	+Demoulin, Barloutaud+	(EPOL, SACL, AMST)	
RITTENBERG	65	PRL 15 556	+Kalbfleisch	(LRL, BNL)	
DAUBER	64	PRL 13 449	+Slater, Smith, Stork, Ticho	(UCLA)	JP
Also	64B	Dubna Conf. 1 418	Dauber, Slater, Smith, Stork, Ticho	(UCLA)	

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KAMAL	92	PL B284 421	+Xu	(ALBE)	
BICKERSTAFF	82	ZPHY C16 171	+McKellar	(MELB)	
KIENZLE	65	PL 19 438	+Maglich, Levrat, Lefebvres+	(CERN)	
TRILLING	65	PL 19 427	+Brown, Goldhaber, Kadyk, Scanio	(LRL)	
GOLDBERG	64	PRL 12 546	+Gundzik, Lichtman, Connolly, Hart+	(SYRA, BNL)	
GOLDBERG	64B	PRL 13 249	+Gundzik, Leitner, Connolly, Hart+	(SYRA, BNL)	
KALBFLEISCH	64	PRL 12 527	+Alvarez, Barbaro-Galtieri+	(LRL)	JP
KALBFLEISCH	64B	PRL 13 349	+Dahl, Rittenberg	(LRL)	JP