

$D^*(2007)^0$

$$I(J^P) = \frac{1}{2}(1^-)$$

I, J, P need confirmation.

J consistent with 1, value 0 ruled out (NGUYEN 77).

$D^*(2007)^0$ MASS

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$, and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
2006.85 ± 0.05 OUR FIT	Error includes scale factor of 1.1.		
• • •	We do not use the following data for averages, fits, limits, etc. • • •		
2006 ± 1.5	¹ GOLDHABER 77	MRK1	$e^+ e^-$
¹ From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$, and D^0 .			

$m_{D^*(2007)^0} - m_{D^0}$

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$, and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
142.014 ± 0.030 OUR FIT	Error includes scale factor of 1.5.			
142.016 ± 0.030 OUR AVERAGE	Error includes scale factor of 1.5.			
142.007 ± 0.015 ± 0.014	10k	² TOMARADZE 15	CLEO	$e^+ e^- \rightarrow$ hadrons
142.2 ± 0.3 ± 0.2	145	ALBRECHT 95F	ARG	$e^+ e^- \rightarrow$ hadrons
142.12 ± 0.05 ± 0.05	1176	BORTOLETTO92B	CLE2	$e^+ e^- \rightarrow$ hadrons
• • •	We do not use the following data for averages, fits, limits, etc. • • •			
142.2 ± 2.0		SADROZINSKI 80	CBAL	$D^{*0} \rightarrow D^0 \pi^0$
142.7 ± 1.7		³ GOLDHABER 77	MRK1	$e^+ e^-$
² Obtained by analyzing CLEO-c data but not authored by the CLEO Collaboration . This value comes from the average of the results for two decay modes, $D^0 \rightarrow K^- \pi^+$ and $D^0 \rightarrow K^- \pi^+ \pi^- \pi^+$.				
³ From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$, and D^0 .				

$D^*(2007)^0$ WIDTH

VALUE (MeV)	CL%	DOCUMENT ID	TECN	COMMENT
<2.1	90	⁴ ABACHI 88B	HRS	$D^{*0} \rightarrow D^+ \pi^-$
⁴ Assuming $m_{D^{*0}} = 2007.2 \pm 2.1 \text{ MeV}/c^2$.				

$D^*(2007)^0$ DECAY MODES

$\bar{D}^*(2007)^0$ modes are charge conjugates of modes below.

	Mode	Fraction (Γ_i/Γ)
Γ_1	$D^0 \pi^0$	$(64.7 \pm 0.9) \%$
Γ_2	$D^0 \gamma$	$(35.3 \pm 0.9) \%$
Γ_3	$D^0 e^+ e^-$	$(3.91 \pm 0.33) \times 10^{-3}$

CONSTRAINED FIT INFORMATION

An overall fit to 2 branching ratios uses 5 measurements and one constraint to determine 2 parameters. The overall fit has a $\chi^2 = 2.5$ for 4 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \delta x_j)$, in percent, from the fit to 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.

$$x_2 \begin{vmatrix} & -100 \\ & \\ x_1 & \end{vmatrix}$$

$D^*(2007)^0$ BRANCHING RATIOS

$\Gamma(D^0 \pi^0) / \Gamma(D^0 \gamma)$ Γ_1 / Γ_2

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
1.83 ± 0.07 OUR FIT				Error includes scale factor of 1.1.
1.85 ± 0.07 OUR AVERAGE				
1.90 ± 0.07 ± 0.05	4.9k	ABLIKIM	15B BES3	10.6 $e^+ e^- \rightarrow$ hadrons
1.74 ± 0.02 ± 0.13		AUBERT, BE	05G BABR	10.6 $e^+ e^- \rightarrow$ hadrons

$\Gamma(D^0 e^+ e^-) / \Gamma(D^0 \gamma)$ Γ_3 / Γ_2

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
11.08 ± 0.76 ± 0.49	421	ABLIKIM	21BD BES3	4.178 GeV $e^+ e^-$

$\Gamma(D^0 \pi^0) / \Gamma_{\text{total}}$ Γ_1 / Γ

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.647 ± 0.009 OUR FIT				

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0.655 ± 0.008 ± 0.005	3.2k	⁵ ABLIKIM	15B BES3	$e^+ e^- \rightarrow$ hadrons
0.635 ± 0.003 ± 0.017	69k	⁵ AUBERT, BE	05G BABR	10.6 $e^+ e^- \rightarrow$ hadrons
0.596 ± 0.035 ± 0.028	858	⁶ ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.636 ± 0.023 ± 0.033	1097	⁶ BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons

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

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.353 ± 0.009 OUR FIT				
0.381 ± 0.029 OUR AVERAGE				
0.404 ± 0.035 ± 0.028	456	⁶ ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.364 ± 0.023 ± 0.033	621	⁶ BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons
0.37 ± 0.08 ± 0.08		ADLER	88D MRK3	$e^+ e^-$

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

$0.345 \pm 0.008 \pm 0.005$	1.8k	⁵ ABLIKIM	15B	BES3	$e^+ e^- \rightarrow$ hadrons
$0.365 \pm 0.003 \pm 0.017$	68k	⁵ AUBERT, BE	05G	BABR	$10.6 e^+ e^- \rightarrow$ hadrons
0.47 ± 0.23		LOW	87	HRS	29 GeV $e^+ e^-$
0.53 ± 0.13		BARTEL	85G	JADE	$e^+ e^-$, hadrons
0.47 ± 0.12		COLES	82	MRK2	$e^+ e^-$
0.45 ± 0.15		GOLDHABER	77	MRK1	$e^+ e^-$

⁵ Derived from the ratio $\Gamma(D^0 \pi^0) / \Gamma(D^0 \gamma)$ assuming that the branching fractions of $D^{*0} \rightarrow D^0 \pi^0$ and $D^{*0} \rightarrow D^0 \gamma$ decays sum to 100%

⁶ The BUTLER 92 and ALBRECHT 95F branching ratios are not independent, they have been constrained by the authors to sum to 100%.

$D^*(2007)^0$ REFERENCES

ABLIKIM	21BD	PR D104 112012	M. Ablikim <i>et al.</i>	(BESIII Collab.)
ABLIKIM	15B	PR D91 031101	M. Ablikim <i>et al.</i>	(BESIII Collab.)
TOMARADZE	15	PR D91 011102	A. Tomaradze <i>et al.</i>	(NWES)
AUBERT, BE	05G	PR D72 091101	B. Aubert <i>et al.</i>	(BABAR Collab.)
ALBRECHT	95F	ZPHY C66 63	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
BORTOLETTO	92B	PRL 69 2046	D. Bortoletto <i>et al.</i>	(CLEO Collab.)
BUTLER	92	PRL 69 2041	F. Butler <i>et al.</i>	(CLEO Collab.)
ABACHI	88B	PL B212 533	S. Abachi <i>et al.</i>	(ANL, IND, MICH, PURD+)
ADLER	88D	PL B208 152	J. Adler <i>et al.</i>	(Mark III Collab.)
LOW	87	PL B183 232	E.H. Low <i>et al.</i>	(HRS Collab.)
BARTEL	85G	PL 161B 197	W. Bartel <i>et al.</i>	(JADE Collab.)
COLES	82	PR D26 2190	M.W. Coles <i>et al.</i>	(LBL, SLAC)
SADROZINSKI	80	Madison Conf. 681	H.F.W. Sadrozinski <i>et al.</i>	(PRIN, CIT+)
GOLDHABER	77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)
NGUYEN	77	PRL 39 262	H.K. Nguyen <i>et al.</i>	(LBL, SLAC) J
