NODE=M061

$D^*(2007)^0$

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

$J^P = 1^-$ established by ABLIKIM 23AZ. NODE=M061

$D^*(2007)^0$ MASS

NODE=M061M

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. NODE=M061M

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
2006.85±0.05 OUR FIT Error includes scale factor of 1.1.			NODE=M061M
• • • 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. NODE=M061M;LINKAGE=G

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

NODE=M061DM

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. NODE=M061DM

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
142.014±0.030 OUR FIT Error includes scale factor of 1.5.				NODE=M061DM
142.016±0.030 OUR AVERAGE Error includes scale factor of 1.5.				
142.007±0.015±0.014	10k	[1] TOMARADZE 15	CLEO	$e^+e^- \to$ hadrons
142.2 ±0.3 ±0.2	145	ALBRECHT 95F	ARG	$e^+e^- \to$ hadrons
142.12 ±0.05 ±0.05	1176	BORTOLETTO 92B	CLE2	$e^+e^- \to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •				
142.2 ±2.0		SADROZINSKI 80	CBAL	$D^{*0} \to D^0\pi^0$
142.7 ±1.7		[2] GOLDHABER 77	MRK1	e^+e^-

[1] 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, $D^0 \to K^-\pi^+$ and $D^0 \to K^-\pi^+\pi^-\pi^+$. NODE=M061DM;LINKAGE=A

[2] From simultaneous fit to $D^*(2010)^+$, $D^*(2007)^0$, D^+, and D^0. NODE=M061DM;LINKAGE=G

$D^*(2007)^0$ WIDTH

NODE=M061W

VALUE (MeV)	CL%	DOCUMENT ID	TECN	COMMENT
<2.1	90	[1] ABACHI 88B	HRS	$D^{*0} \to D^+\pi^-$

[1] Assuming $m_{D^{*0}} = 2007.2 \pm 2.1$ MeV/c^2. NODE=M061W;LINKAGE=A

NODE=M061W

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

NODE=M061220;NODE=M061

$\overline{D}^*(2007)^0$ modes are charge conjugates of modes below. NODE=M061

	Mode	Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$D^0\pi^0$	(64.7 ±0.9) %		DESIG=1
Γ_2	$D^0\gamma$	(35.3 ±0.9) %		DESIG=2
Γ_3	$D^0e^+e^-$	(3.91±0.33) $\times 10^{-3}$		DESIG=3
Γ_4	$\mu^+\mu^-$	< 2.5 $\times 10^{-8}$	90%	DESIG=4
Γ_5	e^+e^-	< 1.7 $\times 10^{-6}$	90%	DESIG=5

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 $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, 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_1
x_2	−100

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

NODE=M061225

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

NODE=M061R2
NODE=M061R2

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.647±0.009 OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.655±0.008±0.005	3.2k	[1] ABLIKIM	15B	BES3	$e^+e^-\to$ hadrons
0.635±0.003±0.017	69k	[1] AUBERT,BE	05G	BABR	10.6 $e^+e^-\to$ hadrons
0.596±0.035±0.028	858	[2] ALBRECHT	95F	ARG	$e^+e^-\to$ hadrons
0.636±0.023±0.033	1097	[2] BUTLER	92	CLE2	$e^+e^-\to$ hadrons

[1] Derived from the ratio $\Gamma(D^0\pi^0)$ / $\Gamma(D^0\gamma)$ assuming that the branching fractions of $D^{*0}\to D^0\pi^0$ and $D^{*0}\to D^0\gamma$ decays sum to 100%. NODE=M061R2;LINKAGE=AU

[2] The BUTLER 92 and ALBRECHT 95F branching ratios are not independent, they have been constrained by the authors to sum to 100%. NODE=M061R2;LINKAGE=A

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

NODE=M061R1
NODE=M061R1

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	[1] ALBRECHT	95F	ARG	$e^+e^-\to$ hadrons
0.364±0.023±0.033	621	[1] BUTLER	92	CLE2	$e^+e^-\to$ 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±0.008±0.005	1.8k	[2] ABLIKIM	15B	BES3	$e^+e^-\to$ hadrons
0.365±0.003±0.017	68k	[2] AUBERT,BE	05G	BABR	10.6 $e^+e^-\to$ 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^-

[1] The BUTLER 92 and ALBRECHT 95F branching ratios are not independent, they have been constrained by the authors to sum to 100%. NODE=M061R;LINKAGE=A

[2] Derived from the ratio $\Gamma(D^0\pi^0)$ / $\Gamma(D^0\gamma)$ assuming that the branching fractions of $D^{*0}\to D^0\pi^0$ and $D^{*0}\to D^0\gamma$ decays sum to 100%. NODE=M061R;LINKAGE=AU

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

NODE=M061R3
NODE=M061R3

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
1.83 ±0.07 OUR FIT					
1.85 ±0.07 OUR AVERAGE					
1.90 ±0.07 ±0.05	4.9k	ABLIKIM	15B	BES3	10.6 $e^+e^-\to$ hadrons
1.74 ±0.02 ±0.13		AUBERT,BE	05G	BABR	10.6 $e^+e^-\to$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.789±0.082		[1] AAIJ	22N	LHCB	$B^0,B_s^0\to\overline{D}^{*0}(K\pi,\ \pi\pi)$

[1] Statistical error only. NODE=M061R3;LINKAGE=A

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

NODE=M061R00
NODE=M061R00

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

$\Gamma(\mu^+\mu^-)/\Gamma_{total}$ Γ_4/Γ

NODE=M061R01
NODE=M061R01

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<2.5\times10^{-8}$	90	[1] AAIJ	23D	LHCB	$B^-\to\pi^-\mu^+\mu^-$

[1] AAIJ 23D reports $< 2.6\times10^{-8}$ from a measurement of $[\Gamma(D^*(2007)^0\to\mu^+\mu^-)/\Gamma_{total}]\times[B(B^+\to\overline{D}^*(2007)^0\pi^+)]$ assuming $B(B^+\to\overline{D}^*(2007)^0\pi^+)=(4.90\pm0.17)\times10^{-3}$, which we rescale to our best value $B(B^+\to\overline{D}^*(2007)^0\pi^+)=5.17\times10^{-3}$. The reported value also assumes $B(B^-\to J/\psi(1S)K^-)=(10.20\pm0.19)\times10^{-4}$ and $B(J/\psi(1S)\to\mu^+\mu^-)=(59.61\pm0.33)\times10^{-3}$ for the normalization mode $B^-\to J/\psi(1S)K^-$. NODE=M061R01;LINKAGE=A

$\Gamma(e^+e^-)/\Gamma_{total}$ Γ_5/Γ

NODE=M061R02
NODE=M061R02

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.7\times10^{-6}$	90	SHEMYAKIN	20	CMD3	$e^+e^-\to D^0\pi^0,\ D^0\gamma$

$D^*(2007)^0$ REFERENCES

NODE=M061

AAIJ	23D	EPJ C83 666	R. Aaij *et al.*	(LHCb Collab.)	REFID=62095
ABLIKIM	23AZ	PL B846 138245	M. Ablikim *et al.*	(BESIII Collab.) JP	REFID=62420
AAIJ	22N	PR D105 072005	R. Aaij *et al.*	(LHCb Collab.)	REFID=61737
ABLIKIM	21BD	PR D104 112012	M. Ablikim *et al.*	(BESIII Collab.)	REFID=61535
SHEMYAKIN	20	PAN 83 954	D.N. Shemyakin	(CMD-3 Collab.)	REFID=62315
ABLIKIM	15B	PR D91 031101	M. Ablikim *et al.*	(BESIII Collab.)	REFID=56375
TOMARADZE	15	PR D91 011102	A. Tomaradze *et al.*	(NWES)	REFID=57142
AUBERT,BE	05G	PR D72 091101	B. Aubert *et al.*	(BABAR Collab.)	REFID=50942
ALBRECHT	95F	ZPHY C66 63	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=44374
BORTOLETTO	92B	PRL 69 2046	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=43116
BUTLER	92	PRL 69 2041	F. Butler *et al.*	(CLEO Collab.)	REFID=43170
ABACHI	88B	PL B212 533	S. Abachi *et al.*	(ANL, IND, MICH, PURD+)	REFID=40584
ADLER	88D	PL B208 152	J. Adler *et al.*	(Mark III Collab.)	REFID=40579
LOW	87	PL B183 232	E.H. Low *et al.*	(HRS Collab.)	REFID=40017
BARTEL	85G	PL 161B 197	W. Bartel *et al.*	(JADE Collab.)	REFID=22880
COLES	82	PR D26 2190	M.W. Coles *et al.*	(LBL, SLAC)	REFID=22866
SADROZINSKI	80	Madison Conf. 681	H.F.W. Sadrozinski *et al.*	(PRIN, CIT+)	REFID=22877
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)	REFID=11434