

# $D^*(2007)^0$

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

$I, J, P$  need confirmation.

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

## $D^*(2007)^0$ MASS

The fit includes  $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>2006.7 ± 0.5 OUR FIT</b>	Error includes scale factor of 1.1.		
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2006 ± 1.5	<sup>1</sup> GOLDHABER 77	MRK1	$e^+ e^-$
<sup>1</sup> From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$ , and $D^0$ .			

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

The fit includes  $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}$ , and  $D_s^{*\pm}$  mass and mass difference measurements.

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>142.12 ± 0.07 OUR FIT</b>				
<b>142.12 ± 0.07 OUR AVERAGE</b>				
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		<sup>2</sup> GOLDHABER 77	MRK1	$e^+ e^-$
<sup>2</sup> From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$ , and $D^0$ .				

## $D^*(2007)^0$ WIDTH

<u>VALUE (MeV)</u>	<u>CL%</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b>&lt;2.1</b>	90	<sup>3</sup> ABACHI	88B HRS	$D^{*0} \rightarrow D^+ \pi^-$
<sup>3</sup> Assuming $m_{D^{*0}} = 2007.2 \pm 2.1$ MeV/ $c^2$ .				

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

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

Mode	Fraction ( $\Gamma_i/\Gamma$ )
$\Gamma_1 \quad D^0 \pi^0$	(61.9 ± 2.9) %
$\Gamma_2 \quad D^0 \gamma$	(38.1 ± 2.9) %

## CONSTRAINED FIT INFORMATION

An overall fit to a branching ratio uses 3 measurements and one constraint to determine 2 parameters. The overall fit has a  $\chi^2 = 0.5$  for 2 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

$\Gamma(D^0 \pi^0) / \Gamma_{\text{total}}$   $\Gamma_1 / \Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.619 ± 0.029 OUR FIT**

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

0.596 ± 0.035 ± 0.028	858	<sup>4</sup> ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.636 ± 0.023 ± 0.033	1097	<sup>4</sup> BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons

$\Gamma(D^0 \gamma) / \Gamma_{\text{total}}$   $\Gamma_2 / \Gamma$

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
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**0.381 ± 0.029 OUR FIT**

**0.381 ± 0.029 OUR AVERAGE**

0.404 ± 0.035 ± 0.028	456	<sup>4</sup> ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.364 ± 0.023 ± 0.033	621	<sup>4</sup> 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. • • •

0.47 ± 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	$e^+ e^-$

<sup>4</sup> 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

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

————— **OTHER RELATED PAPERS** —————

EDWARDS	02	PR D65 012002	K.W. Edwards <i>et al.</i>	(CLEO Collab.)
SEMENOV	99	SPU 42 847	S.V. Semenov	
		Translated from UFN 42 937.		
KAMAL	92	PL B284 421	A.N. Kamal, Q.P. Xu	(ALBE)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB)
GOLDHABER	76	PRL 37 255	G. Goldhaber <i>et al.</i>	(Mark I Collab.)

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