

$D^*(2010)^\pm$

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

I, J, P need confirmation.

 $D^*(2010)^\pm$ 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.

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
2010.28±0.13 OUR FIT				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2008 ±3	¹ GOLDHABER 77	MRK1	±	$e^+ e^-$
2008.6 ±1.0	² PERUZZI 77	LGW	±	$e^+ e^-$

¹From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$, and D^0 ; not independent of FELDMAN 77B mass difference below.

²PERUZZI 77 mass not independent of FELDMAN 77B mass difference below and PERUZZI 77 D^0 mass value.

 $m_{D^*(2010)^+} - m_{D^+}$

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.

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
140.66±0.10 OUR FIT	Error includes scale factor of 1.1.			
140.64±0.08±0.06	620	BORTOLETTO92B	CLE2	$e^+ e^- \rightarrow$ hadrons

 $m_{D^*(2010)^+} - m_{D^0}$

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.

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
145.421±0.010 OUR FIT	Error includes scale factor of 1.1.			
145.421±0.010 OUR AVERAGE				
145.412±0.002±0.012		ANASTASSOV 02	CLE2	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K\pi) \pi^\pm$
145.54 ±0.08	611	³ ADINOLFI 99	BEAT	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.45 ±0.02		³ BREITWEG 99	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K\pi) \pi^\pm$
145.42 ±0.05		³ BREITWEG 99	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K^- 3\pi) \pi^\pm$
145.5 ±0.15	103	⁴ ADLOFF 97B	H1	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.44 ±0.08	152	⁴ BREITWEG 97	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$
145.42 ±0.11	199	⁴ BREITWEG 97	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$
145.4 ±0.2	48	⁴ DERRICK 95	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$

145.39 ±0.06 ±0.03		BARLAG	92B	ACCM	π^-	230 GeV
145.5 ±0.2	115	⁴ ALEXANDER	91B	OPAL	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.30 ±0.06		⁴ DECAMP	91J	ALEP	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.40 ±0.05 ±0.10		ABACHI	88B	HRS	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.46 ±0.07 ±0.03		ALBRECHT	85F	ARG	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.5 ±0.3	28	BAILEY	83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.5 ±0.3	60	FITCH	81	SPEC	$\pi^- A$	
145.3 ±0.5	30	FELDMAN	77B	MRK1	$D^{*+} \rightarrow D^0 \pi^+$	
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●						
145.44 ±0.09	122	⁴ BREITWEG	97B	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$ $D^0 \rightarrow K^- \pi^+$	
145.8 ±1.5	16	AHLEN	83	HRS	$D^{*+} \rightarrow D^0 \pi^+$	
145.1 ±1.8	12	BAILEY	83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.1 ±0.5	14	BAILEY	83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$	
145.5 ±0.5	14	YELTON	82	MRK2	$29 e^+ e^- \rightarrow K^- \pi^+$	
~ 145.5		AVERY	80	SPEC	γA	
145.2 ±0.6	2	BLIETSCHAU	79	BEBC	νp	
³ Statistical errors only.						
⁴ Systematic error not evaluated.						

$m_{D^*(2010)^+} - m_{D^*(2007)^0}$

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
2.6 ± 1.8	⁵ PERUZZI	77 LGW	$e^+ e^-$
⁵ Not independent of FELDMAN 77B mass difference above, PERUZZI 77 D^0 mass, and GOLDHABER 77 $D^*(2007)^0$ mass.			

$D^*(2010)^\pm$ WIDTH

<u>VALUE (keV)</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
96 ± 4 ± 22			ANASTASSOV 02	CLE2	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K\pi) \pi^\pm$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●					
<131	90	110	BARLAG	92B ACCM	π^- 230 GeV

$D^*(2010)^\pm$ DECAY MODES

$D^*(2010)^-$ modes are charge conjugates of the modes below.

Mode	Fraction (Γ_i/Γ)
Γ_1 $D^0 \pi^+$	(67.7 ± 0.5) %
Γ_2 $D^+ \pi^0$	(30.7 ± 0.5) %
Γ_3 $D^+ \gamma$	(1.6 ± 0.4) %

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 6 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 0.3$ 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	-62	
x_3	-43	-44
	x_1	x_2

 $D^*(2010)^+$ BRANCHING RATIOS **$\Gamma(D^0 \pi^+) / \Gamma_{\text{total}}$ Γ_1 / Γ**

<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.677 ± 0.005 OUR FIT			
0.677 ± 0.006 OUR AVERAGE			
0.6759 ± 0.0029 ± 0.0064	^{6,7,8} BARTELT	98 CLE2	$e^+ e^-$
0.688 ± 0.024 ± 0.013	ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.681 ± 0.010 ± 0.013	⁶ BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
0.57 ± 0.04 ± 0.04	ADLER	88D MRK3	$e^+ e^-$
0.44 ± 0.10	COLES	82 MRK2	$e^+ e^-$
0.6 ± 0.15	⁸ GOLDHABER	77 MRK1	$e^+ e^-$

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

<u>VALUE</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.307 ± 0.005 OUR FIT				
0.3073 ± 0.0013 ± 0.0062				
	^{6,7,8}	BARTELT	98 CLE2	$e^+ e^-$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
0.312 ± 0.011 ± 0.008	1404	ALBRECHT	95F ARG	$e^+ e^- \rightarrow$ hadrons
0.308 ± 0.004 ± 0.008	410	⁶ BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons
0.26 ± 0.02 ± 0.02		ADLER	88D MRK3	$e^+ e^-$
0.34 ± 0.07		COLES	82 MRK2	$e^+ e^-$

 $\Gamma(D^+ \gamma) / \Gamma_{\text{total}}$ Γ_3 / Γ

<u>VALUE</u>	<u>CL%</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.016 ± 0.004 OUR FIT					
0.016 ± 0.005 OUR AVERAGE					
0.0168 ± 0.0042 ± 0.0029			^{6,7} BARTELT	98 CLE2	$e^+ e^-$
0.011 ± 0.014 ± 0.016	12		⁶ BUTLER	92 CLE2	$e^+ e^- \rightarrow$ hadrons

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

<0.052	90	ALBRECHT	95F ARG	$e^+e^- \rightarrow$ hadrons
0.17 ± 0.05	± 0.05	ADLER	88D MRK3	e^+e^-
0.22 ± 0.12		⁹ COLES	82 MRK2	e^+e^-

⁶ The branching ratios are not independent, they have been constrained by the authors to sum to 100%.

⁷ Systematic error includes theoretical error on the prediction of the ratio of hadronic modes.

⁸ Assuming that isospin is conserved in the decay.

⁹ Not independent of $\Gamma(D^0\pi^+)/\Gamma_{\text{total}}$ and $\Gamma(D^+\pi^0)/\Gamma_{\text{total}}$ measurement.

$D^*(2010)^\pm$ REFERENCES

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ADINOLFI 99	NP B547 3	M. Adinolfi <i>et al.</i>	(Beatrice Collab.)
BREITWEG 99	EPJ C6 67	J. Breitweg <i>et al.</i>	(ZEUS Collab.)
BARTELT 98	PRL 80 3919	J. Bartelt <i>et al.</i>	(CLEO Collab.)
ADLOFF 97B	ZPHY C72 593	C. Adloff <i>et al.</i>	(H1 Collab.)
BREITWEG 97	PL B401 192	J. Breitweg <i>et al.</i>	(ZEUS Collab.)
BREITWEG 97B	PL B407 402	J. Breitweg <i>et al.</i>	(ZEUS Collab.)
ALBRECHT 95F	ZPHY C66 63	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
DERRICK 95	PL B349 225	M. Derrick <i>et al.</i>	(ZEUS Collab.)
BARLAG 92B	PL B278 480	S. Barlag <i>et al.</i>	(ACCMOR 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.)
ALEXANDER 91B	PL B262 341	G. Alexander <i>et al.</i>	(OPAL Collab.)
DECAMP 91J	PL B266 218	D. Decamp <i>et al.</i>	(ALEPH 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.)
ALBRECHT 85F	PL 150B 235	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
AHLEN 83	PRL 51 1147	S.P. Ahlen <i>et al.</i>	(ANL, IND, LBL+)
BAILEY 83	PL 132B 230	R. Bailey <i>et al.</i>	(AMST, BRIS, CERN, CRAC+)
COLES 82	PR D26 2190	M.W. Coles <i>et al.</i>	(LBL, SLAC)
YELTON 82	PRL 49 430	J.M. Yelton <i>et al.</i>	(SLAC, LBL, UCB+)
FITCH 81	PRL 46 761	V.L. Fitch <i>et al.</i>	(PRIN, SACL, TORI+)
AVERY 80	PRL 44 1309	P. Avery <i>et al.</i>	(ILL, FNAL, COLU)
BLIETSCHAU 79	PL 86B 108	J. Blietschau <i>et al.</i>	(AACH3, BONN, CERN+)
FELDMAN 77B	PRL 38 1313	G.J. Feldman <i>et al.</i>	(Mark I Collab.)
GOLDHABER 77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)
PERUZZI 77	PRL 39 1301	I. Peruzzi <i>et al.</i>	(LGW Collab.)