$D^*(2010)^\pm$

$I(J^P) = \frac{1}{2}(1^-)$
I, J, P need confirmation.

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

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

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
2010.27±0.17 OUR FIT	Error includes scale factor of 1.1.				
• • • 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	MRK1	±	e^+e^-

[1] From simultaneous fit to $D^*(2010)^+$, $D^*(2007)^0$, D^+, and D^0; not independent of FELDMAN 77B mass difference below.
[2] PERUZZI 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}, and $D_s^{*\pm}$ mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
140.64±0.10 OUR FIT	Error includes scale factor of 1.1.				
140.64±0.08±0.06	620	BORTOLETTO	92B	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}, and $D_s^{*\pm}$ mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
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	$D^{*\pm} \rightarrow D^0\pi^\pm$, $D^0 \rightarrow K^-3\pi$
145.42 ±0.11	199	[4] BREITWEG	97	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm$, $D^0 \rightarrow K^-\pi^+$
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	$D^{*\pm} \rightarrow D^0 \pi^+$
145.5	±0.3	28	BAILEY	83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.5	±0.3	60	FITCH	81	SPEC	π^- 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.

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

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
2.6±1.8	[5] PERUZZI	77	MRK1	$e^+ e^-$

[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

VALUE (keV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
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 $\left\langle \delta x_i \delta x_j \right\rangle / (\delta x_i \cdot \delta x_j)$, 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_2	−62	
x_3	−43	−44
	x_1	x_2

$D^*(2010)^+$ BRANCHING RATIOS

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

VALUE	DOCUMENT ID		TECN	COMMENT
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	$e^+e^- \to$ hadrons
0.681 ±0.010 ±0.013	[6] BUTLER	92	CLE2	$e^+e^- \to$ 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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
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	$e^+e^- \to$ hadrons
0.308 ±0.004 ±0.008	410	[6] BUTLER	92	CLE2	$e^+e^- \to$ 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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
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	$e^+e^- \to$ hadrons

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

<0.052			90	ALBRECHT	95F	ARG	$e^+e^- \to$ 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 $\Gamma(D^0\pi^+)/\Gamma_{total}$ and $\Gamma(D^+\pi^0)/\Gamma_{total}$ measurement.

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

ANASTASSOV	02	PR D65 032003	A. Anastassov *et al.*	(CLEO Collab.)
ADINOLFI	99	NP B547 3	M. Adinolfi *et al.*	(Beatrice Collab.)
BREITWEG	99	EPJ C6 67	J. Breitweg *et al.*	(ZEUS Collab.)
BARTELT	98	PRL 80 3919	J. Bartelt *et al.*	(CLEO II Collab.)
ADLOFF	97B	ZPHY C72 593	C. Adloff *et al.*	(H1 Collab.)
BREITWEG	97	PL B401 192	J. Breitweg *et al.*	(ZEUS Collab.)
BREITWEG	97B	PL B407 402	J. Breitweg *et al.*	(ZEUS Collab.)
ALBRECHT	95F	ZPHY C66 63	H. Albrecht *et al.*	(ARGUS Collab.)
DERRICK	95	PL B349 225	M. Derrick *et al.*	(ZEUS Collab.)
BARLAG	92B	PL B278 480	S. Barlag *et al.*	(ACCMOR Collab.)
BORTOLETTO	92B	PRL 69 2046	D. Bortoletto *et al.*	(CLEO Collab.)
BUTLER	92	PRL 69 2041	F. Butler *et al.*	(CLEO Collab.)
ALEXANDER	91B	PL B262 341	G. Alexander *et al.*	(OPAL Collab.)
DECAMP	91J	PL B266 218	D. Decamp *et al.*	(ALEPH Collab.)
ABACHI	88B	PL B212 533	S. Abachi *et al.*	(ANL, IND, MICH, PURD+)
ADLER	88D	PL B208 152	J. Adler *et al.*	(Mark III Collab.)
ALBRECHT	85F	PL 150B 235	H. Albrecht *et al.*	(ARGUS Collab.)
AHLEN	83	PRL 51 1147	S.P. Ahlen *et al.*	(ANL, IND, LBL+)
BAILEY	83	PL 132B 230	R. Bailey *et al.*	(AMST, BRIS, CERN, CRAC+)
COLES	82	PR D26 2190	M.W. Coles *et al.*	(LBL, SLAC)
YELTON	82	PRL 49 430	J.M. Yelton *et al.*	(SLAC, LBL, UCB+)
FITCH	81	PRL 46 761	V.L. Fitch *et al.*	(PRIN, SACL, TORI+)
AVERY	80	PRL 44 1309	P. Avery *et al.*	(ILL, FNAL, COLU)
BLIETSCHAU	79	PL 86B 108	J. Blietschau *et al.*	(AACH3, BONN, CERN+)
FELDMAN	77B	PRL 38 1313	G.J. Feldman *et al.*	(Mark I Collab.)
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	I. Peruzzi *et al.*	(Mark I Collab.)

OTHER RELATED PAPERS

AHMED	01	PRL 87 251801	S. Ahmed *et al.*	(CLEO Collab.)
SEMENOV	99	SPU 42 847	S.V. Semenov	
		Translated from UFN 42 937.		
NUSSINOV	98	PL B418 383	S. Nussinov	
KAMAL	92	PL B284 421	A.N. Kamal, Q.P. Xu	(ALBE)
ALTHOFF	83C	PL 126B 493	M. Althoff *et al.*	(TASSO Collab.)
BEBEK	82	PRL 49 610	C. Bebek *et al.*	(HARV, OSU, ROCH, RUTG+)
TRILLING	81	PRPL 75 57	G.H. Trilling	(LBL, UCB)
PERUZZI	76	PRL 37 569	I. Peruzzi *et al.*	(Mark I Collab.)