$D^*(2010)^\pm$

$I(J^P) = \frac{1}{2}(1^-)$
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*
2010.0±0.5 OR 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 OR 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}, and $D_s^{*\pm}$ mass and mass difference measurements.

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
145.436±0.016 OR FIT					
145.436±0.015 OUR AVERAGE					
145.54 ±0.08	611	ADINOLFI	99	BEAT	$D^{*\pm} \rightarrow D^0\pi^\pm$
145.45 ±0.02		BREITWEG	99	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm \rightarrow (K\pi)\pi^\pm$
145.42 ±0.05		BREITWEG	99	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm \rightarrow (K^-3\pi)\pi^\pm$
145.5 ±0.15	103	[3] ADLOFF	97B	H1	$D^{*\pm} \rightarrow D^0\pi^\pm$
145.44 ±0.08	152	[3] BREITWEG	97	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm$, $D^0 \rightarrow K^-3\pi$
145.42 ±0.11	199	[3] BREITWEG	97	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm$, $D^0 \rightarrow K^-\pi^+$
145.4 ±0.2	48	[3] 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	[3] ALEXANDER	91B	OPAL	$D^{*\pm} \to D^0 \pi^\pm$
145.30	±0.06			[3] DECAMP	91J	ALEP	$D^{*\pm} \to D^0 \pi^\pm$
145.40	±0.05	±0.10		ABACHI	88B	HRS	$D^{*\pm} \to D^0 \pi^\pm$
145.46	±0.07	±0.03		ALBRECHT	85F	ARG	$D^{*\pm} \to D^0 \pi^+$
145.5	±0.3		28	BAILEY	83	SPEC	$D^{*\pm} \to D^0 \pi^\pm$
145.5	±0.3		60	FITCH	81	SPEC	π^- A
145.3	±0.5		30	FELDMAN	77B	MRK1	$D^{*+} \to D^0 \pi^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •							
145.44	±0.09		122	[3] BREITWEG	97B	ZEUS	$D^{*\pm} \to D^0 \pi^\pm$, $D^0 \to K^- \pi^+$
145.8	±1.5		16	AHLEN	83	HRS	$D^{*+} \to D^0 \pi^+$
145.1	±1.8		12	BAILEY	83	SPEC	$D^{*\pm} \to D^0 \pi^\pm$
145.1	±0.5		14	BAILEY	83	SPEC	$D^{*\pm} \to D^0 \pi^\pm$
145.5	±0.5		14	YELTON	82	MRK2	29 $e^+ e^- \to K^- \pi^+$
~ 145.5				AVERY	80	SPEC	γ A
145.2	±0.6		2	BLIETSCHAU	79	BEBC	νp

[3] 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	[4] PERUZZI	77	MRK1	$e^+ e^-$

[4] 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 (MeV)	*CL%*	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
<0.131	90	110	BARLAG	92B	ACCM	π^- 230 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •						
<1.1	90		ABACHI	88B	HRS	$D^{*\pm} \to D^0 \pi^\pm$
<2.2			YELTON	82	MRK2	$e^+ e^- \to K^- \pi^+ \pi^-$
<2.0	90	30	FELDMAN	77B	MRK1	$D^{*+} \to D^0 \pi^+$

$D^*(2010)^\pm$ 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 $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, 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	[5,6,7] BARTELT	98	CLE2	e^+e^-
0.688 ±0.024 ±0.013	ALBRECHT	95F	ARG	$e^+e^- \to$ hadrons
0.681 ±0.010 ±0.013	[5] 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	[7] 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		[5,6,7] 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	[5] 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			[5,6] BARTELT	98	CLE2	e^+e^-
0.011 ±0.014 ±0.016		12	[5] 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		[8]	COLES	82	MRK2	e^+e^-

[5] The branching ratios are not independent, they have been constrained by the authors to sum to 100%.
[6] Systematic error includes theoretical error on the prediction of the ratio of hadronic modes.
[7] Assuming that isospin is conserved in the decay.
[8] 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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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.)
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