$D^*(2010)^\pm$

$I(J^P) = \frac{1}{2}(1^-)$
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 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±0.09 OUR FIT					
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
145.42±0.05 OUR FIT					
145.42±0.04 OUR AVERAGE					
145.39±0.06±0.03		BARLAG	92B	ACCM	π^- 230 GeV
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	$D^{*\pm} \rightarrow D^0\pi^+$
145.8 ±1.5	16	AHLEN	83	HRS	$D^{*+} \rightarrow D^0\pi^+$
145.1 ±1.8	12	BAILEY	83	SPEC	$D^{*\pm} \rightarrow D^0\pi^\pm$
145.5 ±0.3	28	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 ±0.3	60	FITCH	81	SPEC	π^- A
145.2 ±0.6	2	BLIETSCHAU	79	BEBC	νp
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. • • •					
145.4 ±0.2	48	[3] DERRICK	95	ZEUS	$D^{*\pm} \rightarrow D^0\pi^\pm$
145.5 ±0.2	115	[3] ALEXANDER	91B	OPAL	$D^{*\pm} \rightarrow D^0\pi^\pm$
145.30±0.06		[3] DECAMP	91J	ALEP	$D^{*\pm} \rightarrow D^0\pi^\pm$
~ 145.5		AVERY	80	SPEC	γA

[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	$D^0\pi^+$	(68.3±1.4) %
Γ_2	$D^+\pi^0$	(30.6±2.5) %
Γ_3	$D^+\gamma$	($1.1^{+2.1}_{-0.7}$) %

CONSTRAINED FIT INFORMATION

An overall fit to 2 branching ratios uses 3 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 0.0$ for 1 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, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_2	−55	
x_3	0	−83
	x_1	x_2

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

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

VALUE	DOCUMENT ID		TECN	COMMENT
0.683±0.014 OUR FIT				
0.683±0.014 OUR AVERAGE				
0.688±0.024±0.013	ALBRECHT	95F	ARG	$e^+e^- \to$ hadrons
0.681±0.010±0.013	[7] 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	[5] GOLDHABER	77	MRK1	e^+e^-

[5] Assuming that isospin is conserved in the decay.

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

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
0.306±0.025 OUR FIT					
• • • 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	[7] 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^-

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

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
$0.011^{+0.021}_{-0.007}$ OUR FIT						
0.011±0.014±0.016		12	[7] 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		[6] COLES	82	MRK2	e^+e^-

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

[7] The BUTLER 92 branching ratios are not independent, they have been constrained by the authors to sum to 100%.

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

ALBRECHT	95F	ZPHY C66 63	+Ehrlichmann+	(ARGUS Collab.)
DERRICK	95	PL B349 225	+Krakauer, et al	(ZEUS Collab.)
BARLAG	92B	PL B278 480	+Becker, Bozek+	(ACCMOR Collab.)
BORTOLETTO	92B	PRL 69 2046	+Brown, Dominick+	(CLEO Collab.)
BUTLER	92	PRL 69 2041	+Fu, Kalbfleish+	(CLEO Collab.)
ALEXANDER	91B	PL B262 341	+Allison, Allport, Anderson, Arcelli+	(OPAL Collab.)
DECAMP	91J	PL B266 218	+Deschizeaux, Goy, Lees+	(ALEPH Collab.)
ABACHI	88B	PL B212 533	+Akerlof+	(ANL, IND, MICH, PURD, LBL)
ADLER	88D	PL B208 152	+Becker+	(Mark III Collab.)
ALBRECHT	85F	PL 150B 235	+Binder, Harder, Philipp+	(ARGUS Collab.)
AHLEN	83	PRL 51 1147	+Akerlof+	(ANL, IND, LBL, MICH, PURD, SLAC)
BAILEY	83	PL 132B 230	+Bardsley+	(AMST, BRIS, CERN, CRAC, MPIM+)
COLES	82	PR D26 2190	+Abrams, Blocker, Blondel+	(LBL, SLAC)
YELTON	82	PRL 49 430	+Feldman, Goldhaber+	(SLAC, LBL, UCB, HARV)
FITCH	81	PRL 46 761	+Devaux, Cavaglia, May+	(PRIN, SACL, TORI, BNL)
AVERY	80	PRL 44 1309	+Wiss, Butler, Gladding+	(ILL, FNAL, COLU)
BLIETSCHAU	79	PL 86B 108	+	(AACH3, BONN, CERN, MPIM, OXF)
FELDMAN	77B	PRL 38 1313	+Peruzzi, Piccolo, Abrams, Alam+	(Mark I Collab.)
GOLDHABER	77	PL 69B 503	+Wiss, Abrams, Alam+	(Mark I Collab.)
PERUZZI	77	PRL 39 1301	+Piccolo, Feldman+	(Mark I Collab.)

OTHER RELATED PAPERS

KAMAL	92	PL B284 421	+Xu	(ALBE)
ALTHOFF	83C	PL 126B 493	+Fischer, Burkhardt+	(TASSO Collab.)
BEBEK	82	PRL 49 610	+	(HARV, OSU, ROCH, RUTG, SYRA, VAND+)
TRILLING	81	PRPL 75 57		(LBL, UCB)
PERUZZI	76	PRL 37 569	+Piccolo, Feldman, Nguyen, Wiss+	(Mark I Collab.)