$$\boxed{D^*(2010)^\pm} \qquad I(J^P) = \tfrac{1}{2}(1^-)$$

$I,\ J,\ P$ 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.

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
2010.26±0.05 OUR FIT					

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

VALUE (MeV)	DOCUMENT ID		TECN	CHG	COMMENT
2008 ±3	[1] GOLDHABER	77	MRK1	±	e^+e^-
2008.6 ±1.0	[2] PERUZZI	77	LGW	±	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}, $D_s^{*\pm}$, $D_1(2420)^0$, $D_2^*(2460)^0$, and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
140.603 ±0.015 OUR FIT					
140.602 ±0.014 OUR AVERAGE					
140.6010±0.0068±0.0129	151k	LEES	17F	BABR	$e^+e^- \to$ hadrons
140.64 ±0.08 ±0.06	620	BORTOLETTO92B		CLE2	$e^+e^- \to$ 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.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
145.4258±0.0017 OUR FIT					
145.4258±0.0020 OUR AVERAGE	Error includes scale factor of 1.2.				
145.4259±0.0004±0.0017	312.8k	LEES	13X	BABR	$D^{*\pm} \to D^0\pi^\pm \to$ $(K\pi, K3\pi)\pi^\pm$
145.412 ±0.002 ±0.012		ANASTASSOV	02	CLE2	$D^{*\pm} \to D^0\pi^\pm \to$ $(K\pi)\ \pi^\pm$
145.54 ±0.08	611	[3] ADINOLFI	99	BEAT	$D^{*\pm} \to D^0\pi^\pm$
145.45 ±0.02		[3] BREITWEG	99	ZEUS	$D^{*\pm} \to D^0\pi^\pm \to$ $(K\pi)\pi^\pm$
145.42 ±0.05		[3] BREITWEG	99	ZEUS	$D^{*\pm} \to D^0\pi^\pm \to$ $(K^-3\pi)\pi^\pm$
145.5 ±0.15	103	[4] ADLOFF	97B	H1	$D^{*\pm} \to D^0\pi^\pm$
145.44 ±0.08	152	[4] BREITWEG	97	ZEUS	$D^{*\pm} \to D^0\pi^\pm$, $D^0 \to K^-3\pi$

145.42	±0.11	199	[4] BREITWEG	97	ZEUS	$D^{*\pm} \to D^0 \pi^\pm$, $D^0 \to K^- \pi^+$
145.4	±0.2	48	[4] DERRICK	95	ZEUS	$D^{*\pm} \to D^0 \pi^\pm$
145.39	±0.06 ±0.03		BARLAG	92B	ACCM	π^- 230 GeV
145.5	±0.2	115	[4] ALEXANDER	91B	OPAL	$D^{*\pm} \to D^0 \pi^\pm$
145.30	±0.06		[4] 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	$\pi^- A$
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. • • •

145.4256	±0.0006 ±0.0017	138.5k	LEES	13X	BABR	$D^{*\pm} \to D^0 \pi^\pm \to (K^- \pi^+) \pi^\pm$
145.4266	±0.0005 ±0.0019	174.3k	LEES	13X	BABR	$D^{*\pm} \to D^0 \pi^\pm \to (K^- 2\pi^+ \pi^-) \pi^\pm$
145.44	±0.09	122	[4] 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	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	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

VALUE (keV)	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
83.4±1.8 OUR AVERAGE						
83.3±1.2± 1.4		312.8k	[6] LEES	13X	BABR	$D^{*\pm} \to D^0 \pi^\pm \to (K\pi, K3\pi)\pi^\pm$
96 ±4 ±22			[6] ANASTASSOV	02	CLE2	$D^{*\pm} \to D^0 \pi^\pm \to (K\pi) \pi^\pm$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
83.4±1.7± 1.5		138.5k	[6] LEES	13X	BABR	$D^{*\pm} \to D^0 \pi^\pm \to (K^- \pi^+)\pi^\pm$
83.2±1.5± 2.6		174.3k	[6] LEES	13X	BABR	$D^{*\pm} \to D^0 \pi^\pm \to (K^- 2\pi^+ \pi^-)\pi^\pm$
<131	90	110	BARLAG	92B	ACCM	π^- 230 GeV

[6] Ignoring the electromagnetic contribution from $D^{*\pm} \to D^\pm \gamma$.

$D^*(2010)^{\pm}$ 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	$D^+\gamma$	$(\ 1.6\pm0.4)$ %

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.

$$
\begin{array}{c|cc}
x_2 & -62 & \\
x_3 & -43 & -44 \\
\hline
& x_1 & x_2
\end{array}
$$

$D^*(2010)^+$ 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	[7,8,9]	BARTELT	98	CLE2	e^+e^-
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

$\bullet\ \bullet\ \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet\ \bullet\ \bullet$

VALUE		DOCUMENT ID		TECN	COMMENT
0.57 ±0.04 ±0.04		ADLER	88D	MRK3	e^+e^-
0.44 ±0.10		COLES	82	MRK2	e^+e^-
0.6 ±0.15	[9]	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		[7,8,9]	BARTELT	98	CLE2	e^+e^-

$\bullet\ \bullet\ \bullet$ We do not use the following data for averages, fits, limits, etc. $\bullet\ \bullet\ \bullet$

VALUE	EVTS		DOCUMENT ID		TECN	COMMENT
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^-

$\Gamma(D^+\gamma)/\Gamma_{total}$ 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			[7,8] BARTELT	98	CLE2	e^+e^-
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. • • •

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
<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			[10] COLES	82	MRK2	e^+e^-

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

[8] Systematic error includes theoretical error on the prediction of the ratio of hadronic modes.

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

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

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

LEES	17F	PRL 119 202003	J.P. Lees et al.	(BABAR Collab.)
LEES	13X	PRL 111 111801	J.P. Lees et al.	(BABAR Collab.)
Also		PR D88 052003	J.P. Lees et al.	(BABAR Collab.)
Also		PR D88 079902 (errat.)	J.P. Lees et al.	(BABAR Collab.)
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 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.	(LGW Collab.)