NODE=M062

$D^*(2010)^\pm$

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

$J^P = 1^-$ established by ABLIKIM 23AZ.

NODE=M062

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

NODE=M062M

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.

NODE=M062M

NODE=M062M

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. • • •					
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.

NODE=M062M;LINKAGE=G

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

NODE=M062M;LINKAGE=P

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

NODE=M062MD

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.

NODE=M062MD

NODE=M062MD

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	BORTOLETTO	92B	CLE2	$e^+e^- \to$ hadrons

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

NODE=M062DM

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.

NODE=M062DM

NODE=M062DM

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	$D^{*\pm} \to D^0\pi^\pm \to (K\pi,K3\pi)\pi^\pm$	OCCUR=3
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	[1] ADINOLFI	99	BEAT	$D^{*\pm} \to D^0\pi^\pm$	
145.45 ±0.02		[1] BREITWEG	99	ZEUS	$D^{*\pm} \to D^0\pi^\pm \to (K\pi)\pi^\pm$	
145.42 ±0.05		[1] BREITWEG	99	ZEUS	$D^{*\pm} \to D^0\pi^\pm \to (K^-3\pi)\pi^\pm$	OCCUR=2
145.5 ±0.15	103	[2] ADLOFF	97B	H1	$D^{*\pm} \to D^0\pi^\pm$	
145.44 ±0.08	152	[2] BREITWEG	97	ZEUS	$D^{*\pm} \to D^0\pi^\pm$, $D^0 \to K^-3\pi$	
145.42 ±0.11	199	[2] BREITWEG	97	ZEUS	$D^{*\pm} \to D^0\pi^\pm$, $D^0 \to K^-\pi^+$	OCCUR=2
145.4 ±0.2	48	[2] 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	[2] ALEXANDER	91B	OPAL	$D^{*\pm} \to D^0\pi^\pm$	
145.30 ±0.06		[2] 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	$D^{*\pm} \to D^0\pi^\pm$	OCCUR=2
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. • • •

145.4256±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	$D^{*\pm} \to D^0\pi^\pm \to (K^-2\pi^+\pi^-)\pi^\pm$	OCCUR=2
145.44 ±0.09	122	[2]	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	$D^{*\pm} \to D^0\pi^\pm$	OCCUR=3
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	

[1] Statistical errors only. NODE=M062DM;LINKAGE=AV

[2] Systematic error not evaluated. NODE=M062DM;LINKAGE=A

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

NODE=M062EM

VALUE (MeV)		*DOCUMENT ID*		*TECN*	*COMMENT*
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2.6±1.8	[1]	PERUZZI	77	LGW	e^+e^-

NODE=M062EM

[1] Not independent of FELDMAN 77B mass difference above, PERUZZI 77 D^0 mass, and GOLDHABER 77 $D^*(2007)^0$ mass. NODE=M062EM;LINKAGE=P

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

NODE=M062W

VALUE (keV)	*CL%*	*EVTS*		*DOCUMENT ID*		*TECN*	*COMMENT*	
83.4±1.8 OUR AVERAGE								
83.3±1.2± 1.4		312.8k	[1]	LEES	13X	BABR	$D^{*\pm} \to D^0\pi^\pm \to (K\pi,K3\pi)\pi^\pm$	OCCUR=3
96 ±4 ±22			[1]	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	[1]	LEES	13X	BABR	$D^{*\pm} \to D^0\pi^\pm \to (K^-\pi^+)\pi^\pm$	
83.2±1.5± 2.6		174.3k	[1]	LEES	13X	BABR	$D^{*\pm} \to D^0\pi^\pm \to (K^-2\pi^+\pi^-)\pi^\pm$	OCCUR=2
<131	90	110		BARLAG	92B	ACCM	π^- 230 GeV	

NODE=M062W

[1] Ignoring the electromagnetic contribution from $D^{*\pm} \to D^\pm\gamma$. NODE=M062W;LINKAGE=LE

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

NODE=M062225;NODE=M062

$D^*(2010)^-$ modes are charge conjugates of the modes below. NODE=M062

	Mode	Fraction (Γ_i/Γ)	Confidence level	
Γ_1	$D^0\pi^+$	(67.7±0.5) %		DESIG=1
Γ_2	$D^+\pi^0$	(30.7±0.5) %		DESIG=3
Γ_3	$D^+\gamma$	(1.6±0.4) %		DESIG=2
Γ_4	$e^+\nu_e$	$< 1.1 \times 10^{-5}$	90%	DESIG=5
Γ_5	$\mu^+\nu_\mu$	$< 4.3 \times 10^{-6}$	90%	DESIG=6

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, $x_i \equiv \Gamma_i/\Gamma_{\rm total}$. 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

NODE=M062230

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

NODE=M062R1

VALUE		DOCUMENT ID		TECN	COMMENT
0.677 ±0.005 OUR FIT					
0.677 ±0.006 OUR AVERAGE					
0.6759±0.0029±0.0064	[1,2,3]	BARTELT	98	CLE2	e^+e^-
0.688 ±0.024 ±0.013		ALBRECHT	95F	ARG	$e^+e^- \to$ hadrons
0.681 ±0.010 ±0.013	[1]	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	[3]	GOLDHABER	77	MRK1	e^+e^-

[1] The branching ratios are not independent, they have been constrained by the authors to sum to 100%. NODE=M062R1;LINKAGE=A

[2] Systematic error includes theoretical error on the prediction of the ratio of hadronic modes. NODE=M062R1;LINKAGE=B

[3] Assuming that isospin is conserved in the decay. NODE=M062R1;LINKAGE=G

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

NODE=M062R3

VALUE	EVTS		DOCUMENT ID		TECN	COMMENT
0.307 ±0.005 OUR FIT						
0.3073±0.0013±0.0062		[1,2,3]	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	[1]	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^-

[1] The branching ratios are not independent, they have been constrained by the authors to sum to 100%. NODE=M062R3;LINKAGE=A

[2] Systematic error includes theoretical error on the prediction of the ratio of hadronic modes. NODE=M062R3;LINKAGE=B

[3] Assuming that isospin is conserved in the decay. NODE=M062R3;LINKAGE=G

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

NODE=M062R2

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			[1,2]	BARTELT	98	CLE2	e^+e^-
0.011 ±0.014 ±0.016		12	[1]	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			[3]	COLES	82	MRK2	e^+e^-

[1] The branching ratios are not independent, they have been constrained by the authors to sum to 100%. NODE=M062R2;LINKAGE=A

[2] Systematic error includes theoretical error on the prediction of the ratio of hadronic modes. NODE=M062R2;LINKAGE=B

[3] Not independent of $\Gamma(D^0\pi^+)/\Gamma_{total}$ and $\Gamma(D^+\pi^0)/\Gamma_{total}$ measurement. NODE=M062R2;LINKAGE=C

$\Gamma(e^+\nu_e)/\Gamma_{total}$ — Γ_4/Γ

NODE=M062R00

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<1.1 \times 10^{-5}$	90	ABLIKIM	24AO	BES3	e^+e^- at 4.178–4.226 GeV

$\Gamma(\mu^+\nu_\mu)/\Gamma_{total}$ — Γ_5/Γ

NODE=M062R01

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$<4.3 \times 10^{-6}$	90	ABLIKIM	24AO	BES3	e^+e^- at 4.178–4.226 GeV

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

NODE=M062

ABLIKIM	24AO	PR D110 012003	M. Ablikim *et al.*	(BESIII Collab.)	REFID=62703
ABLIKIM	23AZ	PL B846 138245	M. Ablikim *et al.*	(BESIII Collab.) JP	REFID=62420
LEES	17F	PRL 119 202003	J.P. Lees *et al.*	(BABAR Collab.)	REFID=58277
LEES	13X	PRL 111 111801	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55564
Also		PR D88 052003	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55547
Also		PR D88 079902 (errat.)	J.P. Lees *et al.*	(BABAR Collab.)	REFID=55695
ANASTASSOV	02	PR D65 032003	A. Anastassov *et al.*	(CLEO Collab.)	REFID=48550
ADINOLFI	99	NP B547 3	M. Adinolfi *et al.*	(Beatrice Collab.)	REFID=46925
BREITWEG	99	EPJ C6 67	J. Breitweg *et al.*	(ZEUS Collab.)	REFID=46604
BARTELT	98	PRL 80 3919	J. Bartelt *et al.*	(CLEO Collab.)	REFID=46349
ADLOFF	97B	ZPHY C72 593	C. Adloff *et al.*	(H1 Collab.)	REFID=45421
BREITWEG	97	PL B401 192	J. Breitweg *et al.*	(ZEUS Collab.)	REFID=45520
BREITWEG	97B	PL B407 402	J. Breitweg *et al.*	(ZEUS Collab.)	REFID=45699
ALBRECHT	95F	ZPHY C66 63	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=44374
DERRICK	95	PL B349 225	M. Derrick *et al.*	(ZEUS Collab.)	REFID=44373
BARLAG	92B	PL B278 480	S. Barlag *et al.*	(ACCMOR Collab.)	REFID=42174
BORTOLETTO	92B	PRL 69 2046	D. Bortoletto *et al.*	(CLEO Collab.)	REFID=43116
BUTLER	92	PRL 69 2041	F. Butler *et al.*	(CLEO Collab.)	REFID=43170
ALEXANDER	91B	PL B262 341	G. Alexander *et al.*	(OPAL Collab.)	REFID=41553
DECAMP	91J	PL B266 218	D. Decamp *et al.*	(ALEPH Collab.)	REFID=41614
ABACHI	88B	PL B212 533	S. Abachi *et al.*	(ANL, IND, MICH, PURD+)	REFID=40584
ADLER	88D	PL B208 152	J. Adler *et al.*	(Mark III Collab.)	REFID=40579
ALBRECHT	85F	PL 150B 235	H. Albrecht *et al.*	(ARGUS Collab.)	REFID=11527
AHLEN	83	PRL 51 1147	S.P. Ahlen *et al.*	(ANL, IND, LBL+)	REFID=22868
BAILEY	83	PL 132B 230	R. Bailey *et al.*	(AMST, BRIS, CERN, CRAC+)	REFID=22870
COLES	82	PR D26 2190	M.W. Coles *et al.*	(LBL, SLAC)	REFID=22866
YELTON	82	PRL 49 430	J.M. Yelton *et al.*	(SLAC, LBL, UCB+)	REFID=22867
FITCH	81	PRL 46 761	V.L. Fitch *et al.*	(PRIN, SACL, TORI+)	REFID=22863
AVERY	80	PRL 44 1309	P. Avery *et al.*	(ILL, FNAL, COLU)	REFID=11498
BLIETSCHAU	79	PL 86B 108	J. Blietschau *et al.*	(AACH3, BONN, CERN+)	REFID=22861
FELDMAN	77B	PRL 38 1313	G.J. Feldman *et al.*	(Mark I Collab.)	REFID=22858
GOLDHABER	77	PL 69B 503	G. Goldhaber *et al.*	(Mark I Collab.)	REFID=11434
PERUZZI	77	PRL 39 1301	I. Peruzzi *et al.*	(LGW Collab.)	REFID=11435