

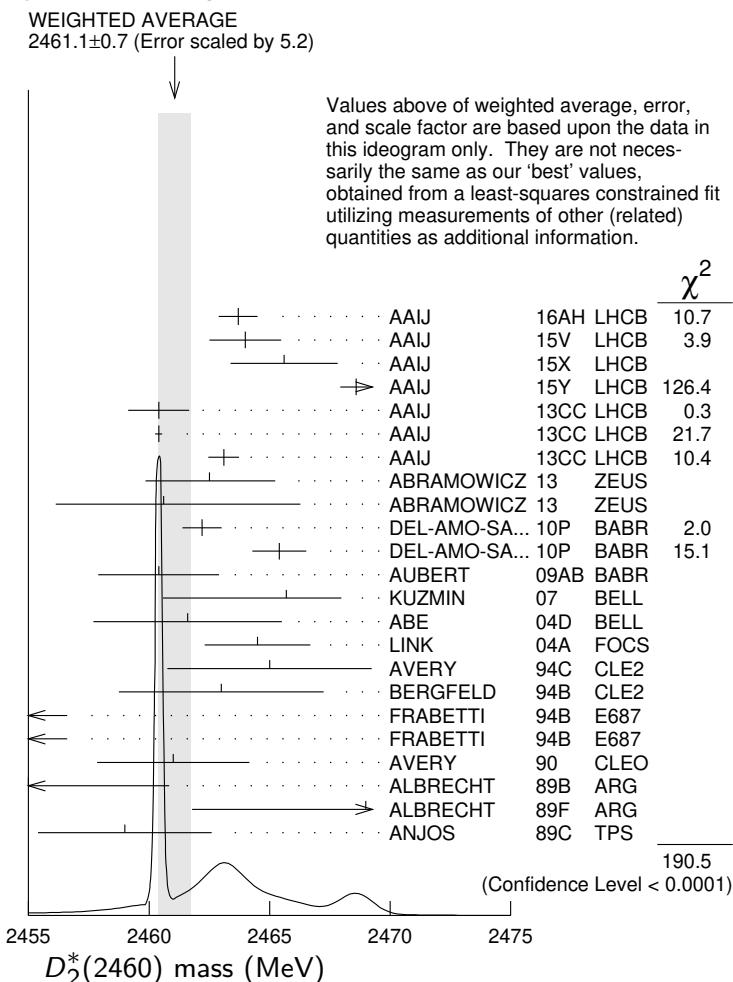
$D_2^*(2460)$ $I(J^P) = \frac{1}{2}(2^+)$ **$D_2^*(2460)$ MASS**

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)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
2461.1^{+0.7}_{-0.8} OUR FIT					Error includes scale factor of 6.2.
2461.1^{+0.7}_{-0.7} OUR AVERAGE					Error includes scale factor of 5.2. See the ideogram below.
2463.7 \pm 0.4 \pm 0.7	28k	¹ AAIJ	16AH LHCb	0	$B^- \rightarrow D^+ \pi^- \pi^-$
2464.0 \pm 1.4 \pm 0.5	2k	² AAIJ	15V LHCb	0	$B^- \rightarrow D^+ K^- \pi^-$
2465.6 \pm 1.8 \pm 1.3		³ AAIJ	15X LHCb	+	$B^0 \rightarrow \bar{D}^0 K^+ \pi^-$
2468.6 \pm 0.6 \pm 0.3		⁴ AAIJ	15Y LHCb	+	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
2460.4 \pm 0.4 \pm 1.2	82k	AAIJ	13CC LHCb	0	$p\bar{p} \rightarrow D^{*+} \pi^- X$
2460.4 \pm 0.1 \pm 0.1	675k	AAIJ	13CC LHCb	0	$p\bar{p} \rightarrow D^+ \pi^- X$
2463.1 \pm 0.2 \pm 0.6	342k	AAIJ	13CC LHCb	+	$p\bar{p} \rightarrow D^0 \pi^+ X$
2462.5 \pm 2.4 _{-1.1} ^{+1.3}	2.3k	⁵ ABRAMOWICZ13	ZEUS	0	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
2460.6 \pm 4.4 _{-0.8} ^{+3.6}	1371	⁶ ABRAMOWICZ13	ZEUS	+	$e^\pm p \rightarrow D^{(*)0} \pi^+ X$
2462.2 \pm 0.1 \pm 0.8	243k	DEL-AMO-SA..10P	BABR	0	$e^+ e^- \rightarrow D^+ \pi^- X$
2465.4 \pm 0.2 \pm 1.1	111k	⁷ DEL-AMO-SA..10P	BABR	+	$e^+ e^- \rightarrow D^0 \pi^+ X$
2460.4 \pm 1.2 \pm 2.2	3.4k	AUBERT	09AB BABR	0	$B^- \rightarrow D^+ \pi^- \pi^-$
2465.7 \pm 1.8 _{-4.8} ^{+1.4}	2909	KUZMIN	07 BELL	+	$e^+ e^- \rightarrow \text{hadrons}$
2461.6 \pm 2.1 \pm 3.3		⁸ ABE	04D BELL	0	$B^- \rightarrow D^+ \pi^- \pi^-$
2464.5 \pm 1.1 \pm 1.9	5.8k	⁸ LINK	04A FOCS	0	γA
2465 ± 3 ± 3	486	AVERY	94C CLE2	0	$e^+ e^- \rightarrow D^+ \pi^- X$
2463 ± 3 ± 3	310	BERGFELD	94B CLE2	+	$e^+ e^- \rightarrow D^0 \pi^+ X$
2453 ± 3 ± 2	128	FRAEBETTI	94B E687	0	$\gamma Be \rightarrow D^+ \pi^- X$
2453 ± 3 ± 2	185	FRAEBETTI	94B E687	+	$\gamma Be \rightarrow D^0 \pi^+ X$
2461 ± 3 ± 1	440	AVERY	90 CLEO	0	$e^+ e^- \rightarrow D^{*+} \pi^- X$
2455 ± 3 ± 5	337	ALBRECHT	89B ARG	0	$e^+ e^- \rightarrow D^+ \pi^- X$
2469 ± 4 ± 6		ALBRECHT	89F ARG	+	$e^+ e^- \rightarrow D^0 \pi^+ X$
2459 ± 3 ± 2	153	ANJOS	89C TPS	0	$\gamma N \rightarrow D^+ \pi^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2468.1 \pm 0.6 \pm 0.5		⁹ AAIJ	15Y LHCb	+	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
2469.1 \pm 3.7 _{-1.3} ^{+1.2}	1.5k	¹⁰ CHEKANOV	09 ZEUS	0	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
2463.3 \pm 0.6 \pm 0.8	20k	ABULENCIA	06A CDF	0	$1900 p\bar{p} \rightarrow D^+ \pi^- X$
2467.6 \pm 1.5 \pm 0.8	3.5k	¹¹ LINK	04A FOCS	+	γA
2461 ± 6	126	¹² ABREU	98M DLPH	0	$e^+ e^-$
2466 ± 7	1	ASRATYAN	95 BEBC	0	$53,40 \nu(\bar{\nu}) \rightarrow pX, dX$

¹ From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

- 2 From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, nonresonant spin-0 and spin-1 components as well as the $D_0^*(2400)^0$, $D_2^*(2460)^0$ and $D_1^*(2760)^0$ resonances.
- 3 From the Dalitz plot analysis including various K^* and D^{**} mesons as well as broad structures in the $K\pi$ S -wave and the $D\pi$ S - and P -waves.
- 4 Modeling the $\pi^+ \pi^-$ S -wave with the Isobar formalism.
- 5 From the combined fit of the $M(D^+ \pi^-)$ and $M(D^{*+} \pi^-)$ distributions, and A_{D_2} fixed to the theoretical prediction of -1.
- 6 From the fit of the $M(D^0 \pi^+)$ distribution. The widths of the D_1^+ and D_2^{*+} are fixed to 25 MeV and 37 MeV, and A_{D_1} and A_{D_2} are fixed to the theoretical predictions of 3 and -1, respectively.
- 7 At a fixed width of 50.5 MeV.
- 8 Fit includes the contribution from $D_0^*(2400)^0$.
- 9 Modeling the $\pi^+ \pi^-$ S -wave with the K-matrix formalism.
- 10 Calculated using the mass difference $m(D_2^{*0}) - m(D^{*+})_{PDG}$ reported below and $m(D^{*+})_{PDG} = 2010.27 \pm 0.17$ MeV. The 0.17 MeV uncertainty of the PDG mass value should be added to the experimental uncertainty of $+1.2$ MeV.
- 11 Fit includes the contribution from $D_0^*(2400)^\pm$. Not independent of the corresponding mass difference measurement, $(m_{D_2^*(2460)^\pm}) - (m_{D_2^*(2460)^0})$.
- 12 No systematic error given.



$m_{D_2^*(2460)^0} - m_{D^+}$

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
591.5^{+0.7}_{-0.8} OUR FIT				Error includes scale factor of 5.9.
593.9\pm0.6\pm0.5	20k	ABULENCIA	06A CDF	1900 $p\bar{p} \rightarrow D^+ \pi^- X$

 $m_{D_2^*(2460)^0} - m_{D^{*+}}$

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
450.9^{+0.7}_{-0.8} OUR FIT				Error includes scale factor of 5.9.
458.8\pm3.7^{+1.2}_{-1.3}	1.5k	CHEKANOV	09 ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$

 $m_{D_2^*(2460)^\pm} - m_{D_2^*(2460)^0}$

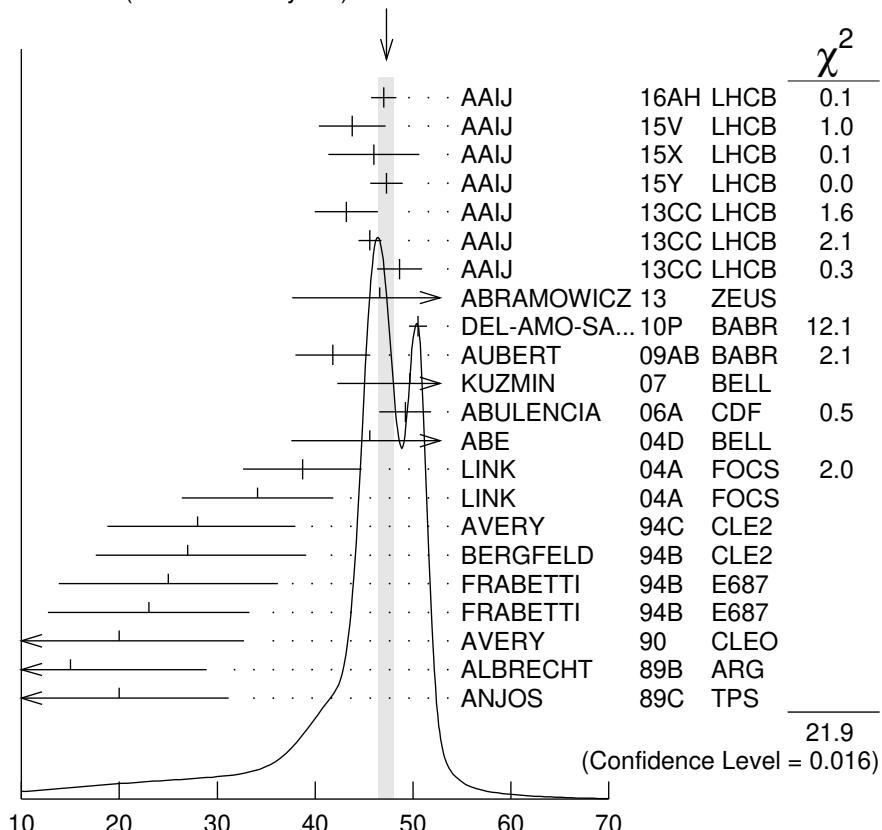
VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
2.4\pm1.7 OUR AVERAGE			
3.1 \pm 1.9 \pm 0.9	LINK	04A FOCS	γA
- 2 \pm 4 \pm 4	BERGFELD	94B CLE2	$e^+ e^- \rightarrow \text{hadrons}$
0 \pm 4	FRABETTI	94B E687	$\gamma Be \rightarrow D\pi X$
14 \pm 5 \pm 8	ALBRECHT	89F ARG	$e^+ e^- \rightarrow D^0 \pi^+ X$

 $D_2^*(2460)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
47.3\pm 0.8 OUR AVERAGE					Error includes scale factor of 1.5. See the ideogram below.
47.0 \pm 0.8 \pm 1.0	28k	1 AAIJ	16AH LHCb	0	$B^- \rightarrow D^+ \pi^- \pi^-$
43.8 \pm 2.9 \pm 1.8	2k	2 AAIJ	15V LHCb	0	$B^- \rightarrow D^+ K^- \pi^-$
46.0 \pm 3.4 \pm 3.2		3 AAIJ	15X LHCb	+	$B^0 \rightarrow \bar{D}^0 K^+ \pi^-$
47.3 \pm 1.5 \pm 0.7		4 AAIJ	15Y LHCb	+	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
43.2 \pm 1.2 \pm 3.0	82k	AAIJ	13CC LHCb	0	$p p \rightarrow D^{*+} \pi^- X$
45.6 \pm 0.4 \pm 1.1	675k	AAIJ	13CC LHCb	0	$p p \rightarrow D^+ \pi^- X$
48.6 \pm 1.3 \pm 1.9	342k	AAIJ	13CC LHCb	+	$p p \rightarrow D^0 \pi^+ X$
46.6 \pm 8.1 $^{+5.9}_{-3.8}$	2.3k	5 ABRAMOWICZ13	ZEUS	0	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
50.5 \pm 0.6 \pm 0.7	243k	DEL-AMO-SA..10P	BABR	0	$e^+ e^- \rightarrow D^+ \pi^- X$
41.8 \pm 2.5 \pm 2.9	3.4k	AUBERT	09AB BABR	0	$B^- \rightarrow D^+ \pi^- \pi^-$
49.7 \pm 3.8 \pm 6.4	2909	KUZMIN	07 BELL	+	$e^+ e^- \rightarrow \text{hadrons}$

$49.2 \pm 2.3 \pm 1.3$	20k	ABULENCIA	06A	CDF	0	$1900 p\bar{p} \rightarrow D^+ \pi^- X$
$45.6 \pm 4.4 \pm 6.7$		⁶ ABE	04D	BELL	0	$B^- \rightarrow D^+ \pi^- \pi^-$
$38.7 \pm 5.3 \pm 2.9$	5.8k	⁶ LINK	04A	FOCS	0	γA
$34.1 \pm 6.5 \pm 4.2$	3.5k	⁷ LINK	04A	FOCS	+	γA
$28 \pm 8 \pm 6$	486	AVERY	94C	CLE2	0	$e^+ e^- \rightarrow D^+ \pi^- X$
$27 \pm 11 \pm 5$	310	BERGFELD	94B	CLE2	+	$e^+ e^- \rightarrow D^0 \pi^+ X$
$25 \pm 10 \pm 5$	128	FRAZETTI	94B	E687	0	$\gamma Be \rightarrow D^+ \pi^- X$
$23 \pm 9 \pm 5$	185	FRAZETTI	94B	E687	+	$\gamma Be \rightarrow D^0 \pi^+ X$
$20 \pm 9 \pm 9$	440	AVERY	90	CLEO	0	$e^+ e^- \rightarrow D^* \pi^- X$
$15 \pm 13 \pm 5$	337	ALBRECHT	89B	ARG	0	$e^+ e^- \rightarrow D^+ \pi^- X$
$20 \pm 10 \pm 5$	153	ANJOS	89C	TPS	0	$\gamma N \rightarrow D^+ \pi^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
$46.0 \pm 1.4 \pm 1.8$		⁸ AAIJ	15Y	LHCb	+	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$

WEIGHTED AVERAGE
 47.3 ± 0.8 (Error scaled by 1.5)



¹ From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^*0 states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

- ² From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, nonresonant spin-0 and spin-1 components as well as the $D_0^*(2400)^0$, $D_2^*(2460)^0$ and $D_1^*(2760)^0$ resonances.
- ³ From the Dalitz plot analysis including various K^* and D^{**} mesons as well as broad structures in the $K\pi$ S-wave and the $D\pi$ S- and P-waves.
- ⁴ Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.
- ⁵ From the combined fit of the $M(D^+ \pi^-)$ and $M(D^{*+} \pi^-)$ distributions. and A_{D_2} fixed to the theoretical prediction of -1.
- ⁶ Fit includes the contribution from $D_0^*(2400)^0$.
- ⁷ Fit includes the contribution from $D_0^*(2400)^\pm$.
- ⁸ Modeling the $\pi^+ \pi^-$ S-wave with the K-matrix formalism.

 $D_2^*(2460)$ width (MeV)

$D_2^*(2460)$ DECAY MODES

 $\overline{D}_2^*(2460)$ modes are charge conjugates of modes below.

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 D\pi^-$	seen
$\Gamma_2 D^*(2010)\pi^-$	seen
$\Gamma_3 D\pi^+\pi^-$	
$\Gamma_4 D^*\pi^+\pi^-$	

$D_2^*(2460)$ BRANCHING RATIOS

$\Gamma(D\pi^-)/\Gamma_{\text{total}}$		Γ_1/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
seen	3.4k	AUBERT	09AB	BABR	0 $B^- \rightarrow D^+ \pi^- \pi^-$
seen	337	ALBRECHT	89B	ARG	0 $e^+ e^- \rightarrow D^+ \pi^- X$
seen		ALBRECHT	89F	ARG	+
seen		ANJOS	89C	TPS	0 $e^+ e^- \rightarrow D^0 \pi^+ X$
$\gamma N \rightarrow D^+ \pi^- X$					
$\Gamma(D^*(2010)\pi^-)/\Gamma_{\text{total}}$		Γ_2/Γ			
VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
seen		ACKERSTAFF	97W	OPAL	0 $e^+ e^- \rightarrow D^{*+} \pi^- X$
seen		AVERY	90	CLEO	0 $e^+ e^- \rightarrow D^{*+} \pi^- X$
seen		ALBRECHT	89H	ARG	0 $e^+ e^- \rightarrow D^* \pi^- X$
$\Gamma(D\pi^-)/\Gamma(D^*(2010)\pi^-)$		Γ_1/Γ_2			
VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
1.52 ± 0.14 OUR AVERAGE					
1.4 ± 0.3	± 0.3	2.3k	1 ABRAMOWICZ13	ZEUS	0 $e^\pm p \rightarrow D^{(*)+} \pi^- X$
1.1 ± 0.4	± 0.3	1371	2 ABRAMOWICZ13	ZEUS	± $e^\pm p \rightarrow D^{(*)0} \pi^+ X$
1.47 ± 0.03	± 0.16	379k	DEL-AMO-SA..10P	BABR	0 $e^+ e^- \rightarrow D^{(*)+} \pi^- X$
2.8 ± 0.8	± 0.5	1.5k	CHEKANOV	09 ZEUS	0 $e^\pm p \rightarrow D^{(*)+} \pi^- X$

$2.2 \pm 0.7 \pm 0.6$	AVERY	94C	CLE2	0	$e^+ e^- \rightarrow D^* \pi^- X$
$1.9 \pm 1.1 \pm 0.3$	BERGFELD	94B	CLE2	+	$e^+ e^- \rightarrow \text{hadrons}$
2.3 ± 0.8	AVERY	90	CLEO	0	$e^+ e^-$
$3.0 \pm 1.1 \pm 1.5$	ALBRECHT	89H	ARG	0	$e^+ e^- \rightarrow D^* \pi^- X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.9 ± 0.5	ABE	04D	BELL	0	$B^- \rightarrow D^{(*)} \pi^- \pi^-$

¹ From the combined fit of the $M(D^+ \pi^-)$ and $M(D^{*+} \pi^-)$ distributions. and A_{D_2} fixed to the theoretical prediction of -1 .

² From the fit of the $M(D^0 \pi^+)$ distribution. The widths of the D_1^+ and D_2^{*+} are fixed to 25 MeV and 37 MeV, and A_{D_1} and A_{D_2} are fixed to the theoretical predictions of 3 and -1 , respectively.

$\Gamma(D\pi^-)/[\Gamma(D\pi^-) + \Gamma(D^*(2010)\pi^-)]$

$\Gamma_1/(\Gamma_1 + \Gamma_2)$

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$0.62 \pm 0.03 \pm 0.02$	8414	¹ AUBERT	09Y	BABR	$0 \quad B^+ \rightarrow D_2^{*0} \ell^+ \nu_\ell$
$0.62 \pm 0.03 \pm 0.02$	3361	¹ AUBERT	09Y	BABR	$+ \quad \bar{B}^0 \rightarrow D_2^{*+} \ell^- \nu_\ell$

¹ Assuming $\Gamma(\gamma(4S) \rightarrow B^+ B^-) / \Gamma(\gamma(4S) \rightarrow B^0 \bar{B}^0) = 1.065 \pm 0.026$ and equal partial widths for charged and neutral D_2^* mesons.

$D_2^*(2460)$ POLARIZATION AMPLITUDE A_{D_2}

A polarization amplitude A_{D_2} is a parameter that depends on the initial polarization of the D_2 . For D_2 decays the helicity angle, θ_H , distribution varies like $1 + A_{D_2} \cos^2(\theta_H)$, where θ_H is the angle in the D^* rest frame between the two pions emitted by the $D_2 \rightarrow D^* \pi$ and $D^* \rightarrow D \pi$.

VALUE	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
-1.16 ± 0.35	2.3k	¹ ABRAMOWICZ13	ZEUS	0	$e^\pm p \rightarrow D^{(*)} \pi^- X$
consistent with -1	243k	DEL-AMO-SA..10P	BABR	0	$e^+ e^- \rightarrow D^+ \pi^- X$
$-0.74^{+0.49}_{-0.38}$	² AVERY	94C	CLE2	0	$e^+ e^- \rightarrow D^{*+} \pi^- X$

¹ From the combined fit of the $M(D^+ \pi^-)$ and $M(D^{*+} \pi^-)$ distributions.

² Systematic uncertainties not estimated.

$D_2^*(2460)$ REFERENCES

AAIJ	16AH	PR D94 072001	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15V	PR D91 092002	R. Aaij <i>et al.</i>	(LHCb Collab.)
Also		PR D93 119901 (errat.)	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15X	PR D92 012012	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15Y	PR D92 032002	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	13CC	JHEP 1309 145	R. Aaij <i>et al.</i>	(LHCb Collab.)
ABRAMOWICZ	13	NP B866 229	H. Abramowicz <i>et al.</i>	(ZEUS Collab.)
DEL-AMO-SA...10P		PR D82 111101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
AUBERT	09AB	PR D79 112004	B. Aubert <i>et al.</i>	(BABAR Collab.)
AUBERT	09Y	PRL 103 051803	B. Aubert <i>et al.</i>	(BABAR Collab.)
CHEKANOV	09	EPJ C60 25	S. Chekanov <i>et al.</i>	(ZEUS Collab.)
KUZMIN	07	PR D76 012006	A. Kuzmin <i>et al.</i>	(BELLE Collab.)
ABULENCIA	06A	PR D73 051104	A. Abulencia <i>et al.</i>	(CDF Collab.)

ABE	04D	PR D69 112002	K. Abe <i>et al.</i>	(BELLE Collab.)
LINK	04A	PL B586 11	J.M. Link <i>et al.</i>	(FOCUS Collab.)
ABREU	98M	PL B426 231	P. Abreu <i>et al.</i>	(DELPHI Collab.)
ACKERSTAFF	97W	ZPHY C76 425	K. Ackerstaff <i>et al.</i>	(OPAL Collab.)
ASRATYAN	95	ZPHY C68 43	A.E. Asratyan <i>et al.</i>	(BIRM, BELG, CERN+)
AVERY	94C	PL B331 236	P. Avery <i>et al.</i>	(CLEO Collab.)
BERGFELD	94B	PL B340 194	T. Bergfeld <i>et al.</i>	(CLEO Collab.)
FRAEBETTI	94B	PRL 72 324	P.L. Frabetti <i>et al.</i>	(FNAL E687 Collab.)
AVERY	90	PR D41 774	P. Avery, D. Besson	(CLEO Collab.)
ALBRECHT	89B	PL B221 422	H. Albrecht <i>et al.</i>	(ARGUS Collab.) JP
ALBRECHT	89F	PL B231 208	H. Albrecht <i>et al.</i>	(ARGUS Collab.)
ALBRECHT	89H	PL B232 398	H. Albrecht <i>et al.</i>	(ARGUS Collab.) JP
ANJOS	89C	PRL 62 1717	J.C. Anjos <i>et al.</i>	(FNAL E691 Collab.)