

$D_2^*(2460)^0$

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

$J^P = 2^+$ assignment strongly favored(ALBRECHT 89B, ALBRECHT 89H), natural parity confirmed by the helicity analysis(DEL-AMO-SANCHEZ 10P),

$D_2^*(2460)^0$ 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	COMMENT
2462.6±0.6 OUR FIT	Error includes scale factor of 1.2.			
2461.8±0.7 OUR AVERAGE	Error includes scale factor of 1.1.			
2462.5±2.4 ^{+1.3} _{-1.1}	2.3k	¹ ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
2462.2±0.1±0.8	243k	DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^+ \pi^- X$
2460.4±1.2±2.2	3.4k	AUBERT	09AB BABR	$B^- \rightarrow D^+ \pi^- \pi^-$
2461.6±2.1±3.3		² ABE	04D BELL	$B^- \rightarrow D^+ \pi^- \pi^-$
2464.5±1.1±1.9	5.8k	² LINK	04A FOCS	γA
2465 ±3 ±3	486	AVERY	94C CLE2	$e^+ e^- \rightarrow D^+ \pi^- X$
2453 ±3 ±2	128	FRABETTI	94B E687	$\gamma Be \rightarrow D^+ \pi^- X$
2461 ±3 ±1	440	AVERY	90 CLEO	$e^+ e^- \rightarrow D^{*+} \pi^- X$
2455 ±3 ±5	337	ALBRECHT	89B ARG	$e^+ e^- \rightarrow D^+ \pi^- X$
2459 ±3 ±2	153	ANJOS	89C TPS	$\gamma N \rightarrow D^+ \pi^- X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
2469.1±3.7 ^{+1.2} _{-1.3}	1560±230	³ CHEKANOV	09 ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
2463.3±0.6±0.8	20k	ABULENCIA	06A CDF	1900 $p\bar{p} \rightarrow D^+ \pi^- X$
2461 ±6	126	⁴ ABREU	98M DLPH	$e^+ e^-$
2466 ±7	1	ASRATYAN	95 BEBC	53,40 $\nu(\bar{\nu}) \rightarrow pX, dX$

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 Fit includes the contribution from $D_0^*(2400)^0$.

³ 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 $\begin{matrix} +1.2 \\ -1.3 \end{matrix}$ MeV.

⁴ No systematic error given.

$m_{D_2^{*0}} - m_{D^+}$

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
593.0±0.6 OUR FIT	Error includes scale factor of 1.3.			
593.9±0.6±0.5	20k	ABULENCIA	06A CDF	1900 $p\bar{p} \rightarrow D^+ \pi^- X$

$$m_{D_2^{*0}} - m_{D^{*+}}$$

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
452.3±0.6 OUR FIT	Error includes scale factor of 1.3.			
458.8±3.7^{+1.2}_{-1.3}	1560 ± 230	CHEKANOV	09 ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$

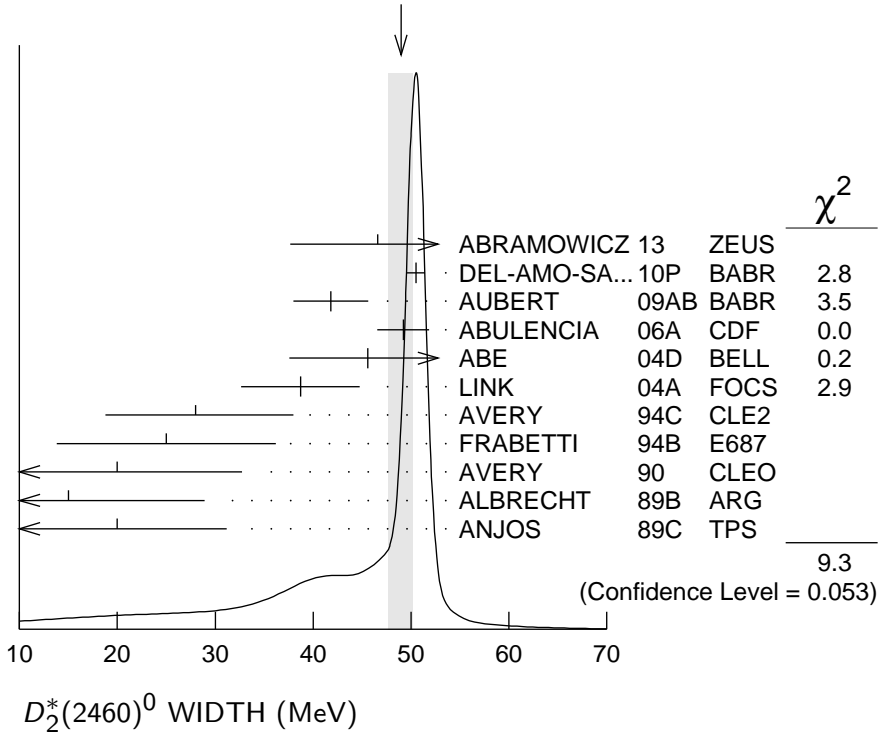
$D_2^*(2460)^0$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
49.0± 1.3 OUR AVERAGE	Error includes scale factor of 1.5. See the ideogram below.			
46.6± 8.1 ⁺ _{-3.8}	2.3k	⁵ ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
50.5± 0.6± 0.7	243k	DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^+ \pi^- X$
41.8± 2.5± 2.9	3.4k	AUBERT	09AB BABR	$B^- \rightarrow D^+ \pi^- \pi^-$
49.2± 2.3± 1.3	20k	ABULENCIA	06A CDF	1900 $p\bar{p} \rightarrow D^+ \pi^- X$
45.6± 4.4± 6.7		⁶ ABE	04D BELL	$B^- \rightarrow D^+ \pi^- \pi^-$
38.7± 5.3± 2.9	5.8k	⁶ LINK	04A FOCS	γA
28 ⁺ ₋₇ ± 8 ± 6	486	AVERY	94C CLE2	$e^+ e^- \rightarrow D^+ \pi^- X$
25 ± 10 ± 5	128	FRABETTI	94B E687	$\gamma Be \rightarrow D^+ \pi^- X$
20 ⁺ ₋₁₂ ⁺ ₋₁₀	440	AVERY	90 CLEO	$e^+ e^- \rightarrow D^{*+} \pi^- X$
15 ⁺ ₋₁₀ ⁺ ₋₁₀	337	ALBRECHT	89B ARG	$e^+ e^- \rightarrow D^+ \pi^- X$
20 ± 10 ± 5	153	ANJOS	89C TPS	$\gamma N \rightarrow D^+ \pi^- X$

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 $D_0^*(2400)^0$.

WEIGHTED AVERAGE
 49.0 ± 1.3 (Error scaled by 1.5)



$D_2^*(2460)^0$ DECAY MODES

$\bar{D}_2^*(2460)^0$ modes are charge conjugates of modes below.

Mode	Fraction (Γ_i/Γ)
Γ_1 $D^+ \pi^-$	seen
Γ_2 $D^*(2010)^+ \pi^-$	seen
Γ_3 $D^0 \pi^+ \pi^-$	not seen
Γ_4 $D^{*0} \pi^+ \pi^-$	not seen

$D_2^*(2460)^0$ BRANCHING RATIOS

$\Gamma(D^+ \pi^-)/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
seen	3.4k	AUBERT 09AB	BABR	$B^- \rightarrow D^+ \pi^- \pi^-$	
seen	337	ALBRECHT 89B	ARG	$e^+ e^- \rightarrow D^+ \pi^- X$	
seen		ANJOS 89C	TPS	$\gamma N \rightarrow D^+ \pi^- X$	

$\Gamma(D^*(2010)^+ \pi^-)/\Gamma_{\text{total}}$				Γ_2/Γ
VALUE	DOCUMENT ID	TECN	COMMENT	
seen	ACKERSTAFF 97W	OPAL	$e^+ e^- \rightarrow D^{*+} \pi^- X$	
seen	AVERY 90	CLEO	$e^+ e^- \rightarrow D^{*+} \pi^- X$	
seen	ALBRECHT 89H	ARG	$e^+ e^- \rightarrow D^* \pi^- X$	

$\Gamma(D^+ \pi^-) / \Gamma(D^{*(2010)+} \pi^-)$ Γ_1 / Γ_2

VALUE EVTS DOCUMENT ID TECN COMMENT

1.54 ± 0.15 OUR AVERAGE

1.4 ± 0.3 ± 0.3	2.3k	⁷ ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
1.47 ± 0.03 ± 0.16	379k	DEL-AMO-SA...10P	BABR	$e^+ e^- \rightarrow D^{(*)+} \pi^- X$
2.8 ± 0.8 ^{+0.5} / _{-0.6}	1560 ± 230	CHEKANOV	09	ZEUS $e^\pm p \rightarrow D^{(*)+} \pi^- X$
2.2 ± 0.7 ± 0.6		AVERY	94C	CLE2 $e^+ e^- \rightarrow D^{*+} \pi^- X$
2.3 ± 0.8		AVERY	90	CLEO $e^+ e^-$
3.0 ± 1.1 ± 1.5		ALBRECHT	89H	ARG $e^+ e^- \rightarrow D^* \pi^- X$

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

1.9 ± 0.5		ABE	04D	BELL $B^- \rightarrow D^{(*)+} \pi^- \pi^-$
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⁷ 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 .

$\Gamma(D^+ \pi^-) / [\Gamma(D^+ \pi^-) + \Gamma(D^{*(2010)+} \pi^-)]$ $\Gamma_1 / (\Gamma_1 + \Gamma_2)$

VALUE EVTS DOCUMENT ID TECN COMMENT

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

0.62 ± 0.03 ± 0.02	8414	⁸ AUBERT	09Y	BABR $B^+ \rightarrow D_2^{*0} \ell^+ \nu_\ell$
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⁸ Assuming $\Gamma(\Upsilon(4S) \rightarrow B^+ B^-) / \Gamma(\Upsilon(4S) \rightarrow B^0 \bar{B}^0) = 1.065 \pm 0.026$ and equal partial widths for charged and neutral D_2^* mesons.

$D_2^{*(2460)^0}$ 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 COMMENT

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

-1.16 ± 0.35	2.3k	⁹ ABRAMOWICZ13	ZEUS	$e^\pm p \rightarrow D^{(*)+} \pi^- X$
consistent with -1	243k	DEL-AMO-SA...10P	BABR	$e^+ e^- \rightarrow D^+ \pi^- X$
-0.74 ^{+0.49} / _{-0.38}		¹⁰ AVERY	94C	CLE2 $e^+ e^- \rightarrow D^{*+} \pi^- X$

⁹ From the combined fit of the $M(D^+ \pi^-)$ and $M(D^{*+} \pi^-)$ distributions.

¹⁰ Systematic uncertainties not estimated.

$D_2^{*(2460)^0}$ REFERENCES

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.)
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.)
FRABETTI	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	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.)
