$D_2^*(2460)^0$

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

$J^P = 2^+$ assignment strongly favored (ALBRECHT 89B, ALBRECHT 89H), natural parity confirmed by the helicity analysis (DEL-AMO-SANCHEZ 10P). AAIJ 13CC confirms $J^P = 2^+$ and natural parity.

$D_2^*(2460)^0$ 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
2460.7 ±0.4 OUR FIT	Error includes scale factor of 3.1.				
2460.56±0.35 OUR AVERAGE	Error includes scale factor of 2.6. See the ideogram below.				
2463.7 ±0.4 ±0.7	28k	[1] AAIJ	16AH	LHCB	$B^- \to D^+ \pi^- \pi^-$
2460.4 ±0.4 ±1.2	82k	AAIJ	13CC	LHCB	$p p \to D^{*+} \pi^- X$
2460.4 ±0.1 ±0.1	675k	AAIJ	13CC	LHCB	$p p \to D^+ \pi^- X$
2462.5 ±2.4 $^{+1.3}_{-1.1}$	2.3k	[2] ABRAMOWICZ	13	ZEUS	$e^{\pm} p \to D^{(*)+} \pi^- X$
2462.2 ±0.1 ±0.8	243k	DEL-AMO-SA...	10P	BABR	$e^+ e^- \to D^+ \pi^- X$
2460.4 ±1.2 ±2.2	3.4k	AUBERT	09AB	BABR	$B^- \to D^+ \pi^- \pi^-$
2461.6 ±2.1 ±3.3		[3] ABE	04D	BELL	$B^- \to D^+ \pi^- \pi^-$
2464.5 ±1.1 ±1.9	5.8k	[3] LINK	04A	FOCS	γ A
2465 ±3 ±3	486	AVERY	94C	CLE2	$e^+ e^- \to D^+ \pi^-$X
2453 ±3 ±2	128	FRABETTI	94B	E687	γBe $\to D^+ \pi^-$X
2461 ±3 ±1	440	AVERY	90	CLEO	$e^+ e^- \to D^{*+} \pi^-$X
2455 ±3 ±5	337	ALBRECHT	89B	ARG	$e^+ e^- \to D^+ \pi^-$X
2459 ±3 ±2	153	ANJOS	89C	TPS	$\gamma N \to D^+ \pi^-$X
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2469.1 ±3.7 $^{+1.2}_{-1.3}$	1.5k	[4] CHEKANOV	09	ZEUS	$e^{\pm} p \to D^{(*)+} \pi^- X$
2463.3 ±0.6 ±0.8	20k	ABULENCIA	06A	CDF	1900 $p \overline{p} \to D^+ \pi^- X$
2461 ±6	126	[5] ABREU	98M	DLPH	$e^+ e^-$
2466 ±7	1	ASRATYAN	95	BEBC	53,40 $\nu(\overline{\nu}) \to p X, d X$

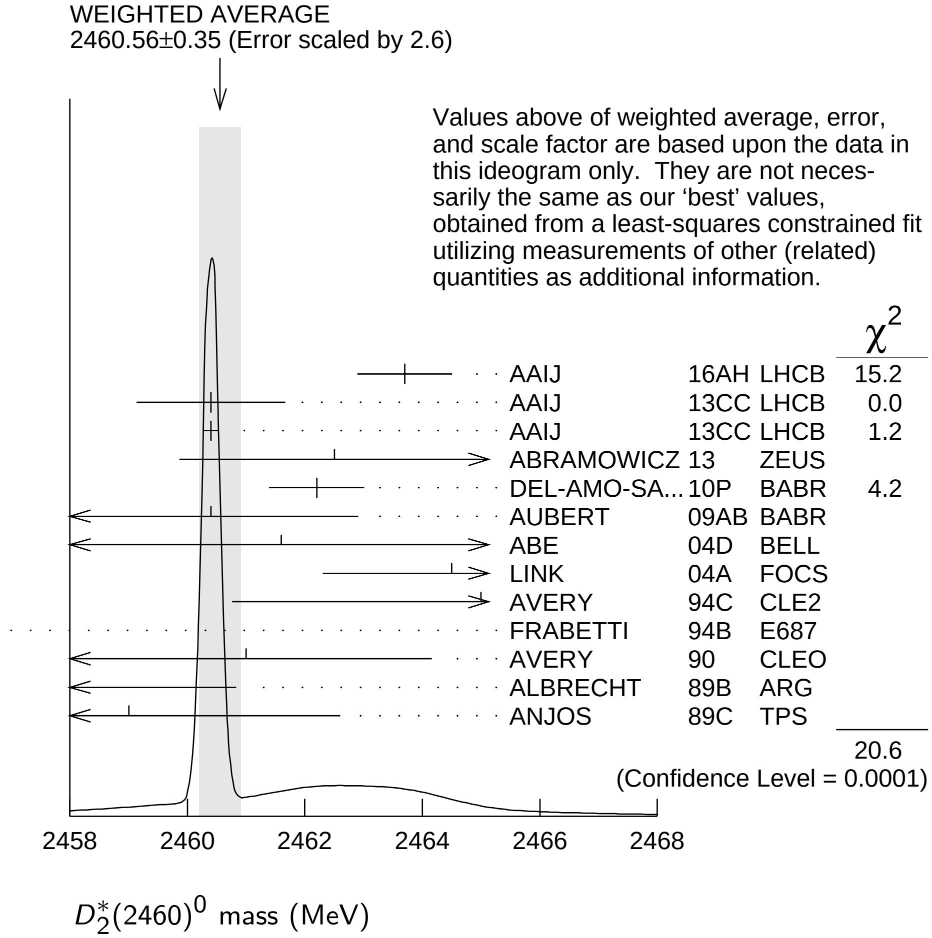
[1] From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

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

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

[4] 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 $^{+1.2}_{-1.3}$ MeV.

[5] 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
591.0±0.4 OUR FIT	Error includes scale factor of 2.9.				
593.9±0.6±0.5	20k	ABULENCIA	06A	CDF	1900 $p\overline{p} \rightarrow D^+\pi^- X$

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

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
450.4±0.4 OUR FIT	Error includes scale factor of 2.9.				
458.8±3.7$^{+1.2}_{-1.3}$	1560 ± 230	CHEKANOV	09	ZEUS	$e^{\pm}p \rightarrow D^{(*)+}\pi^- X$

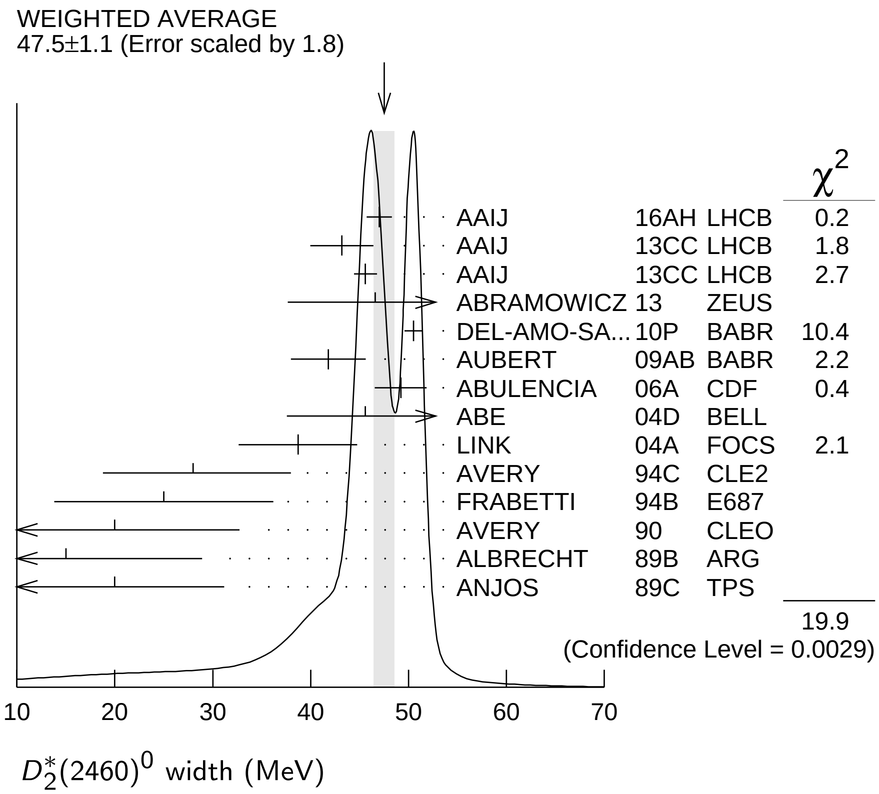
$D_2^*(2460)^0$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
47.5± 1.1 OUR AVERAGE	Error includes scale factor of 1.8. See the ideogram below.				
47.0± 0.8± 1.0	28k	[6] AAIJ	16AH	LHCB	$B^- \rightarrow D^+ \pi^- \pi^-$
43.2± 1.2± 3.0	82k	AAIJ	13CC	LHCB	$p p \rightarrow D^{*+} \pi^- X$
45.6± 0.4± 1.1	675k	AAIJ	13CC	LHCB	$p p \rightarrow D^+ \pi^- X$
$46.6 \pm 8.1 ^{+5.9}_{-3.8}$	2.3k	[7] ABRAMOWICZ	13	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 $p \overline{p} \rightarrow D^+ \pi^- X$
45.6± 4.4± 6.7		[8] ABE	04D	BELL	$B^- \rightarrow D^+ \pi^- \pi^-$
38.7± 5.3± 2.9	5.8k	[8] LINK	04A	FOCS	γ A
$28 ^{+8}_{-7} \pm 6$	486	AVERY	94C	CLE2	$e^+ e^- \rightarrow D^+ \pi^-$ X
25 ±10 ± 5	128	FRABETTI	94B	E687	γ Be $\rightarrow D^+ \pi^-$ X
$20 ^{+9}_{-12} {}^{+9}_{-10}$	440	AVERY	90	CLEO	$e^+ e^- \rightarrow D^{*+} \pi^-$ X
$15 ^{+13}_{-10} {}^{+5}_{-10}$	337	ALBRECHT	89B	ARG	$e^+ e^- \rightarrow D^+ \pi^-$ X
20 ±10 ± 5	153	ANJOS	89C	TPS	$\gamma N \rightarrow D^+ \pi^-$ X

[6] 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.

[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.

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



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

$\overline{D}_2^*(2460)^0$ 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

$\Gamma(D^+\pi^-)/\Gamma_{total}$ 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	$\gamma N \rightarrow D^+\pi^- X$

$\Gamma(D^*(2010)^+\pi^-)/\Gamma_{total}$ 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	[9] ABRAMOWICZ	13	ZEUS	$e^\pm p \to D^{(*)+}\pi^- X$
1.47±0.03±0.16	379k	DEL-AMO-SA..	10P	BABR	$e^+e^- \to D^{(*)+}\pi^- X$
2.8 ±0.8 $^{+0.5}_{-0.6}$	1560 ± 230	CHEKANOV	09	ZEUS	$e^\pm p \to D^{(*)+}\pi^- X$
2.2 ±0.7 ±0.6		AVERY	94C	CLE2	$e^+e^- \to D^{*+}\pi^-$ X
2.3 ±0.8		AVERY	90	CLEO	e^+e^-
3.0 ±1.1 ±1.5		ALBRECHT	89H	ARG	$e^+e^- \to D^*\pi^-$ X
• • • We do not use the following data for averages, fits, limits, etc. • • •					
1.9 ±0.5		ABE	04D	BELL	$B^- \to D^{(*)+}\pi^-\pi^-$

[9] 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	[10] AUBERT	09Y	BABR	$B^+ \to D_2^{*0}\ell^+\nu_\ell$

[10] Assuming $\Gamma(\Upsilon(4S) \to B^+B^-)$ / $\Gamma(\Upsilon(4S) \to B^0\overline{B}^0)$ = 1.065 ± 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 $D_2 \to D^*\pi$ and $D^* \to D\pi$.

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
−1.16±0.35	2.3k	[11] ABRAMOWICZ	13	ZEUS	$e^\pm p \to D^{(*)+}\pi^- X$
consistent with −1	243k	DEL-AMO-SA..	10P	BABR	$e^+e^- \to D^+\pi^- X$
$-0.74^{+0.49}_{-0.38}$		[12] AVERY	94C	CLE2	$e^+e^- \to D^{*+}\pi^- X$

[11] From the combined fit of the $M(D^+\pi^-)$ and $M(D^{*+}\pi^-)$ distributions.
[12] Systematic uncertainties not estimated.

$D_2^*(2460)^0$ REFERENCES

AAIJ	16AH	PR D94 072001	R. Aaij et al.	(LHCb Collab.)
AAIJ	13CC	JHEP 1309 145	R. Aaij et al.	(LHCb Collab.)
ABRAMOWICZ	13	NP B866 229	H. Abramowicz et al.	(ZEUS Collab.)
DEL-AMO-SA...	10P	PR D82 111101	P. del Amo Sanchez et al.	(BABAR Collab.)
AUBERT	09AB	PR D79 112004	B. Aubert et al.	(BABAR Collab.)
AUBERT	09Y	PRL 103 051803	B. Aubert et al.	(BABAR Collab.)
CHEKANOV	09	EPJ C60 25	S. Chekanov et al.	(ZEUS Collab.)
ABULENCIA	06A	PR D73 051104	A. Abulencia et al.	(CDF Collab.)
ABE	04D	PR D69 112002	K. Abe et al.	(BELLE Collab.)
LINK	04A	PL B586 11	J.M. Link et al.	(FOCUS Collab.)

ABREU	98M	PL B426 231	P. Abreu *et al.*	(DELPHI Collab.)
ACKERSTAFF	97W	ZPHY C76 425	K. Ackerstaff *et al.*	(OPAL Collab.)
ASRATYAN	95	ZPHY C68 43	A.E. Asratyan *et al.*	(BIRM, BELG, CERN+)
AVERY	94C	PL B331 236	P. Avery *et al.*	(CLEO Collab.)
FRABETTI	94B	PRL 72 324	P.L. Frabetti *et al.*	(FNAL E687 Collab.)
AVERY	90	PR D41 774	P. Avery, D. Besson	(CLEO Collab.)
ALBRECHT	89B	PL B221 422	H. Albrecht *et al.*	(ARGUS Collab.) JP
ALBRECHT	89H	PL B232 398	H. Albrecht *et al.*	(ARGUS Collab.) JP
ANJOS	89C	PRL 62 1717	J.C. Anjos *et al.*	(FNAL E691 Collab.)