

$D_3^*(2750)$

$$I(J^P) = \frac{1}{2}(3^-)$$

OMITTED FROM SUMMARY TABLE

J^P determined by AAIJ 15Y from the Dalitz plot analysis of $B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$ decays. J^P consistent with natural parity (AAIJ 13CC).

$D_3^*(2750)$ MASS

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
2763.5 ± 3.4 OUR AVERAGE		Error includes scale factor of 2.2. See the ideogram below.			
2775.5 ± 4.5 ± 6.5	28k	¹ AAIJ	16AH LHCb		$B^- \rightarrow D^+ \pi^- \pi^-$
2798 ± 7 ± 7		² AAIJ	15Y LHCb		$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
2761.1 ± 5.1 ± 6.5	14k	AAIJ	13CC LHCb	0	$pp \rightarrow D^{*+} \pi^- X$
2760.1 ± 1.1 ± 3.7	56k	AAIJ	13CC LHCb	0	$pp \rightarrow D^+ \pi^- X$
2771.7 ± 1.7 ± 3.8	20k	AAIJ	13CC LHCb	+	$pp \rightarrow D^0 \pi^+ X$
2752.4 ± 1.7 ± 2.7	23.5k	³ DEL-AMO-SA...10P	BABR	0	$e^+ e^- \rightarrow D^{*+} \pi^- X$
2763.3 ± 2.3 ± 2.3	11.3k	³ DEL-AMO-SA...10P	BABR	0	$e^+ e^- \rightarrow D^+ \pi^- X$
2769.7 ± 3.8 ± 1.5	5.7k	^{3,4} DEL-AMO-SA...10P	BABR	+	$e^+ e^- \rightarrow D^0 \pi^+ X$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2802 ± 11 ± 10		⁵ AAIJ	15Y LHCb		$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$

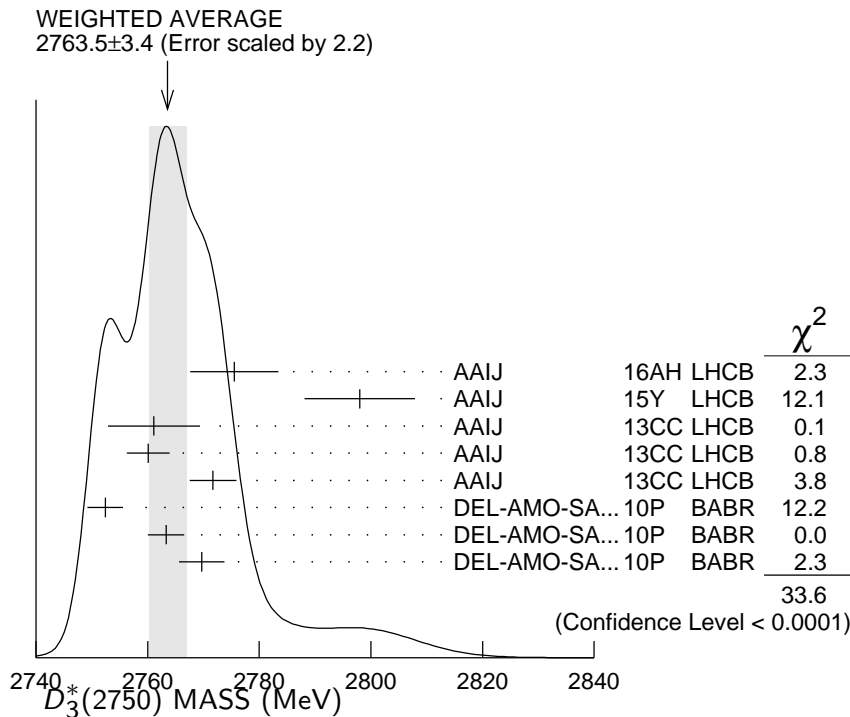
¹ From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

² Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.

³ The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

⁴ At a fixed width of 60.9 MeV.

⁵ Modeling the $\pi^+ \pi^-$ S-wave with the K-matrix formalism.



$D_3^*(2750)$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT
66 ± 5	OUR AVERAGE				
95.3 ± 9.6 ± 34.0	28k	⁶ AAIJ	16AH	LHCB	$B^- \rightarrow D^+ \pi^- \pi^-$
105 ± 18 ± 24		⁷ AAIJ	15Y	LHCB	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
74.4 ± 3.4 ± 37.0	14k	AAIJ	13CC	LHCB 0	$pp \rightarrow D^{*+} \pi^- X$
74.4 ± 3.4 ± 19.1	56k	AAIJ	13CC	LHCB 0	$pp \rightarrow D^+ \pi^- X$
66.7 ± 6.6 ± 10.5	20k	AAIJ	13CC	LHCB +	$pp \rightarrow D^0 \pi^+ X$
71 ± 6 ± 11	23.5k	⁸ DEL-AMO-SA..10P	BABR		$e^+ e^- \rightarrow D^{*+} \pi^- X$
60.9 ± 5.1 ± 3.6	11.3k	⁸ DEL-AMO-SA..10P	BABR		$e^+ e^- \rightarrow D^+ \pi^- X$
• • •					We do not use the following data for averages, fits, limits, etc. • • •
154 ± 27 ± 16		⁹ AAIJ	15Y	LHCB	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$

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 Modeling the $\pi^+ \pi^-$ S -wave with the Isobar formalism.

⁸ The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

⁹ Modeling the $\pi^+ \pi^-$ S -wave with the K-matrix formalism.

 $D_3^*(2750)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
Γ_1 $D \pi$	seen
Γ_2 $D^+ \pi^-$	seen
Γ_3 $D^0 \pi^\pm$	seen
Γ_4 $D^* \pi$	seen
Γ_5 $D^{*+} \pi^-$	seen

 $D_3^*(2750)$ BRANCHING RATIOS

$\Gamma(D^+ \pi^-)/\Gamma(D^{*+} \pi^-)$	Γ_2/Γ_5			
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.42 ± 0.05 ± 0.11	34.8k	¹⁰ DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^{(*)+} \pi^- X$

¹⁰ The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

 $D_3^*(2750)$ POLARIZATION AMPLITUDE A_D

A polarization amplitude A_D is a parameter that depends on the initial polarization of the $D_3^*(2750)$. For $D_3^*(2750)$ decays the helicity angle, θ_H , distribution varies like $1 + A_D \cos(\theta_H)$, where θ_H is the angle in the D^* rest frame between the two pions emitted by the $D_3^*(2750) \rightarrow D^* \pi$ and $D^* \rightarrow D \pi$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
• • •				We do not use the following data for averages, fits, limits, etc. • • •
-0.33 ± 0.28	23.5k	¹¹ DEL-AMO-SA..10P	BABR	$e^+ e^- \rightarrow D^{*+} \pi^- X$

¹¹ Systematic uncertainties not estimated. The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

$D_3^*(2750)$ REFERENCES

AAIJ	16AH	PR D94	072001	R. Aaij <i>et al.</i>	(LHCb Collab.)
AAIJ	15Y	PR D92	032002	R. Aaij <i>et al.</i>	(LHCb Collab.) JP
AAIJ	13CC	JHEP	1309 145	R. Aaij <i>et al.</i>	(LHCb Collab.)
DEL-AMO-SA...	10P	PR D82	111101	P. del Amo Sanchez <i>et al.</i>	(BABAR Collab.)
