

$D_3^*(2750)$

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

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	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$

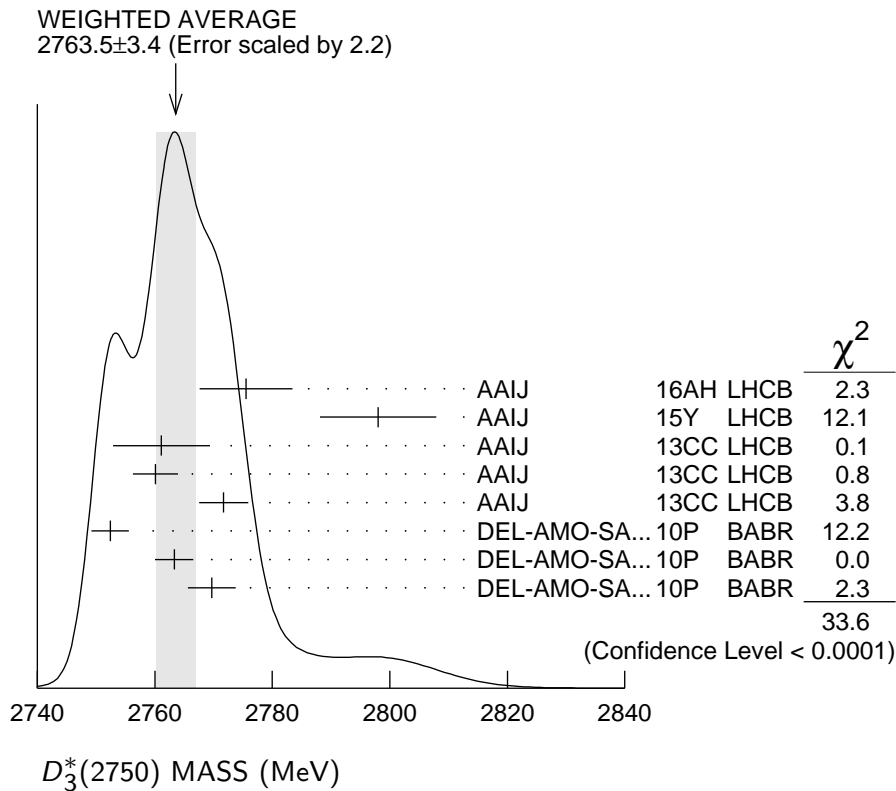
¹ From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

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				
$95.3 \pm 9.6 \pm 34.0$	28k	⁶ AAIJ	16AH	LHCB	$B^- \rightarrow D^+ \pi^- \pi^-$
$105 \pm 18 \pm 24$		⁷ AAIJ	15Y	LHCB	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
$74.4 \pm 3.4 \pm 37.0$	14k	AAIJ	13CC	LHCB 0	$pp \rightarrow D^{*+} \pi^- X$
$74.4 \pm 3.4 \pm 19.1$	56k	AAIJ	13CC	LHCB 0	$pp \rightarrow D^+ \pi^- X$
$66.7 \pm 6.6 \pm 10.5$	20k	AAIJ	13CC	LHCB +	$pp \rightarrow D^0 \pi^+ X$
$71 \pm 6 \pm 11$	23.5k	⁸ DEL-AMO-SA...10P	BABR		$e^+ e^- \rightarrow D^{*+} \pi^- X$
$60.9 \pm 5.1 \pm 3.6$	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. ● ● ●					
$154 \pm 27 \pm 16$		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	
$0.42 \pm 0.05 \pm 0.11$	34.8k	¹⁰ DEL-AMO-SA..10P	BABR	$e^+e^- \rightarrow D^{(*)+}\pi^- X$	

¹⁰The 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
-0.33 ± 0.28	23.5k	¹¹ DEL-AMO-SA..10P	BABR	$e^+e^- \rightarrow D^{*+}\pi^- X$

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

¹¹Systematic 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.)