

$D_3^*(2750)$

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

J^P determined by AAIJ 15Y from the Dalitz plot analysis of $B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$ decays.

$D_3^*(2750)$ MASS

<u>VALUE (MeV)</u>	<u>EVTS</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>CHG</u>	<u>COMMENT</u>
2763.1 ± 3.2 OUR AVERAGE		Error includes scale factor of 2.1. See the ideogram below.			
2753 ± 4 ± 6	79k	¹ AAIJ	20D	LHCB	$B^- \rightarrow D^{*+} \pi^- \pi^-$
2775.5 ± 4.5 ± 6.5	28k	² AAIJ	16AH	LHCB	$B^- \rightarrow D^+ \pi^- \pi^-$
2798 ± 7 ± 7		³ 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	⁴ DEL-AMO-SA..10P	BABR	0	$e^+ e^- \rightarrow D^{*+} \pi^- X$
2763.3 ± 2.3 ± 2.3	11.3k	⁴ DEL-AMO-SA..10P	BABR	0	$e^+ e^- \rightarrow D^+ \pi^- X$
2769.7 ± 3.8 ± 1.5	5.7k	^{4,5} 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		⁶ AAIJ	15Y	LHCB	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$

¹ From a full four-body amplitude analysis of the $B^- \rightarrow D^{*+} \pi^- \pi^-$ decay.

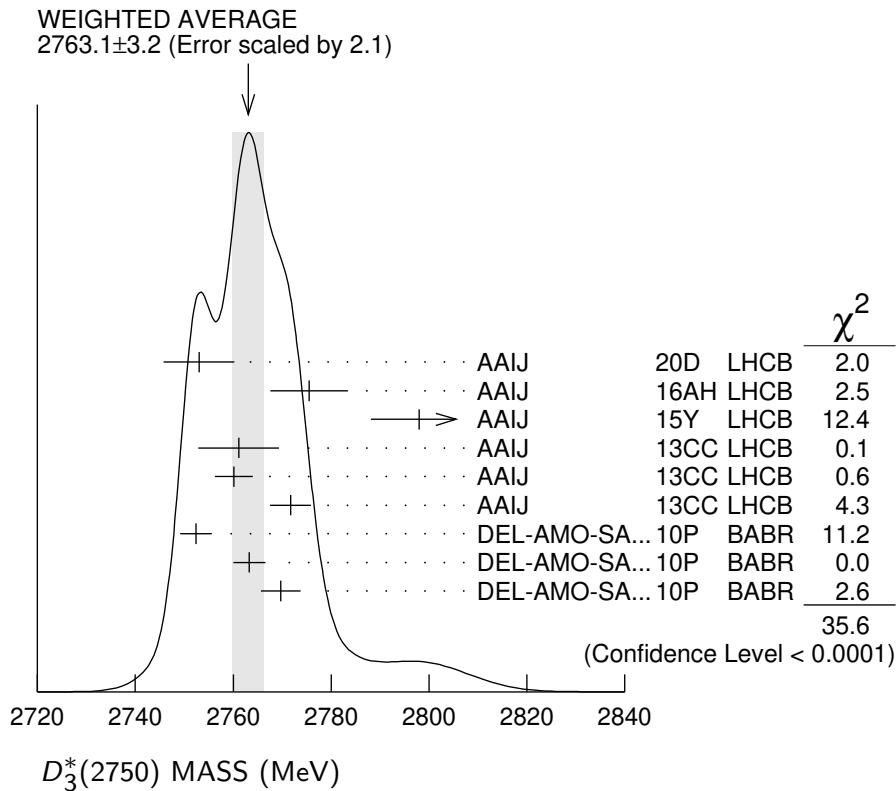
² From the amplitude analysis in the model describing the $D^+ \pi^-$ wave together with virtual contributions from the $D^*(2007)^0$ and B^{*0} states, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

³ Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.

⁴ The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

⁵ At a fixed width of 60.9 MeV.

⁶ 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				
66 ±10 ±14	79k	¹ AAIJ	20D	LHCB	$B^- \rightarrow D^{*+} \pi^- \pi^-$
95.3 ± 9.6 ±34.0	28k	² AAIJ	16AH	LHCB	$B^- \rightarrow D^+ \pi^- \pi^-$
105 ±18 ±24		³ 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	⁴ DEL-AMO-SA..10P	BABR		$e^+ e^- \rightarrow D^{*+} \pi^- X$
60.9 ± 5.1 ± 3.6	11.3k	⁴ 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		⁵ AAIJ	15Y	LHCB	$B^0 \rightarrow \bar{D}^0 \pi^+ \pi^-$
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¹ From a full four-body amplitude analysis of the $B^- \rightarrow D^{*+} \pi^- \pi^-$ decay.

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, and components corresponding to the $D_2^*(2460)^0$, $D_1^*(2680)^0$, $D_3^*(2760)^0$, and $D_2^*(3000)^0$ resonances.

³ Modeling the $\pi^+ \pi^-$ S-wave with the Isobar formalism.

⁴ The states observed in the $D^* \pi$ and $D \pi$ final states are not necessarily the same.

⁵ 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	¹ DEL-AMO-SA..10P	BABR	$e^+e^- \rightarrow D^{(*)+}\pi^- X$	

¹The 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	¹ DEL-AMO-SA..10P	BABR	$e^+e^- \rightarrow D^{*+}\pi^- X$

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

¹Systematic 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	20D	PR D101 032005	R. Aaij <i>et al.</i>	(LHCb Collab.)
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.)