# $D(2750)$

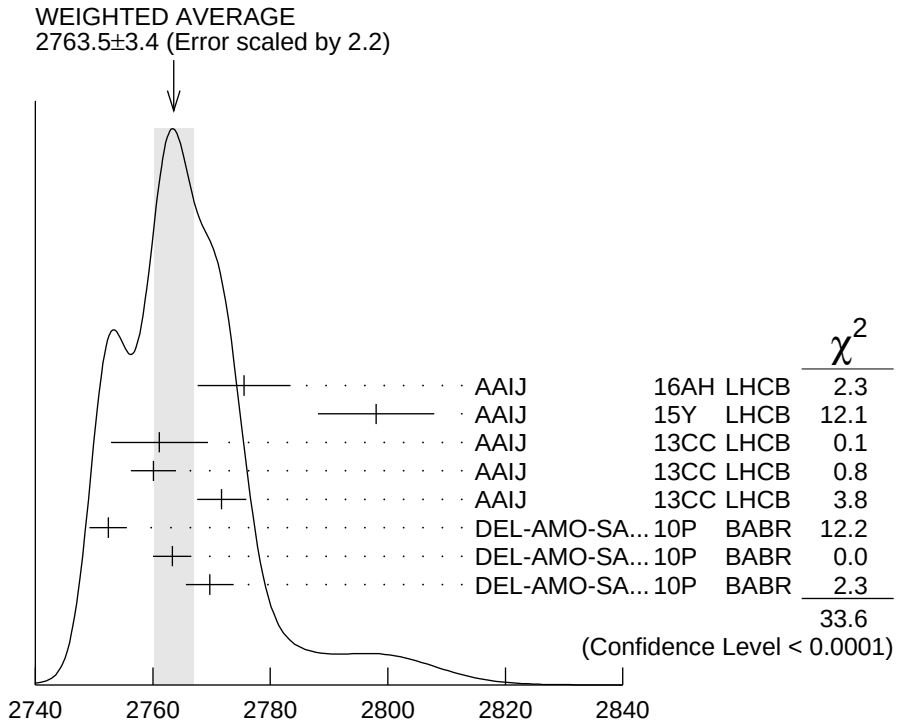
$I(J^P) = \frac{1}{2}(3^-)$

OMITTED FROM SUMMARY TABLE

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

## *D*(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 | | $B^- \to D^+\pi^-\pi^-$ |
| 2798 ± 7 ± 7 | | [2] AAIJ | 15Y | LHCB | | $B^0 \to \overline{D}^0\pi^+\pi^-$ |
| 2761.1± 5.1± 6.5 | 14k | AAIJ | 13CC | LHCB | 0 | $pp \to D^{*+}\pi^- X$ |
| 2760.1± 1.1± 3.7 | 56k | AAIJ | 13CC | LHCB | 0 | $pp \to D^+\pi^- X$ |
| 2771.7± 1.7± 3.8 | 20k | AAIJ | 13CC | LHCB | + | $pp \to D^0\pi^+ X$ |
| 2752.4± 1.7± 2.7 | 23.5k | [3] DEL-AMO-SA.. | 10P | BABR | 0 | $e^+e^- \to D^{*+}\pi^- X$ |
| 2763.3± 2.3± 2.3 | 11.3k | [3] DEL-AMO-SA.. | 10P | BABR | 0 | $e^+e^- \to D^+\pi^- X$ |
| 2769.7± 3.8± 1.5 | 5.7k | [3,4] DEL-AMO-SA.. | 10P | BABR | + | $e^+e^- \to D^0\pi^+ X$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| 2802 ±11 ±10 | | [5] AAIJ | 15Y | LHCB | | $B^0 \to \overline{D}^0\pi^+\pi^-$ |



[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.

## $D(2750)$ WIDTH

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

[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.

## $D(2750)$ DECAY MODES

| | Mode | Fraction ($\Gamma_i/\Gamma$) |
|---|---|---|
| $\Gamma_1$ | $D\pi$ | seen |
| $\Gamma_2$ | $D^+\pi^-$ | seen |
| $\Gamma_3$ | $D^0\pi^\pm$ | seen |
| $\Gamma_4$ | $D^*\pi$ | seen |
| $\Gamma_5$ | $D^{*+}\pi^-$ | seen |

## $D(2750)$ BRANCHING RATIOS

### $\Gamma(D^+\pi^-)/\Gamma(D^{*+}\pi^-)$ $\Gamma_2/\Gamma_5$

| VALUE | EVTS | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|---|
| **0.42±0.05±0.11** | 34.8k | [10] DEL-AMO-SA..10P | | BABR | $e^+e^- \to D^{(*)+}\pi^- X$ |

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

## *D*(2750) POLARIZATION AMPLITUDE $A_D$

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

| *VALUE* | *EVTS* | *DOCUMENT ID* | *TECN* | *COMMENT* |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $-0.33 \pm 0.28$ | 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*(2750) REFERENCES


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