Reference = AAIJ 16AH; PR D94 072001
Verifier code = LHCB

Normally we send all verifications for one experiment to one person, usually the spokesperson or data-analysis co-ordinator, who then distributes them to the appropriate people. Please tell us if we should send the verifications for your experiment to someone else.

PLEASE READ NOW

PLEASE REPLY WITHIN ONE WEEK

Vincenzo Vagnoni

EMAIL: vincenzo.vagnoni@bo.infn.it

March 20, 2017

Dear Colleague,

(1) Please check the results of your experiment carefully. They are marked.

(2) Please reply within one week.

(3) Please reply even if everything is correct.

(4) IMPORTANT!! Please tell WHICH papers you are verifying. We have lots of requests out.

(5) Feel free to make comments on our treatment of any of the results (not just yours) you see.

Thank you for helping us make the Review accurate and useful.

Sincerely,

Simon Eidelman
BINP, Budker Inst. of Nuclear Physics
Prospekt Lavrent'eva 11
RU-630090 Novosibirsk
Russian Federation

EMAIL: simon.eidelman@cern.ch

CHARMED MESONS ($C = \pm 1$)

NODE=MXXX035

$D^+ = c\overline{d}$, $D^0 = c\overline{u}$, $\overline{D}^0 = \overline{c}\,u$, $D^- = \overline{c}\,d$, similarly for D^*'s

NODE=MXXX035

NODE=M119

$D_2^*(2460)^0$

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

$J^P = 2^+$ 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.

NODE=M119

$D_2^*(2460)0$ MASS

NODE=M119M

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.

NODE=M119M

NODE=M119M

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
2460.56±0.35 OUR AVERAGE Error includes scale factor of 2.6. See the ideogram below.					
YOUR DATA 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	$pp \to D^{*+}\pi^- X$
2460.4 ±0.1 ±0.1	675k	AAIJ	13CC	LHCB	$pp \to D^+\pi^- X$
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 $\nu(\overline{\nu}) \to pX,dX$

YOUR NOTE

[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.

NODE=M119M;LINKAGE=B

[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.

NODE=M119M;LINKAGE=AR

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

NODE=M119M;LINKAGE=LI

[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.

NODE=M119M;LINKAGE=CH

[5] No systematic error given.

NODE=M119M;LINKAGE=K

$D_2^*(2460)^0$ WIDTH

NODE=M119W

NODE=M119W

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
47.5± 1.1 OUR AVERAGE Error includes scale factor of 1.8. See the ideogram below.					
YOUR DATA 47.0± 0.8± 1.0	28k	[6] AAIJ	16AH	LHCB	$B^- \to D^+\pi^-\pi^-$
43.2± 1.2± 3.0	82k	AAIJ	13CC	LHCB	$pp \to D^{*+}\pi^- X$

OCCUR=2

OCCUR=2

OCCUR=3

45.6± 0.4± 1.1	675k		AAIJ	13CC	LHCB	$pp \to D^+\pi^-X$	OCCUR=2
$46.6\pm 8.1^{+5.9}_{-3.8}$	2.3k	[7]	ABRAMOWICZ	13	ZEUS	$e^\pm p \to D^{(*)+}\pi^-X$	
50.5± 0.6± 0.7	243k		DEL-AMO-SA..	10P	BABR	$e^+e^- \to D^+\pi^-X$	
41.8± 2.5± 2.9	3.4k		AUBERT	09AB	BABR	$B^- \to D^+\pi^-\pi^-$	
49.2± 2.3± 1.3	20k		ABULENCIA	06A	CDF	1900 $p\overline{p} \to D^+\pi^-X$	
45.6± 4.4± 6.7		[8]	ABE	04D	BELL	$B^- \to D^+\pi^-\pi^-$	
38.7± 5.3± 2.9	5.8k	[8]	LINK	04A	FOCS	γ A	
$28\ ^{+8}_{-7}\ \pm 6$	486		AVERY	94C	CLE2	$e^+e^- \to D^+\pi^-X$	
25 ±10 ± 5	128		FRABETTI	94B	E687	γBe $\to D^+\pi^-X$	
$20\ ^{+9}_{-12}\ ^{+9}_{-10}$	440		AVERY	90	CLEO	$e^+e^- \to D^{*+}\pi^-X$	
$15\ ^{+13}_{-10}\ ^{+5}_{-10}$	337		ALBRECHT	89B	ARG	$e^+e^- \to D^+\pi^-X$	
20 ±10 ± 5	153		ANJOS	89C	TPS	$\gamma N \to D^+\pi^-X$	

YOUR NOTE

[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. NODE=M119W;LINKAGE=D

[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. NODE=M119W;LINKAGE=AR

[8] Fit includes the contribution from $D_0^*(2400)^0$. NODE=M119W;LINKAGE=LI

$D_2^*(2460)^0$ REFERENCES

NODE=M119

YOUR PAPER

AAIJ	16AH	PR D94 072001	R. Aaij *et al.*	(LHCb Collab.)	REFID=57518
AAIJ	13CC	JHEP 1309 145	R. Aaij *et al.*	(LHCb Collab.)	REFID=55581
ABRAMOWICZ	13	NP B866 229	H. Abramowicz *et al.*	(ZEUS Collab.)	REFID=54743
DEL-AMO-SA...	10P	PR D82 111101	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53534
AUBERT	09AB	PR D79 112004	B. Aubert *et al.*	(BABAR Collab.)	REFID=52941
CHEKANOV	09	EPJ C60 25	S. Chekanov *et al.*	(ZEUS Collab.)	REFID=52733
ABULENCIA	06A	PR D73 051104	A. Abulencia *et al.*	(CDF Collab.)	REFID=51054
ABE	04D	PR D69 112002	K. Abe *et al.*	(BELLE Collab.)	REFID=50011
LINK	04A	PL B586 11	J.M. Link *et al.*	(FOCUS Collab.)	REFID=49775
ABREU	98M	PL B426 231	P. Abreu *et al.*	(DELPHI Collab.)	REFID=46315
ASRATYAN	95	ZPHY C68 43	A.E. Asratyan *et al.*	(BIRM, BELG, CERN+)	REFID=44439
AVERY	94C	PL B331 236	P. Avery *et al.*	(CLEO Collab.)	REFID=44096
FRABETTI	94B	PRL 72 324	P.L. Frabetti *et al.*	(FNAL E687 Collab.)	REFID=43687
AVERY	90	PR D41 774	P. Avery, D. Besson	(CLEO Collab.)	REFID=41013
ALBRECHT	89B	PL B221 422	H. Albrecht *et al.*	(ARGUS Collab.) JP	REFID=40736
ALBRECHT	89H	PL B232 398	H. Albrecht *et al.*	(ARGUS Collab.) JP	REFID=41001
ANJOS	89C	PRL 62 1717	J.C. Anjos *et al.*	(FNAL E691 Collab.)	REFID=40737

NODE=M199

$D_J^*(2600)$

was $D(2600)$,

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

OMITTED FROM SUMMARY TABLE

J^P consistent with natural parity (DEL-AMO-SANCHEZ 10P, AAIJ 13CC). NODE=M199

$D_J^*(2600)$ MASS

NODE=M199M

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*CHG*	*COMMENT*	
2623 ±12 OUR AVERAGE		Error includes scale factor of 4.8. See the ideogram below.					NODE=M199M
YOUR DATA 2681.1± 5.6±14.0	28k	[1] AAIJ	16AH	LHCB		$B^- \to D^+\pi^-\pi^-$	
2649.2± 3.5± 3.5	51k	AAIJ	13CC	LHCB		$pp \to D^{*+}\pi^-X$	
2608.7± 2.4± 2.5	26k	DEL-AMO-SA..	10P	BABR	0	$e^+e^- \to D^+\pi^-X$	
2621.3± 3.7± 4.2	13k	[2] DEL-AMO-SA..	10P	BABR	+	$e^+e^- \to D^0\pi^+X$	OCCUR=2

YOUR NOTE

[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. NODE=M199M;LINKAGE=A

[2] At a fixed width of 93 MeV. NODE=M199M;LINKAGE=DE

$D_J^*(2600)$ WIDTH

NODE=M199W

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT	
139 ±31 OUR AVERAGE		Error includes scale factor of 3.2. See the ideogram below.			NODE=M199W
YOUR DATA 186.7± 8.5±11.9	28k	[3] AAIJ	16AH LHCB	$B^- \to D^+\pi^-\pi^-$	
140.2±17.1±18.6	51k	AAIJ	13CC LHCB	$pp \to D^{*+}\pi^- X$	
93 ± 6 ±13	26k	DEL-AMO-SA..10P	BABR	$e^+e^- \to D^+\pi^- X$	

YOUR NOTE [3] 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. NODE=M199W;LINKAGE=A

$D_J^*(2600)$ REFERENCES

NODE=M199

YOUR PAPER
AAIJ 16AH PR D94 072001 R. Aaij *et al.* (LHCb Collab.) REFID=57518
AAIJ 13CC JHEP 1309 145 R. Aaij *et al.* (LHCb Collab.) REFID=55581
DEL-AMO-SA... 10P PR D82 111101 P. del Amo Sanchez *et al.* (BABAR Collab.) REFID=53534

NODE=M203

$D(2750)$

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

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). NODE=M203

$D(2750)$ MASS

NODE=M203M

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.				NODE=M203M
YOUR DATA 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	$pp \to D^+\pi^- X$	OCCUR=2
2771.7± 1.7± 3.8	20k	AAIJ	13CC LHCB	+	$pp \to D^0\pi^+ X$	OCCUR=3
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	$e^+e^- \to D^+\pi^- X$	OCCUR=2
2769.7± 3.8± 1.5	5.7k	[3,4] DEL-AMO-SA..10P	BABR	+	$e^+e^- \to D^0\pi^+ X$	OCCUR=3
• • • We do not use the following data for averages, fits, limits, etc. • • •						
2802 ±11 ±10		[5] AAIJ	15Y LHCB		$B^0 \to \overline{D}^0\pi^+\pi^-$	OCCUR=2

YOUR NOTE [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. NODE=M203M;LINKAGE=C

[2] Modeling the $\pi^+\pi^-$ S-wave with the Isobar formalism. NODE=M203M;LINKAGE=A

[3] The states observed in the $D^*\pi$ and $D\pi$ final states are not necessarily the same. NODE=M203M;LINKAGE=DE

[4] At a fixed width of 60.9 MeV. NODE=M203M;LINKAGE=DA

[5] Modeling the $\pi^+\pi^-$ S-wave with the K-matrix formalism. NODE=M203M;LINKAGE=B

$D(2750)$ WIDTH

NODE=M203W

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	CHG	COMMENT	
66 ± 5 OUR AVERAGE						NODE=M203W
YOUR DATA 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	$pp \to D^+\pi^- X$	OCCUR=2
66.7± 6.6±10.5	20k	AAIJ	13CC LHCB	+	$pp \to D^0\pi^+ X$	OCCUR=4
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		$e^+e^- \to D^+\pi^- X$	OCCUR=2
• • • We do not use the following data for averages, fits, limits, etc. • • •						
154 ±27 ±16		[9] AAIJ	15Y LHCB		$B^0 \to \overline{D}^0\pi^+\pi^-$	OCCUR=2

YOUR NOTE [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. NODE=M203W;LINKAGE=C

[7] Modeling the $\pi^+\pi^-$ S-wave with the Isobar formalism. NODE=M203W;LINKAGE=A

[8] The states observed in the $D^*\pi$ and $D\pi$ final states are not necessarily the same. NODE=M203W;LINKAGE=DE

[9] Modeling the $\pi^+\pi^-$ S-wave with the K-matrix formalism. NODE=M203W;LINKAGE=B

$D(2750)$ REFERENCES

NODE=M203

YOUR PAPER	AAIJ	16AH	PR D94 072001	R. Aaij *et al.*	(LHCb Collab.)	REFID=57518
	AAIJ	15Y	PR D92 032002	R. Aaij *et al.*	(LHCb Collab.) JP	REFID=56609
	AAIJ	13CC	JHEP 1309 145	R. Aaij *et al.*	(LHCb Collab.)	REFID=55581
	DEL-AMO-SA...	10P	PR D82 111101	P. del Amo Sanchez *et al.*	(BABAR Collab.)	REFID=53534

NODE=M229

$D(3000)^0$

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

OMITTED FROM SUMMARY TABLE

Both natural- and unnatural-parity components observed depending on the decay mode (AAIJ 13CC).

NODE=M229

$D(3000)^0$ MASS

NODE=M229M

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
YOUR DATA **3214 ±29 ±49**	28k	[1] AAIJ	16AH	LHCB	$B^- \to D^+\pi^-\pi^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
2971.8± 8.7	9.5k	[2,3] AAIJ	13CC	LHCB	$pp \to D^{*+}\pi^- X$	
3008.1± 4.0	17.6k	[2,4] AAIJ	13CC	LHCB	$pp \to D^+\pi^- X$	OCCUR=2

NODE=M229M

YOUR NOTE

[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. NODE=M229M;LINKAGE=D

[2] Systematic uncertainty not estimated. NODE=M229M;LINKAGE=A

[3] Unnatural parity preferred. NODE=M229M;LINKAGE=B

[4] Natural parity state. A state $D(3000)^+$ is possibly seen in $D^0\pi^+$ final state. NODE=M229M;LINKAGE=C

$D(3000)^0$ WIDTH

NODE=M229W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
YOUR DATA **186 ±38 ±72**	28k	[5] AAIJ	16AH	LHCB	$B^- \to D^+\pi^-\pi^-$	
• • • We do not use the following data for averages, fits, limits, etc. • • •						
188.1±44.8	9.5k	[6,7] AAIJ	13CC	LHCB	$pp \to D^{*+}\pi^- X$	
110.5±11.5	17.6k	[6,8] AAIJ	13CC	LHCB	$pp \to D^+\pi^- X$	OCCUR=2

NODE=M229W

YOUR NOTE

[5] 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. NODE=M229W;LINKAGE=D

[6] Systematic uncertainty not estimated. NODE=M229W;LINKAGE=A

[7] Unnatural parity preferred. NODE=M229W;LINKAGE=C

[8] Natural parity state. A state $D(3000)^+$ is possibly seen in $D^0\pi^+$ final state. NODE=M229W;LINKAGE=B

$D(3000)^0$ REFERENCES

NODE=M229

YOUR PAPER	AAIJ	16AH	PR D94 072001	R. Aaij *et al.*	(LHCb Collab.)	REFID=57518
	AAIJ	13CC	JHEP 1309 145	R. Aaij *et al.*	(LHCb Collab.)	REFID=55581