

Reference = AAIJ 15AB; JHEP 1504 024
Verifier code = LHCB

PLEASE READ NOW

*PLEASE
REPLY
WITHIN
ONE WEEK*

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

Vincenzo Vagnoni

EMAIL: vincenzo.vagnoni@bo.infn.it

July 21, 2016

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
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Prospekt Lavrent'eva 11
RU-630090 Novosibirsk
Russian Federation

EMAIL: simon.eidelman@cern.ch

BOTTOM MESONS

($B = \pm 1$)

$$B^+ = u\bar{b}, B^0 = d\bar{b}, \bar{B}^0 = \bar{d}b, B^- = \bar{u}b, \text{ similarly for } B^{*'}s$$

$B_1(5721)^+$

$$I(J^P) = \frac{1}{2}(1^+) \text{ Status: } **$$

I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

$$m_{B_1^+} = m_{B^{*0}}$$

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
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401.2^{+2.4}_{-2.7} OUR AVERAGE

YOUR DATA	400.5 $\pm$ 1.8 $\pm$ 3.1	8K	¹ AAIJ	15AB LHCb	pp at 7, 8 TeV
	402 $\pm$ 3 $\begin{smallmatrix} +1 \\ -3 \end{smallmatrix}$		² AALTONEN	14l CDF	$p\bar{p}$ at 1.96 TeV

YOUR NOTE ¹ AAIJ 15AB reports $[m_{B_1^+} - m_{B^0}] - (m_{B^{*0}} - m_{B^0}) - m_{\pi^+} = 260.9 \pm 1.8 \pm 3.1$ MeV which we adjust by the π^+ mass and assume $(m_{B^{*0}} - m_{B^0}) = (m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV. The masses inside the square brackets were measured for each candidate event.

² AALTONEN 14l reports $m_{B_1(5721)^+} - m_{B^{*0}} - m_{\pi^+} = 262 \pm 3 \begin{smallmatrix} +1 \\ -3 \end{smallmatrix}$ MeV which we adjusted by the π^+ mass.

$B_1(5721)^+$ WIDTH

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
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31 $\pm$ 6 OUR AVERAGE Error includes scale factor of 1.1.

YOUR DATA	29.1 $\pm$ 3.6 $\pm$ 4.3	8K	AAIJ	15AB LHCb	pp at 7, 8 TeV
	49 $\begin{smallmatrix} +12 \\ -10 \end{smallmatrix}$ $\begin{smallmatrix} +2 \\ -13 \end{smallmatrix}$		AALTONEN	14l CDF	$p\bar{p}$ at 1.96 TeV

$B_1(5721)^+$ BRANCHING RATIOS

$$\Gamma(B^{*0}\pi^+)/\Gamma_{\text{total}} \quad \Gamma_1/\Gamma$$

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
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YOUR DATA	seen	8K	AAIJ	15AB LHCb	pp at 7, 8 TeV
	seen		AALTONEN	14l CDF	$p\bar{p}$ at 1.96 TeV

$B_1(5721)^+$ REFERENCES

YOUR PAPER	AAIJ	15AB JHEP 1504 024	R. Aaij <i>et al.</i>	(LHCb Collab.)
	AALTONEN	14l PR D90 012013	T. Aaltonen <i>et al.</i>	(CDF Collab.)

$B_1(5721)^0$

$$I(J^P) = \frac{1}{2}(1^+) \text{ Status: } ***$$

I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

$$m_{B_1^0} = m_{B^{*+}}$$

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
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402.8 $\pm$ 1.1 OUR AVERAGE

YOUR DATA	403.4 $\pm$ 0.7 $\pm$ 1.5	35K	² AAIJ	15AB LHCb	pp at 7, 8 TeV
	402.3 $\pm$ 0.9 $\begin{smallmatrix} +1.1 \\ -1.2 \end{smallmatrix}$		³ AALTONEN	14l CDF	$p\bar{p}$ at 1.96 TeV

YOUR NOTE

- ² AAIJ 15AB reports $[m_{B_1^0} - m_{B^+}] - (m_{B^{*+}} - m_{B^+}) - m_{\pi^-} = 263.9 \pm 0.7 \pm 1.5$ MeV which we adjust by the π^- mass and $(m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV. The masses inside the square brackets were measured for each candidate event.
- ³ AALTONEN 14I reports $m_{B_1(5721)^0} - m_{B^{*+}} - m_{\pi^-} = 262.7 \pm 0.9^{+1.1}_{-1.2}$ MeV which we adjusted by the π^- mass.

NODE=M183DM2;LINKAGE=B

NODE=M183DM2;LINKAGE=AA

 $B_1(5721)^0$ WIDTH

NODE=M183W

NODE=M183W

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
27.5 ± 3.4 OUR AVERAGE	Error includes scale factor of 1.1.			
30.1 ± 1.5 ± 3.5	35k	AAIJ	15AB LHCB	pp at 7, 8 TeV
23 ± 3 ± 4		AALTONEN 14I	CDF	$p\bar{p}$ at 1.96 TeV

YOUR DATA

 $B_1(5721)^0$ BRANCHING RATIOS

NODE=M183220

NODE=M183R01
NODE=M183R01

$\Gamma(B^{*+}\pi^-)/\Gamma_{\text{total}}$	VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_1/Γ
seen	35K	AAIJ	15AB LHCB	pp at 7, 8 TeV		
dominant		AALTONEN	09D CDF	$p\bar{p}$ at 1.96 TeV		
dominant		⁴ ABAZOV	07T D0	$p\bar{p}$ at 1.96 TeV		

YOUR DATA

⁴ Observed in $B_1^0 \rightarrow B^{*+}\pi^-$ with $B^{*+} \rightarrow B^+\gamma$ and $B^+ \rightarrow J/\psi\pi^+$.

NODE=M183R01;LINKAGE=AB

 $B_1(5721)^0$ REFERENCES

NODE=M183

REFID=56628
REFID=56029
REFID=52700
REFID=52014
NODE=M219

YOUR PAPER

AAIJ	15AB	JHEP 1504 024	R. Aaij <i>et al.</i>	(LHCb Collab.)
AALTONEN 14I	PR	D90 012013	T. Aaltonen <i>et al.</i>	(CDF Collab.)
AALTONEN 09D	PRL	102 102003	T. Aaltonen <i>et al.</i>	(CDF Collab.)
ABAZOV 07T	PRL	99 172001	V.M. Abazov <i>et al.</i>	(D0 Collab.)

 $B_2^*(5747)^+$

$I(J^P) = \frac{1}{2}(2^+)$ Status: **
I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M219

 $m_{B_2^*} - m_{B^0}$

NODE=M219DM

NODE=M219DM

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
457.5 ± 0.7 OUR AVERAGE				
457.62 ± 0.72 ± 0.40	4K	¹ AAIJ	15AB LHCB	pp at 7, 8 TeV
457.3 ± 1.3 $^{+0.3}_{-0.9}$		² AALTONEN 14I	CDF	$p\bar{p}$ at 1.96 TeV

YOUR DATA

- ¹ AAIJ 15AB reports $[m_{B_2^{*+}} - m_{B^0}] - m_{\pi^+} = 318.1 \pm 0.7 \pm 0.4$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event.
- ² AALTONEN 14I reports $m_{B_2^*(5747)^+} - m_{B^0} - m_{\pi^+} = 317.7 \pm 1.2^{+0.3}_{-0.9}$ MeV which we adjusted by the π^+ mass.

YOUR NOTE

NODE=M219DM;LINKAGE=B

NODE=M219DM;LINKAGE=A

 $B_2^*(5747)^+$ WIDTH

NODE=M219W

NODE=M219W

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
20 ± 5 OUR AVERAGE	Error includes scale factor of 2.2.			
23.6 ± 2.0 ± 2.1	4K	AAIJ	15AB LHCB	pp at 7, 8 TeV
11 $^{+4}_{-3}$ $^{+3}_{-4}$		AALTONEN 14I	CDF	$p\bar{p}$ at 1.96 TeV

YOUR DATA

 $B_2^*(5747)^+$ BRANCHING RATIOS

NODE=M219220

NODE=M219R01
NODE=M219R01

$\Gamma(B^0\pi^+)/\Gamma_{\text{total}}$	VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	Γ_1/Γ
seen	4K	AAIJ	15AB LHCB	pp at 7, 8 TeV		
seen		AALTONEN 14I	CDF	$p\bar{p}$ at 1.96 TeV		

YOUR DATA

$\Gamma(B^{*0}\pi^+)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

seen

4k

AAIJ

15AB LHCb

 pp at 7, 8 TeVNODE=M219R02
NODE=M219R02 $\Gamma(B^{*0}\pi^+)/\Gamma(B^0\pi^+)$ Γ_2/Γ_1

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

 $1.0 \pm 0.5 \pm 0.8$

4k

AAIJ

15AB LHCb

 pp at 7, 8 TeVNODE=M219R03
NODE=M219R03 $B_2^*(5747)^+$ REFERENCES

NODE=M219

YOUR PAPER

AAIJ 15AB JHEP 1504 024
AALTONEN 14I PR D90 012013R. Aaij *et al.* (LHCb Collab.)
T. Aaltonen *et al.* (CDF Collab.)REFID=56628
REFID=56029
NODE=M184 $B_2^*(5747)^0$ $I(J^P) = \frac{1}{2}(2^+)$ Status: * * *
 I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M184

 $m_{B_2^{*0}} - m_{B^+}$

NODE=M184DM2

VALUE (MeV) EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

459.9 $\pm$ 0.8 OUR AVERAGE

Error includes scale factor of 1.8.

460.18 $\pm$ 0.37 $\pm$ 0.33

17K

² AAIJ

15AB LHCb

 pp at 7, 8 TeV457.5 $\pm$ 1.2 $^{+0.8}_{-0.9}$ ³ AALTONEN

14I

CDF

 $p\bar{p}$ at 1.96 TeV

NODE=M184DM2

YOUR NOTE

² AAIJ 15AB reports $[m_{B_2^{*0}} - m_{B^+}] - m_{\pi^-} = 320.6 \pm 0.4 \pm 0.3$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event.³ AALTONEN 14I reports $m_{B_2^*(5747)^0} - m_{B^+} - m_{\pi^-} = 317.9 \pm 1.2^{+0.8}_{-0.9}$ MeV which we adjusted by the π^- mass.

NODE=M184DM2;LINKAGE=A

NODE=M184DM2;LINKAGE=AA

 $B_2^*(5747)^0$ WIDTH

NODE=M184W

VALUE (MeV) EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

24.2 $\pm$ 1.7 OUR AVERAGE24.5 $\pm$ 1.0 $\pm$ 1.5

17K

AAIJ

15AB LHCb

 pp at 7, 8 TeV22 $^{+3}_{-2}$ $^{+4}_{-5}$

AALTONEN

14I

CDF

 $p\bar{p}$ at 1.96 TeV

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

22.7 $^{+3.8}_{-3.2}$ $^{+3.2}_{-10.2}$

AALTONEN

09D

CDF

Repl. by AALTONEN 14I

NODE=M184W

 $B_2^*(5747)^0$ BRANCHING RATIOS

NODE=M184220

 $\Gamma(B^+\pi^-)/\Gamma_{\text{total}}$ Γ_1/Γ

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

seen

17K

AAIJ

15AB LHCb

 pp at 7, 8 TeV

dominant

AALTONEN

09D

CDF

 $p\bar{p}$ at 1.96 TeV

dominant

ABAZOV

07T

D0

 $p\bar{p}$ at 1.96 TeVNODE=M184R01
NODE=M184R01 $\Gamma(B^{*+}\pi^-)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

seen

17K

AAIJ

15AB LHCb

 pp at 7, 8 TeV

dominant

AALTONEN

09D

CDF

 $p\bar{p}$ at 1.96 TeV

dominant

ABAZOV

07T

D0

 $p\bar{p}$ at 1.96 TeVNODE=M184R02
NODE=M184R02 $\Gamma(B^{*+}\pi^-)/\Gamma(B^+\pi^-)$ Γ_2/Γ_1

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

YOUR DATA

0.82 $\pm$ 0.28 OUR AVERAGE0.71 $\pm$ 0.14 $\pm$ 0.30

17K

AAIJ

15AB LHCb

 pp at 7, 8 TeV1.10 $\pm$ 0.42 $\pm$ 0.31⁴ ABAZOV

07T

D0

 $p\bar{p}$ at 1.96 TeVNODE=M184R03
NODE=M184R03⁴ Converted from measured ratio of $R = \text{B}(B_2^{*0} \rightarrow B^{*+}\pi^-) / \text{B}(B_2^{*0} \rightarrow B^{(*)+}\pi^-) = 0.475 \pm 0.095 \pm 0.069$.

NODE=M184R03;LINKAGE=AB

$B_2^*(5747)^0$ REFERENCES

YOUR PAPER

AAIJ 15AB JHEP 1504 024
 AALTONEN 14I PR D90 012013
 AALTONEN 09D PRL 102 102003
 ABAZOV 07T PRL 99 172001

R. Aaij *et al.* (LHCb Collab.)
 T. Aaltonen *et al.* (CDF Collab.)
 T. Aaltonen *et al.* (CDF Collab.)
 V.M. Abazov *et al.* (D0 Collab.)

NODE=M184

REFID=56628
 REFID=56029
 REFID=52700
 REFID=52014
 NODE=M224

 $B_J(5840)^+$

$I(J^P) = \frac{1}{2}(?)$ Status: **
 I, J, P need confirmation.

OMITTED FROM SUMMARY TABLE

Quantum numbers shown are quark-model predictions.

NODE=M224

 $m_{B_J(5840)^+} - m_{B^0}$

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$571 \pm 13 \pm 14$	7k	¹ AAIJ	15AB LHCB	pp at 7, 8 TeV

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

$595 \pm 26 \pm 14$	7k	² AAIJ	15AB LHCB	pp at 7, 8 TeV
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¹ AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - m_{\pi^+} = 431 \pm 13 \pm 14$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses two relativistic Breit-Wigner functions in the fit for mass difference.

² AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - m_{\pi^+} = 455 \pm 26 \pm 14$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses three relativistic Breit-Wigner functions in the fit for mass difference.

 $m_{B_J(5840)^+} - m_{B^{*0}}$

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$565 \pm 15 \pm 14$	7k	³ AAIJ	15AB LHCB	pp at 7, 8 TeV

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

³ AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - (m_{B^{*+}} - m_{B^+}) - m_{\pi^+} = 425 \pm 15 \pm 14$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = -(-1)^J$, $(m_{B^{*0}} - m_{B^0}) = (m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV, and uses three relativistic Breit-Wigner functions in the fit for mass difference.

 $B_J(5840)^+$ WIDTH

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$224 \pm 24 \pm 80$	7k	⁴ AAIJ	15AB LHCB	pp at 7, 8 TeV

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

$215 \pm 27 \pm 80$	7k	⁵ AAIJ	15AB LHCB	pp at 7, 8 TeV
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$229 \pm 27 \pm 80$	7k	⁶ AAIJ	15AB LHCB	pp at 7, 8 TeV
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⁴ Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.

⁵ Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

⁶ Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

 $B_J(5840)^+$ BRANCHING RATIOS **$\Gamma(B^{*0}\pi^+)/\Gamma_{\text{total}}$** **$\Gamma_1/\Gamma$**

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
seen	7k	AAIJ	15AB LHCB	pp at 7, 8 TeV

 $\Gamma(B^0\pi^+)/\Gamma_{\text{total}}$ **Γ_2/Γ**

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
possibly seen	7k	⁷ AAIJ	15AB LHCB	pp at 7, 8 TeV

⁷ A $B\pi$ decay is forbidden from a $P = -(-1)^J$ parent, whereas $B^*\pi$ is allowed.

NODE=M224220

NODE=M224R01
 NODE=M224R01

NODE=M224R02
 NODE=M224R02

NODE=M224R02;LINKAGE=A

$B_J(5840)^+$ REFERENCES

YOUR PAPER AAIJ 15AB JHEP 1504 024 R. Aaij *et al.* (LHCb Collab.)

NODE=M224

REFID=56628
NODE=M225

$$B_J(5840)^0$$

$$I(J^P) = \frac{1}{2}(?) \text{ Status: } **$$

I, J, P need confirmation.

OMITTED FROM SUMMARY TABLE

Quantum numbers shown are quark-model predictions.

NODE=M225

$$m_{B_J(5840)^0} - m_{B^+}$$

NODE=M225DM

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$584 \pm 5 \pm 7$	12k	¹ AAIJ	15AB LHCB	pp at 7, 8 TeV

NODE=M225DM

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

$610 \pm 22 \pm 7$	12k	² AAIJ	15AB LHCB	pp at 7, 8 TeV
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OCCUR=2

¹ AAIJ 15AB reports $[m_{B_J^0} - m_{B^+}] - m_{\pi^-} = 444 \pm 5 \pm 7$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225DM;LINKAGE=A

² AAIJ 15AB reports $[m_{B_J^0} - m_{B^+}] - m_{\pi^-} = 471 \pm 22 \pm 7$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225DM;LINKAGE=B

$$m_{B_J(5840)^0} - m_{B^{*+}}$$

NODE=M225DM2

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$584 \pm 5 \pm 7$	12k	³ AAIJ	15AB LHCB	pp at 7, 8 TeV

NODE=M225DM2

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

$584 \pm 5 \pm 7$	12k	³ AAIJ	15AB LHCB	pp at 7, 8 TeV
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³ AAIJ 15AB reports $[m_{B_J^0} - m_{B^+}] - (m_{B^{*+}} - m_{B^+}) - m_{\pi^-} = 444 \pm 5 \pm 7$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = -(-1)^J$, $(m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV, and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225DM2;LINKAGE=A

$$B_J(5840)^0 \text{ WIDTH}$$

NODE=M225W

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
$127 \pm 17 \pm 34$	12k	⁴ AAIJ	15AB LHCB	pp at 7, 8 TeV

NODE=M225W

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

$107 \pm 20 \pm 34$	12k	⁵ AAIJ	15AB LHCB	pp at 7, 8 TeV
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OCCUR=2

$119 \pm 17 \pm 34$	12k	⁶ AAIJ	15AB LHCB	pp at 7, 8 TeV
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OCCUR=3

⁴ Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225W;LINKAGE=A

⁵ Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225W;LINKAGE=B

⁶ Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M225W;LINKAGE=C

$$B_J(5840)^0 \text{ BRANCHING RATIOS}$$

NODE=M225220

$$\Gamma(B^{*+} \pi^-) / \Gamma_{\text{total}} \quad \Gamma_1 / \Gamma$$

NODE=M225R01
NODE=M225R01

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
seen	12k	AAIJ	15AB LHCB	pp at 7, 8 TeV

$$\Gamma(B^+ \pi^-) / \Gamma_{\text{total}} \quad \Gamma_2 / \Gamma$$

NODE=M225R02
NODE=M225R02

VALUE	DOCUMENT ID	TECN	COMMENT
possibly seen	⁷ AAIJ	15AB LHCB	pp at 7, 8 TeV

⁷ A $B \pi$ decay is forbidden from a $P = -(-1)^J$ parent, whereas $B^* \pi$ is allowed.

NODE=M225R02;LINKAGE=A

$B_J(5840)^0$ REFERENCES

YOUR PAPER AAIJ

15AB JHEP 1504 024

R. Aaij *et al.*

(LHCb Collab.)

NODE=M225

REFID=56628

NODE=M220

 $B_J(5970)^+$

$$I(J^P) = \frac{1}{2}(?) \text{ Status: } **$$

I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M220

 $m_{B_J(5970)^+} - m_{B^0}$

NODE=M220DM

NODE=M220DM

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
685 ±5 OUR AVERAGE				

YOUR DATA 685.3±4.1± 2.5 2K ¹ AAIJ 15AB LHCB pp at 7, 8 TeV
 681 ±5 ±12 ² AALTONEN 14l CDF $p\bar{p}$ at 1.96 TeV

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

YOUR DATA 686.8±4.5± 2.5 2K ³ AAIJ 15AB LHCB pp at 7, 8 TeV

OCCUR=2

YOUR NOTE ¹ AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - m_{\pi^+} = 545.8 \pm 4.1 \pm 2.5$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220DM;LINKAGE=B

² AALTONEN 14l reports $m_{B_J(5970)^+} - m_{B^0} - m_{\pi^+} = 541 \pm 5 \pm 12$ MeV which we adjusted by the π^+ mass.

NODE=M220DM;LINKAGE=A

YOUR NOTE ³ AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - m_{\pi^+} = 547 \pm 5 \pm 3$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220DM;LINKAGE=C

 $m_{B_J(5970)^+} - m_{B^{*0}}$

NODE=M220DM2

NODE=M220DM2

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				

YOUR DATA 686.0±4.0±2.5 2k ⁴ AAIJ 15AB LHCB pp at 7, 8 TeV

YOUR NOTE ⁴ AAIJ 15AB reports $[m_{B_J^+} - m_{B^0}] - (m_{B^{*+}} - m_{B^+}) - m_{\pi^+} = 547 \pm 4 \pm 3$ MeV which we adjust by the π^+ mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = -(-1)^J$, $(m_{B^{*0}} - m_{B^0}) = (m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV, and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220DM2;LINKAGE=A

 $B_J(5970)^+$ WIDTH

NODE=M220W

NODE=M220W

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
62±20 OUR AVERAGE				

YOUR DATA 63±15±17 2K ⁵ AAIJ 15AB LHCB pp at 7, 8 TeV

60⁺³⁰₋₂₀±40 AALTONEN 14l CDF $p\bar{p}$ at 1.96 TeV

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

YOUR DATA 61±14±17 2K ⁶ AAIJ 15AB LHCB pp at 7, 8 TeV

OCCUR=2

YOUR DATA 61±15±17 2K ⁷ AAIJ 15AB LHCB pp at 7, 8 TeV

OCCUR=3

YOUR NOTE ⁵ Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220W;LINKAGE=A

YOUR NOTE ⁶ Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220W;LINKAGE=B

YOUR NOTE ⁷ Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M220W;LINKAGE=C

 $B_J(5970)^+$ BRANCHING RATIOS

NODE=M220220

 $\Gamma(B^0\pi^+)/\Gamma_{\text{total}}$ **Γ_1/Γ**

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
possibly seen	2K	⁸ AAIJ	15AB LHCB	pp at 7, 8 TeV
possibly seen		AALTONEN	14l CDF	$p\bar{p}$ at 1.96 TeV

YOUR DATA

NODE=M220R01
NODE=M220R01

YOUR NOTE ⁸ A $B\pi$ decay is forbidden from a $P = -(-1)^J$ parent, whereas $B^*\pi$ is allowed.

NODE=M220R01;LINKAGE=A

$\Gamma(B^{*0}\pi^+)/\Gamma_{\text{total}}$ Γ_2/Γ

VALUE	EVTs	DOCUMENT ID	TECN	COMMENT
seen	2k	AAIJ	15AB LHCb	pp at 7, 8 TeV
seen		AALTONEN	14i CDF	$p\bar{p}$ at 1.96 TeV

NODE=M220R02
 NODE=M220R02

 $B_J(5970)^+$ REFERENCES

YOUR PAPER AAJ 15AB JHEP 1504 024 R. Aaij *et al.* (LHCb Collab.)
 AALTONEN 14i PR D90 012013 T. Aaltonen *et al.* (CDF Collab.)

NODE=M220

REFID=56628
 REFID=56029
 NODE=M221

 $B_J(5970)^0$

$I(J^P) = \frac{1}{2}(?)$ Status: **
 I, J, P need confirmation.

Quantum numbers shown are quark-model predictions.

NODE=M221

 $m_{B_J(5970)^0} = m_{B^+}$

NODE=M221DM

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
691 ±5 OUR AVERAGE				

NODE=M221DM

YOUR DATA 689.9±2.9± 5.1 10K ¹ AAJ 15AB LHCb pp at 7, 8 TeV
 698 ±5 ±12 ² AALTONEN 14i CDF $p\bar{p}$ at 1.96 TeV
 • • • We do not use the following data for averages, fits, limits, etc. • • •

YOUR DATA 714.3±6.4± 5.1 10K ³ AAJ 15AB LHCb pp at 7, 8 TeV

OCCUR=2

YOUR NOTE ¹ AAJ 15AB reports $[m_{B_J^0} - m_{B^+}] - m_{\pi^-} = 550.4 \pm 2.9 \pm 5.1$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221DM;LINKAGE=B

² AALTONEN 14i reports $m_{B_J(5970)^0} - m_{B^+} - m_{\pi^-} = 558 \pm 5 \pm 12$ MeV which we adjusted by the π^- mass.

NODE=M221DM;LINKAGE=A

YOUR NOTE ³ AAJ 15AB reports $[m_{B_J^0} - m_{B^+}] - m_{\pi^-} = 575 \pm 6 \pm 5$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = (-1)^J$ and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221DM;LINKAGE=C

 $m_{B_J(5970)^0} - m_{B^{*+}}$

NODE=M221DM2

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
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NODE=M221DM2

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

YOUR DATA 691.6±3.7±5.1 10k ⁴ AAJ 15AB LHCb pp at 7, 8 TeV

YOUR NOTE ⁴ AAJ 15AB reports $[m_{B_J^0} - m_{B^+}] - (m_{B^{*+}} - m_{B^+}) - m_{\pi^-} = 552 \pm 4 \pm 5$ MeV which we adjust by the π^- mass. The masses inside the square brackets were measured for each candidate event. The result assumes $P = -(-1)^J$, $(m_{B^{*+}} - m_{B^+}) = 45.01 \pm 0.30 \pm 0.23$ MeV, and uses three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221DM2;LINKAGE=A

 $B_J(5970)^0$ WIDTH

NODE=M221W

VALUE (MeV)	EVTs	DOCUMENT ID	TECN	COMMENT
81±12 OUR AVERAGE				

NODE=M221W

YOUR DATA 82± 8± 9 10K ⁵ AAJ 15AB LHCb pp at 7, 8 TeV
 70⁺³⁰₋₂₀±30 AALTONEN 14i CDF $p\bar{p}$ at 1.96 TeV

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

YOUR DATA 56± 7± 9 10K ⁶ AAJ 15AB LHCb pp at 7, 8 TeV

OCCUR=2

YOUR DATA 82±10± 9 10K ⁷ AAJ 15AB LHCb pp at 7, 8 TeV

OCCUR=3

YOUR NOTE ⁵ Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221W;LINKAGE=A

YOUR NOTE ⁶ Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221W;LINKAGE=B

YOUR NOTE ⁷ Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.

NODE=M221W;LINKAGE=C

$B_J(5970)^0$ BRANCHING RATIOS

NODE=M221220

$\Gamma(B^+\pi^-)/\Gamma_{\text{total}}$ Γ_1/Γ
VALUE EVTs DOCUMENT ID TECN COMMENT

NODE=M221R01
NODE=M221R01
OCCUR=2

YOUR DATA possibly seen 10K ⁸ AAIJ 15AB LHCb pp at 7, 8 TeV
possibly seen AALTONEN 14i CDF $p\bar{p}$ at 1.96 TeV

YOUR NOTE ⁸ A $B\pi$ decay is forbidden from a $P = -(-1)^J$ parent, whereas $B^*\pi$ is allowed.

NODE=M221R01;LINKAGE=A

$\Gamma(B^{*+}\pi^-)/\Gamma_{\text{total}}$ Γ_2/Γ
VALUE EVTs DOCUMENT ID TECN COMMENT

NODE=M221R02
NODE=M221R02
OCCUR=2

YOUR DATA seen 10K AAIJ 15AB LHCb pp at 7, 8 TeV
seen AALTONEN 14i CDF $p\bar{p}$ at 1.96 TeV

$B_J(5970)^0$ REFERENCES

NODE=M221

YOUR PAPER AAIJ 15AB JHEP 1504 024 R. Aaij *et al.* (LHCb Collab.)
AALTONEN 14i PR D90 012013 T. Aaltonen *et al.* (CDF Collab.)

REFID=56628
REFID=56029