NODE=M248

$B_J(5970)$

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

Quantum numbers shown are quark-model predictions.

NODE=M248

$B_J(5970)$ MASS

NODE=M248205

$B_J(5970)^+$ MASS

NODE=M248M+

OUR FIT uses m_{B^0} and $m_{B_J(5970)^+} - m_{B^0}$ to determine $m_{B_J(5970)^+}$.

NODE=M248M+

VALUE (MeV)	DOCUMENT ID
5965±5 OUR FIT	

NODE=M248M+

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

NODE=M248DM+

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
685 ±5 OUR FIT					
685 ±5 OUR AVERAGE					
685.3±4.1± 2.5	2k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV
681 ±5 ±12	1.4k	[2] AALTONEN	14I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
686.8±4.5± 2.5	2k	[3] AAIJ	15AB	LHCB	pp at 7, 8 TeV

NODE=M248DM+
NODE=M248DM+
OCCUR=2

[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=M248DM+;LINKAGE=B

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

NODE=M248DM+;LINKAGE=A

[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=M248DM+;LINKAGE=C

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

NODE=M248DM1

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
686.0±4.0±2.5	2k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV

NODE=M248DM1
NODE=M248DM1

[1] 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=M248DM1;LINKAGE=A

$B_J(5970)^0$ MASS

NODE=M248M0

OUR FIT uses m_{B^+} and $m_{B_J(5970)^0} - m_{B^+}$ to determine $m_{B_J(5970)^0}$.

NODE=M248M0

VALUE (MeV)	DOCUMENT ID
5971±5 OUR FIT	

NODE=M248M0

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

NODE=M248DM0

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
691 ±5 OUR FIT					
691 ±5 OUR AVERAGE					
689.9±2.9± 5.1	10k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV
698 ±5 ±12	2.6k	[2] AALTONEN	14I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
714.3±6.4± 5.1	10k	[3] AAIJ	15AB	LHCB	pp at 7, 8 TeV

NODE=M248DM0
NODE=M248DM0
OCCUR=2

[1] AAIJ 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=M248DM0;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=M248DM0;LINKAGE=A

[3] AAIJ 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=M248DM0;LINKAGE=C

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

NODE=M248DM2
NODE=M248DM2

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$691.6 \pm 3.7 \pm 5.1$	10k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV

[1] AAIJ 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=M248DM2;LINKAGE=A

$B_J(5970)$ WIDTH

NODE=M248210

$B_J(5970)^+$ WIDTH

NODE=M248W+
NODE=M248W+

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
62 ± 20 OUR AVERAGE					
$63 \pm 15 \pm 17$	2k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV
$60^{+30}_{-20} \pm 40$	1.4k	AALTONEN	14I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$61 \pm 14 \pm 17$	2k	[2] AAIJ	15AB	LHCB	pp at 7, 8 TeV
$61 \pm 15 \pm 17$	2k	[3] AAIJ	15AB	LHCB	pp at 7, 8 TeV

OCCUR=2
OCCUR=3

[1] Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W+;LINKAGE=A

[2] Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W+;LINKAGE=B

[3] Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W+;LINKAGE=C

$B_J(5970)^0$ WIDTH

NODE=M248W0
NODE=M248W0

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
81 ± 12 OUR AVERAGE					
$82 \pm 8 \pm 9$	10k	[1] AAIJ	15AB	LHCB	pp at 7, 8 TeV
$70^{+30}_{-20} \pm 30$	2.6k	AALTONEN	14I	CDF	$p\overline{p}$ at 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$56 \pm 7 \pm 9$	10k	[2] AAIJ	15AB	LHCB	pp at 7, 8 TeV
$82 \pm 10 \pm 9$	10k	[3] AAIJ	15AB	LHCB	pp at 7, 8 TeV

OCCUR=2
OCCUR=3

[1] Assuming $P = (-1)^J$ and using two relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W0;LINKAGE=A

[2] Assuming $P = (-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W0;LINKAGE=B

[3] Assuming $P = -(-1)^J$ and using three relativistic Breit-Wigner functions in the fit for mass difference.
NODE=M248W0;LINKAGE=C

$B_J(5970)$ DECAY MODES

NODE=M248215;NODE=M248

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$B\pi$	possibly seen	DESIG=1
Γ_2	$B^*\pi$	seen	DESIG=2

$B_J(5970)$ BRANCHING RATIOS

NODE=M248220

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

NODE=M248R01
NODE=M248R01

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
possibly seen	2k	[1] AAIJ	15AB	LHCB	$\pm$	pp at 7, 8 TeV
possibly seen	10k	[1] AAIJ	15AB	LHCB	0	pp at 7, 8 TeV
possibly seen	2.6k	AALTONEN	14I	CDF	0	$p\overline{p}$ at 1.96 TeV
possibly seen	1.4k	AALTONEN	14I	CDF	$\pm$	$p\overline{p}$ at 1.96 TeV

OCCUR=2
OCCUR=2

[1] A $B\pi$ decay is forbidden from a $P = -(-1)^J$ parent, whereas $B^*\pi$ is allowed.
NODE=M248R01;LINKAGE=A

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

NODE=M248R02
NODE=M248R02

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
seen	10k	AAIJ	15AB	LHCB	0	pp at 7, 8 TeV
seen	2k	AAIJ	15AB	LHCB	$\pm$	pp at 7, 8 TeV
seen	2.6k	AALTONEN	14I	CDF	0	$p\overline{p}$ at 1.96 TeV
seen	1.4k	AALTONEN	14I	CDF	$\pm$	$p\overline{p}$ at 1.96 TeV

OCCUR=2
OCCUR=2

$B_J(5970)$ REFERENCES

NODE=M248

AAIJ 15AB JHEP 1504 024 R. Aaij *et al.* (LHCb Collab.) REFID=56628
AALTONEN 14I PR D90 012013 T. Aaltonen *et al.* (CDF Collab.) REFID=56029