B^0

$I(J^P) = \frac{1}{2}(0^-)$

Quantum numbers not measured. Values shown are quark-model predictions.

For measurements of the B mean life and for branching ratios in which the charge of the decaying B is not determined, see the $B^{\pm}$ section.

See the Notes "Experimental Highlights of B Meson Production and Decay" and "Semileptonic Decays of B Mesons" at the beginning of the $B^{\pm}$ Full Listings and the Note on "B^0-$\overline{B}^0$ Mixing and CP Violation in B Decay" near the end of the B^0 Full Listings.

B^0 MASS

The fit uses m_{B^+} and $(m_{B^0} - m_{B^+})$ to determine m_{B^0}. m_{B^0} data are excluded from the fit because they are not independent. These experiments actually measure the difference between half of E_{cm} and the B mass.

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
5279.0±2.0 OUR FIT					
5278.9±2.0 OUR AVERAGE					
5279.2±0.54±2.0	340	[1] ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
5278.0±0.4 ±2.0		[1] BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
5279.6±0.7 ±2.0	40	[1,2] ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
5280.6±0.8 ±2.0		[1] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
5278.2±1.0 ±3.0	40	ALBRECHT	87C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
5279.5±1.6 ±3.0	7	[3] ALBRECHT	87D	ARG	$e^+e^- \rightarrow \Upsilon(4S)$

[1] These experiments all report a common systematic error 2.0 MeV. We have artificially increased the systematic error to allow the experiments to be treated as independent measurements in our average. See "Treatment of Errors" section of the Introductory Text.
[2] ALBRECHT 90J assumes 10580 for $\Upsilon(4S)$ mass. Supersedes ALBRECHT 87C and ALBRECHT 87D.
[3] Found using fully reconstructed decays with J/ψ. ALBRECHT 87D assume $m_{\Upsilon(4S)} =$ 10577 MeV.

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

The mass difference measurements are not independent of the $B^{\pm}$ and B^0 mass measurement by the same experimenters.

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
0.34±0.29 OUR FIT Error includes scale factor of 1.1.				
0.34±0.32 OUR AVERAGE Error includes scale factor of 1.2.				
0.41±0.25±0.19	ALAM	94	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$
−0.4 ±0.6 ±0.5	BORTOLETTO	92	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
−0.9 ±1.2 ±0.5	ALBRECHT	90J	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
2.0 ±1.1 ±0.3	[4] BEBEK	87	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[4] BEBEK 87 actually measure the difference between half of E_{cm} and the $B^{\pm}$ or B^0 mass, so the $m_{B^0} - m_{B^{\pm}}$ is more accurate. Assume $m_{\Upsilon(4S)} = 10580$ MeV.

$m_{B^0_H} - m_{B^0_L}$

See the B^0-$\overline{B}^0$ MIXING section near the end of these B^0 Listings.

B^0 MEAN LIFE

See $B^{\pm}$ Full Listings for data on B hadron mean life averaged over species of bottom particles.

VALUE (10^{-12} s)	EVTS	DOCUMENT ID		TECN	COMMENT
1.50±0.11 OUR AVERAGE					
1.57±0.18±0.08	121	[5] ABE	94D	CDF	$p\overline{p}$ at 1.8 TeV
$1.17^{+0.29}_{-0.23}\pm0.16$	96	[6] ABREU	93D	DLPH	$e^+e^- \rightarrow Z$
1.55±0.25±0.18	76	[7] ABREU	93G	DLPH	$e^+e^- \rightarrow Z$
$1.51^{+0.24}_{-0.23}{}^{+0.12}_{-0.14}$	78	[6] ACTON	93C	OPAL	$e^+e^- \rightarrow Z$
$1.52^{+0.20}_{-0.18}{}^{+0.07}_{-0.13}$	77	[6] BUSKULIC	93D	ALEP	$e^+e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.20^{+0.52}_{-0.36}{}^{+0.16}_{-0.14}$	15	[8] WAGNER	90	MRK2	E^{ee}_{cm}= 29 GeV
$0.82^{+0.57}_{-0.37}\pm0.27$		[9] AVERILL	89	HRS	E^{ee}_{cm}= 29 GeV

[5] ABE 94D measured mean life using fully reconstructed decays.
[6] Data analyzed using $D / D^* \ell$anything event vertices.
[7] ABREU 93G data analyzed using charged and neutral vertices.
[8] WAGNER 90 tagged B^0 mesons by their decays into $D^{*-}e^+\nu$ and $D^{*-}\mu^+\nu$ where the D^{*-} is tagged by its decay into $\pi^-\overline{D}^0$.
[9] AVERILL 89 is an estimate of the B^0 mean lifetime assuming that $B^0 \rightarrow D^{*+} + X$ always.

MEAN LIFE RATIO τ_{B^+}/τ_{B^0}

The measurements at high energy are direct lifetime measurements while those at the $\Upsilon(4S)$ are inferred from the branching fractions for semileptonic decay or other spectator-dominated decays by assuming that the rates for such decays are equal for B^0 and B^+.

VALUE	CL%	EVTS	DOCUMENT ID		TECN	COMMENT
0.98±0.09 OUR AVERAGE						
1.02±0.16±0.05		269	[10] ABE	94D	CDF	$p\overline{p}$ at 1.8 TeV
$1.11^{+0.51}_{-0.39}\pm0.11$		188	[11] ABREU	93D	DLPH	$e^+e^- \rightarrow Z$
$1.01^{+0.29}_{-0.22}\pm0.12$		253	[12] ABREU	93G	DLPH	$e^+e^- \rightarrow Z$
$1.0\ ^{+0.33}_{-0.25}\pm0.08$		130	ACTON	93C	OPAL	$e^+e^- \rightarrow Z$
$0.96^{+0.19}_{-0.15}{}^{+0.18}_{-0.12}$		154	[11] BUSKULIC	93D	ALEP	$e^+e^- \rightarrow Z$
0.91±0.27±0.21			[13] ALBRECHT	92C	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
1.0 ±0.4		29	[13,14] ALBRECHT	92G	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
0.89±0.19±0.13			[13] FULTON	91	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$
1.00±0.23±0.14			[13] ALBRECHT	89L	ARG	$e^+e^- \rightarrow \Upsilon(4S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.49 to 2.3	90		[15] BEAN	87B	CLEO	$e^+e^- \rightarrow \Upsilon(4S)$

[10] ABE 94D is a direct measurement using fully reconstructed decays.
[11] Data analyzed using $D / D^* \ell$anything event vertices.
[12] ABREU 93G data analyzed using charged and neutral vertices.
[13] Assumes equal production of B^0 and B^+.
[14] ALBRECHT 92G data analyzed using $B \rightarrow D_s\overline{D}, D_s\overline{D}^*, D_s^*\overline{D}, D_s^*\overline{D}^*$ events.
[15] BEAN 87B assume the fraction of $B^0\overline{B}^0$ events at the $\Upsilon(4S)$ is 0.41.

B^0 DECAY MODES

$\overline{B}^0$ modes are charge conjugates of the modes below. Reactions indicate the weak decay vertex and do not include mixing. Decays in which the charge of the B is not determined are in the $B^{\pm}$ section.

Only data from $\Upsilon(4S)$ decays are used for branching fractions, with rare exceptions. The branching fractions listed below assume a 50:50 $B^0\overline{B}^0$:B^+B^- production ratio at the $\Upsilon(4S)$. We have attempted to bring older measurements up to date by rescaling their assumed $\Upsilon(4S)$ production ratio to 50:50 and their assumed D, D_s, D^*, and ψ branching ratios to current values whenever this would effect our averages and best limits significantly.

Indentation is used to indicate a subchannel of a previous reaction. All resonant subchannels have been corrected for resonance branching fractions to the final state so the sum of the subchannel branching fractions can exceed that of the final state.

	Mode	Fraction (Γ_i/Γ)	Confidence level
	Semileptonic and leptonic modes		
Γ_1	$\ell^+\nu_\ell$ anything	[a] (9.5 ±1.6) %	
Γ_2	$D^-\ell^+\nu_\ell$	[a] (1.9 ±0.5) %	
Γ_3	$D^*(2010)^-\ell^+\nu_\ell$	[a] (4.4 ±0.4) %	
Γ_4	$\rho^-\ell^+\nu_\ell$	[a] < 4.1 $\times 10^{-4}$	90%
Γ_5	$\pi^-\mu^+\nu_\mu$	seen	
	D, D^*, or D_s modes		
Γ_6	$D^-\pi^+$	(3.0 ±0.4) $\times 10^{-3}$	
Γ_7	$D^-\rho^+$	(7.8 ±1.4) $\times 10^{-3}$	
Γ_8	$\overline{D}^0\pi^+\pi^-$	< 1.6 $\times 10^{-3}$	90%
Γ_9	$D^*(2010)^-\pi^+$	(2.6 ±0.4) $\times 10^{-3}$	
Γ_{10}	$D^-\pi^+\pi^+\pi^-$	(8.0 ±2.5) $\times 10^{-3}$	
Γ_{11}	$(D^-\pi^+\pi^+\pi^-)$ nonresonant	(3.9 ±1.9) $\times 10^{-3}$	
Γ_{12}	$D^-\pi^+\rho^0$	(1.1 ±1.0) $\times 10^{-3}$	
Γ_{13}	$D^-a_1(1260)^+$	(6.0 ±3.3) $\times 10^{-3}$	
Γ_{14}	$D^*(2010)^-\pi^+\pi^0$	(1.5 ±0.5) %	
Γ_{15}	$D^*(2010)^-\rho^+$	(7.3 ±1.5) $\times 10^{-3}$	
Γ_{16}	$D^*(2010)^-\pi^+\pi^+\pi^-$	(1.19±0.27) %	
Γ_{17}	$(D^*(2010)^-\pi^+\pi^+\pi^-)$ non-resonant	(0.0 ±2.5) $\times 10^{-3}$	
Γ_{18}	$D^*(2010)^-\pi^+\rho^0$	(5.7 ±3.1) $\times 10^{-3}$	
Γ_{19}	$D^*(2010)^-a_1(1260)^+$	(1.5 ±0.7) %	
Γ_{20}	$D^*(2010)^-\pi^+\pi^+\pi^-\pi^0$	(3.4 ±1.8) %	
Γ_{21}	$\overline{D}_2^*(2460)^-\pi^+$	< 2.2 $\times 10^{-3}$	90%
Γ_{22}	$\overline{D}_2^*(2460)^-\rho^+$	< 4.9 $\times 10^{-3}$	90%
Γ_{23}	$D^-D_s^+$	(8 ±4) $\times 10^{-3}$	
Γ_{24}	$D^*(2010)^-D_s^+$	(1.2 ±0.6) %	
Γ_{25}	$D^-D_s^{*+}$	(2.1 ±1.5) %	
Γ_{26}	$D^*(2010)^-D_s^{*+}$	(2.0 ±1.2) %	
Γ_{27}	$D_s^+\pi^-$	< 2.9 $\times 10^{-4}$	90%