CP VIOLATION PARAMETERS

$|\mathrm{Re}(\epsilon_{B^0})|$

CP Impurity in B^0_d system. It is obtained from $a_{\ell\ell}$, the charge asymmetry in like-sign dilepton events at the $\Upsilon(4S)$.

$$\mathrm{Re}(\epsilon_{B^0}) \simeq \frac{1}{4} a_{\ell\ell} = \frac{1}{4}\ \frac{N(\ell^+\ell^+) - N(\ell^-\ell^-)}{N(\ell^+\ell^+) + N(\ell^-\ell^-)}\ .$$

VALUE	*DOCUMENT ID*	*TECN*	*COMMENT*
<0.045	[208] BARTELT 93	CLE2	$e^+e^- \rightarrow \Upsilon(4S)$

[208] BARTELT 93 finds $a_{\ell\ell} = 0.031 \pm 0.096 \pm 0.032$ which corresponds to $|a_{\ell\ell}| < 0.18$, which yields the above $\mathrm{Re}(\epsilon_{B^0})$.

B^0 REFERENCES

ABE 94D PRL 72 3456 +Albrow, Amidei, Anway-Wiese, Apollinari (CDF Collab.)
AKERS 94C PL B327 411 +Alexander, Allison, Anderson, Arcelli+ (OPAL Collab.)
ALAM 94 PR D (to be pub.) +Kim, Nemati, O'Neill, Severini+ (CLEO Collab.)
CLNS 94-1270
ALBRECHT 94 PL B324 249 +Ehrlichmann, Hamacher+ (ARGUS Collab.)
AMMAR 94 PR D49 5701 +Ball, Baringer, Bean, Besson, Coppage+ (CLEO Collab.)
BUSKULIC 94B PL B322 441 +De Bonis, Decamp, Ghez, Goy, Lees+ (ALEPH Collab.)
PDG 94 PR D50 1173 Montanet+ (CERN, LBL, BOST, IFIC+)
PROCARIO 94 PRL (to be pub.) +Balest, Cho, Daoudi, Ford+ (CLEO Collab.)
CLNS 93/1264, CLEO 93-24
STONE 94 HEPSY 93-11
ABREU 93D ZPHY C57 181 +Adam, Adye, Agasi, Alekseev+ (DELPHI Collab.)
ABREU 93G PL B312 253 +Adam, Adye, Agasi, Ajinenko+ (DELPHI Collab.)
ACTON 93C PL B307 247 +Alexander, Allison, Allport, Anderson+ (OPAL Collab.)
ALBRECHT 93 ZPHY C57 533 +Ehrlichmann, Hamacher, Hofmann+ (ARGUS Collab.)
ALBRECHT 93E ZPHY C60 11 +Ehrlichmann, Hamacher, Hofmann+ (ARGUS Collab.)
ALEXANDER 93B PL B319 365 +Bebek, Berkelman, Bloom, Browder+ (CLEO Collab.)
AMMAR 93 PRL 71 674 +Ball, Baringer, Coppage, Copty+ (CLEO Collab.)
BARTELT 93 PRL 71 1680 +Csorna, Egyed, Jain, Sheldon+ (CLEO Collab.)
BATTLE 93 PRL 71 3922 +Ernst, Kroha, Kwon, Roberts+ (CLEO Collab.)
BEAN 93B PRL 70 2681 +Gronberg, Kutschke, Menary, Morrison+ (CLEO Collab.)
BUSKULIC 93D PL B307 194 +Decamp, Goy, Lees, Minard+ (ALEPH Collab.)
BUSKULIC 93K PL B313 498 +De Bonis, Decamp, Ghez, Goy+ (ALEPH Collab.)
SANGHERA 93 PR D47 791 +Skwarnicki, Stroynowski, Artuso, Goldberg+ (CLEO Collab.)
ALBRECHT 92C PL B275 195 +Ehrlichmann, Hamacher, Krueger, Nau+ (ARGUS Collab.)
ALBRECHT 92G ZPHY C54 1 +Ehrlichmann, Hamacher, Krueger, Nau+ (ARGUS Collab.)
ALBRECHT 92L ZPHY C55 357 +Ehrlichmann, Hamacher, Krueger, Nau+ (ARGUS Collab.)
BORTOLETTO 92 PR D45 21 +Brown, Dominick, McIlwain+ (CLEO Collab.)
HENDERSON 92 PR D45 2212 +Kinoshita, Pipkin, Procario+ (CLEO Collab.)
KRAMER 92 PL B279 181 +Palmer (HAMB, OSU)
ALBAJAR 91C PL B262 163 +Albrow, Allkofer, Ankoviak, Apsimon+ (UA1 Collab.)
ALBAJAR 91E PL B273 540 +Albrow, Allkofer, Ankoviak+ (UA1 Collab.)
ALBRECHT 91B PL B254 288 +Glaeser, Harder, Krueger, Nippe+ (ARGUS Collab.)
ALBRECHT 91C PL B255 297 +Ehrlichmann, Glaeser, Harder, Krueger+ (ARGUS Collab.)
ALBRECHT 91E PL B262 148 +Glaeser, Harder, Krueger, Nippe+ (ARGUS Collab.)
BERKELMAN 91 ARNPS 41 1 +Stone (CORN, SYRA)
"Decays of *B* Mesons"
FULTON 91 PR D43 651 +Jensen, Johnson, Kagan, Kass+ (CLEO Collab.)
ALBRECHT 90B PL B241 278 +Glaeser, Harder, Krueger, Nilsson+ (ARGUS Collab.)
ALBRECHT 90J ZPHY C48 543 +Ehrlichmann, Harder, Krueger+ (ARGUS Collab.)
BORTOLETTO 90 PRL 64 2117 +Goldberg, Horwitz, Jain, Mestayer+ (CLEO Collab.)
ELSEN 90 ZPHY C46 349 +Allison, Ambrus, Barlow, Bartel+ (JADE Collab.)
ROSNER 90 PR D42 3732
WAGNER 90 PRL 64 1095 +Hinshaw, Ong, Snyder+ (Mark II Collab.)
ALBRECHT 89C PL B219 121 +Boeckmannn, Glaeser, Harder+ (ARGUS Collab.)
ALBRECHT 89G PL B229 304 +Glaeser, Harder, Krueger+ (ARGUS Collab.)
ALBRECHT 89J PL B229 175 +Glaser, Harder+ (ARGUS Collab.)
ALBRECHT 89L PL B232 554 +Glaeser, Harder, Krueger, Nippe, Oest+ (ARGUS Collab.)
ARTUSO 89 PRL 62 2233 +Bebek, Berkelman, Blucher+ (CLEO Collab.)
AVERILL 89 PR D39 123 +Blockus, Brabson+ (HRS Collab.)
AVERY 89B PL B223 470 +Besson, Garren, Yelton+ (CLEO Collab.)
BEBEK 89 PRL 62 8 +Berkelman, Blucher+ (CLEO Collab.)
BORTOLETTO 89 PRL 62 2436 +Goldberg, Horwitz, Mestayer+ (CLEO Collab.)
BORTOLETTO 89B PRL 63 1667 +Goldberg, Horwitz, Mestayer+ (CLEO Collab.)
ALBRECHT 88F PL B209 119 +Boeckmann, Glaeser+ (ARGUS Collab.)
ALBRECHT 88K PL B215 424 +Boeckmann, Glaeser+ (ARGUS Collab.)
ALBRECHT 87C PL B185 218 +Binder, Boeckmann, Glaser+ (ARGUS Collab.)
ALBRECHT 87D PL B199 451 +Andam, Binder, Boeckmann+ (ARGUS Collab.)
ALBRECHT 87I PL B192 245 +Andam, Binder, Boeckmann+ (ARGUS Collab.)
ALBRECHT 87J PL B197 452 +Andam, Binder, Boeckmann+ (ARGUS Collab.)
AVERY 87 PL B183 429 +Besson, Bowcock, Giles+ (CLEO Collab.)
BEAN 87B PRL 58 183 +Bobbink, Brock, Engler+ (CLEO Collab.)
BEBEK 87 PR D36 1289 +Berkelman, Blucher, Cassel+ (CLEO Collab.)
ALAM 86 PR D34 3279 +Katayama, Kim, Sun+ (CLEO Collab.)
ALBRECHT 86F PL B182 95 +Binder, Boeckmann, Glaser+ (ARGUS Collab.)
PDG 86 PL 170B Aguilar-Benitez, Porter+ (CERN, CIT+)
CHEN 85 PR D31 2386 +Goldberg, Horwitz, Jawahery+ (CLEO Collab.)
HAAS 85 PRL 55 1248 +Hempstead, Jensen, Kagan+ (CLEO Collab.)
AVERY 84 PRL 53 1309 +Bebek, Berkelman, Cassel+ (CLEO Collab.)
GILES 84 PR D30 2279 +Hassard, Hempstead, Kinoshita+ (CLEO Collab.)
BEHRENDS 83 PRL 50 881 +Chadwick, Chauveau, Ganci+ (CLEO Collab.)

OTHER RELATED PAPERS

WINSTEIN 93 RMP 65 1113 +Wolfenstein
"The Search for Direct *CP* Violation"
BERKELMAN 91 ARNPS 41 1 +Stone (CORN, SYRA)
"Decays of *B* Mesons"
MILLER 90 MPL A5 2683
"Recent Results in *B* Physics"
SCHINDLER 88 High Energy Electron-Positron Physics 234 (SLAC)
Editors: A. Ali and P. Soeding, World Scientific, Singapore
SCHUBERT 87 IHEP-HD/87-7 (HEIDH)
EPS Conference – Uppsala, Proc., Vol. 2, p. 791

B^*

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

I, *J*, *P* need confirmation. Quantum numbers shown are quark-model predictions.

B^* MASS

From mass difference below and the average of our *B* masses $(m_{B^\pm}+m_{B^0})/2$.

VALUE (MeV)	*DOCUMENT ID*
5324.8±2.1 OUR FIT	

$m_{B^*} - m_B$

VALUE (MeV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
46.0±0.6 OUR FIT				
46.0±0.6 OUR AVERAGE				
46.4±0.3±0.8		[1] AKERIB 91	CLE2	$e^+e^- \rightarrow \gamma X$
45.6±0.8		[1] WU 91	CSB2	$e^+e^- \rightarrow \gamma X, \gamma \ell X$
45.4±1.0		[2] LEE-FRANZINI 90	CSB2	$e^+e^- \rightarrow \Upsilon(5S)$
• • • We do not use the following data for averages, fits, limits, etc. • • •				
52.0±2. ±4.	1400	[3] HAN 85	CUSB	$e^+e^- \rightarrow \gamma e X$

[1] These papers report E_γ in the B^* center of mass. The $m_{B^*} - m_B$ is 0.2 MeV higher. E_{cm} = 10.61–10.7 GeV. Admixture of B^0 and B^+ mesons, but not B_s.

[2] LEE-FRANZINI 90 value is for an admixture of B^0 and B^+. They measure $46.7 \pm 0.4 \pm 0.2$ MeV for an admixture of B^0, B^+, and B_s, and use the shape of the photon line to separate the above value.

[3] HAN 85 is for E_{cm} = 10.6–11.2 GeV, giving an admixture of B^0, B^+, and B_s.

B^* REFERENCES

AKERIB 91 PRL 67 1692 +Barish, Cown, Eigen, Stroynowski+ (CLEO Collab.)
WU 91 PL B273 177 +Franzini, Kanekal, Tuts+ (CUSB II Collab.)
LEE-FRANZINI 90 PRL 65 2947 +Heintz, Lovelock, Narain, Schamberger+ (CUSB II Collab.)
HAN 85 PRL 55 36 +Klopfenstein, Mageras+ (COLU, LSU, MPIM, STON)

BOTTOM, STRANGE MESONS
$(B = \pm1,\ S = \mp1)$

$B^0_s = s\overline{b}$, $\overline{B}^0_s = \overline{s}\,b$, similarly for B^*_s's

B^0_s

$I(J^P) = 0(0^-)$

I, *J*, *P* need confirmation. Quantum numbers shown are quark-model predictions.

B^0_s MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*	*TECN*	*COMMENT*
5375 ± 6 OUR FIT Error includes scale factor of 1.3.				
5375 ± 5 OUR AVERAGE Error includes scale factor of 1.2.				
5374 ±16 ±2	3	ABREU 94D	DLPH	$e^+e^- \rightarrow Z$
5383.3± 4.5±5.0	14	ABE 93F	CDF	$p\overline{p}$ at 1.8 TeV
5368.6± 5.6±1.5	2	BUSKULIC 93G	ALEP	$e^+e^- \rightarrow Z$

$m_{B^0_s} - m_B$

Fit value is from B_s mass above and the average of our *B* masses $(m_{B^\pm}+m_{B^0})/2$.

VALUE (MeV)	*CL%*	*DOCUMENT ID*	*TECN*	*COMMENT*
96±6 OUR FIT Error includes scale factor of 1.3.				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
80 to 130	68	LEE-FRANZINI 90	CSB2	$e^+e^- \rightarrow \Upsilon(5S)$

$m_{B^0_{sH}} - m_{B^0_{sL}}$

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