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

$7.1\pm\ 5.4\pm\ 0.7$	5.2	89.66	[173] ACTON	93K OPAL
$13.1\pm\ 4.7\pm\ 1.3$	10.8	92.75	[173] ACTON	93K OPAL
$9.3\pm\ 1.1$		91.2	[178] QUAST	93 RVUE
$8.6\pm\ 1.5\pm\ 0.7$	8.2	91.24	[179] ADRIANI	92D L3
$2.5\pm\ 5.1\pm\ 0.7$	5.3	89.67	[176] ADRIANI	92D L3
$6.2\pm\ 4.2\pm\ 0.7$	10.8	92.81	[176] ADRIANI	92D L3
$9.7\pm\ 5.7\pm\ 1.4$	9.	91	AKRAWY	91E OPAL
$-71\ \pm 34\ {}^{+\ 7}_{-\ 8}$	-58	58.3	SHIMONAKA	91 TOPZ
$-22.2\pm\ 7.7\pm\ 3.5$	-26.0	35	BEHREND	90D CELL
$-49.1\pm16.0\pm\ 5.0$	-39.7	43	BEHREND	90D CELL
$-28\ \pm 11$	-23	35	BRAUNSCH...	90 TASS
$-16.6\pm\ 7.7\pm\ 4.8$	-24.3	35	ELSEN	90 JADE
$-33.6\pm22.2\pm\ 5.2$	-39.9	44	ELSEN	90 JADE
$3.4\pm\ 7.0\pm\ 3.5$	-16.0	29.0	BAND	89 MAC
$-72\ \pm 28\ \pm 13$	-56	55.2	SAGAWA	89 AMY

[173] ACTON 93K use the lepton tagging technique. The systematic error includes the uncertainty on the mixing parameter.

[174] AKERS 93D identify the b and c decays using D^*.

[175] B tagging via its semimuonic decay. Experimental value corrected using average LEP B^0-$\overline{B}^0$ mixing parameter $\chi = 0.143 \pm 0.023$.

[176] ADRIANI 92D use both electron and muon semileptonic decays. The quoted systematic error is common to all measurements.

[177] DECAMP 91E use the lepton-tagging technique.

[178] QUAST 93 is a combined analysis of LEP results as of Feb. 1993.

[179] ADRIANI 92D use both electron and muon semileptonic decays. For this measurement ADRIANI 92D average over all $\sqrt{s}$ values to obtain a single result.

CHARGE ASYMMETRY IN $e^+e^- \rightarrow q\overline{q}$

Summed over five lighter flavors.

Experimental and Standard Model values are somewhat event-selection dependent. Standard Model expectations contain some assumptions on B^0-$\overline{B}^0$ mixing and on other electroweak parameters.

ASYMMETRY (%)	STD. MODEL	$\sqrt{s}$ (GeV)	DOCUMENT ID	TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •				
3.93 ± 0.65		91.2	[180] QUAST	93 RVUE
$-\ 0.76\pm0.12\pm0.15$		91.2	[181] ABREU	92I DLPH
$4.0\ \pm0.4\ \pm0.63$	4.0	91.3	[182] ACTON	92L OPAL
$9.1\ \pm1.4\ \pm1.6$	9.0	57.9	ADACHI	91 TOPZ
$-\ 0.84\pm0.15\pm0.04$		91	DECAMP	91B ALEP
$8.3\ \pm2.9\ \pm1.9$	8.7	56.6	STUART	90 AMY
$11.4\ \pm2.2\ \pm2.1$	8.7	57.6	ABE	89L VNS
$6.0\ \pm1.3$	5.0	34.8	GREENSHAW	89 JADE
$8.2\ \pm2.9$	8.5	43.6	GREENSHAW	89 JADE

[180] QUAST 93 is a combined analysis of LEP results as of Feb. 1993.

[181] ABREU 92I has 0.14 systematic error due to uncertainty of quark fragmentation.

[182] ACTON 92L use the weight function method on 259k selected $Z \rightarrow$ hadrons events. The systematic error includes a contribution of 0.2 due to B^0-$\overline{B}^0$ mixing effect, 0.4 due to Monte Carlo (MC) fragmentation uncertainties and 0.3 due to MC statistics. ACTON 92L derive a value of $\sin^2\theta_W^{\mathrm{eff}}$ to be $0.2321 \pm 0.0017 \pm 0.0028$.

CHARGE ASYMMETRY IN $p\overline{p} \rightarrow\ Z \rightarrow\ e^+e^-$

ASYMMETRY (%)	STD. MODEL	$\sqrt{s}$ (GeV)	DOCUMENT ID	TECN
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$5.2\pm5.9\pm0.4$		91	ABE	91E CDF

Z REFERENCES

ABE 94C PRL (to be pub.) +Abt, Ash, Aston, Bacchetta, Baird+ (SLD Collab.)
ABREU 94 NP B418 403 +Adam, Adye, Agasi+ (DELPHI Collab.)
ABREU 94B PL B327 386 +Adam, Adye, Agasi+ (DELPHI Collab.)
ACCIARRI 94 ZPHY C62 551 +Adam, Adriani, Aguilar-Benitez+ (L3 Collab.)
AKERS 94 ZPHY C61 19 +Alexander, Allison+ (OPAL Collab.)
AKERS 94D ZPHY C61 357 +Alexander, Allison+ (OPAL Collab.)
BUSKULIC 94 ZPHY C62 539 +Casper, De Bonis, Decamp, Ghez, Goy+ (ALEPH Collab.)
ABE 93 PRL 70 2515 +Abt, Acton+ (SLD Collab.)
ABREU 93B PL B298 247 +Adam, Adye, Agasi+ (DELPHI Collab.)
ABREU 93I ZPHY C59 533 +Adam, Adye, Agasi+ (DELPHI Collab.)
ABREU 93L PL B318 249 +Adam, Adami, Adye+ (DELPHI Collab.)
ACTON 93D ZPHY C58 219 +Alexander, Allison+ (OPAL Collab.)
ACTON 93E PL B311 391 +Akers, Alexander+ (OPAL Collab.)
ACTON 93F ZPHY C58 405 +Alexander, Allison+ (OPAL Collab.)
ACTON 93I ZPHY C58 523 +Alexander, Allison+ (OPAL Collab.)
ACTON 93K ZPHY C60 19 +Akers, Alexander+ (OPAL Collab.)
ACTON 93M ZPHY C60 579 +Akers, Alexander+ (OPAL Collab.)
ADRIANI 93E PL B307 237 +Aguilar-Benitez, Ahlen+ (L3 Collab.)
ADRIANI 93F PL B309 451 +Aguilar-Benitez, Ahlen+ (L3 Collab.)
ADRIANI 93H PL B315 494 +Aguilar-Benitez, Ahlen+ (L3 Collab.)
ADRIANI 93I PL B316 427 +Aguilar-Benitez, Ahlen+ (L3 Collab.)
ADRIANI 93J PL B317 467 +Aguilar-Benitez, Ahlen, Alcaraz+ (L3 Collab.)
ADRIANI 93M PRPL 236 1 +Aguilar-Benitez, Ahlen, Alcaraz, Aloisio+ (L3 Collab.)
Also 92H PL B294 466 Adriani, Aguilar-Benitez, Ahlen, Alcaraz+ (L3 Collab.)
AKERS 93B ZPHY C60 199 +Alexander, Allison, Anderson, Arcelli+ (OPAL Collab.)
AKERS 93D ZPHY C60 601 +Alexander, Allison+ (OPAL Collab.)
BUSKULIC 93J ZPHY C60 71 +Decamp, Goy, Lees, Minard+ (ALEPH Collab.)
BUSKULIC 93L PL B313 520 +De Bonis, Decamp+ (ALEPH Collab.)
BUSKULIC 93M PL B313 535 +De Bonis, Decamp+ (ALEPH Collab.)
BUSKULIC 93N PL B313 549 +De Bonis, Decamp+ (ALEPH Collab.)
BUSKULIC 93P ZPHY C59 369 +Decamp, Goy+ (ALEPH Collab.)
LEP 93 PL B307 187 +LEP Energy Group, LEP Collabs (LEP Collabs.)
QUAST 93 MPL A8 675 (DESY)
ABREU 92 ZPHY C53 567 +Adam, Adami, Adye+ (DELPHI Collab.)
ABREU 92G PL B275 231 +Adam, Adami, Adye+ (DELPHI Collab.)
ABREU 92H PL B276 536 +Adam, Adami, Adye+ (DELPHI Collab.)
ABREU 92I PL B277 371 +Adam, Adami, Adye+ (DELPHI Collab.)
ABREU 92K PL B281 383 +Adam, Adami, Adye+ (DELPHI Collab.)
ABREU 92M PL B289 199 +Adam, Adye, Agasi, Alekseev+ (DELPHI Collab.)
ABREU 92N ZPHY C55 555 +Adam, Adye, Agasi+ (DELPHI Collab.)
ABREU 92O PL B295 383 +Adam, Adami, Adye+ (DELPHI Collab.)
ACTON 92I ZPHY C55 191 +Alexander, Allison, Allport+ (OPAL Collab.)
ACTON 92J PL B291 503 +Alexander, Allison, Allport+ (OPAL Collab.)
ACTON 92L PL B294 436 +Alexander, Allison, Allport+ (OPAL Collab.)
ADEVA 92 PL B275 209 +Adriani, Aguilar-Benitez+ (L3 Collab.)
ADRIANI 92B PL B288 404 +Aguilar-Benitez, Ahlen, Akbari, Alcaraz+ (L3 Collab.)
ADRIANI 92D PL B292 454 +Aguilar-Benitez, Ahlen, Akbari+ (L3 Collab.)
ADRIANI 92E PL B292 463 +Aguilar-Benitez, Ahlen, Akbari, Alcaraz+ (L3 Collab.)
ALITTI 92B PL B276 354 +Ambrosini, Ansari, Autiero, Bareyre+ (UA2 Collab.)
BANERJEE 92 IJMP A7 1853 +Ganguli, Gurtu (TATA)
BARDADIN-... 92 ZPHY C55 163 Bardadin-Otwinowska (CLER)
DECAMP 92 PRPL 216 253 +Deschizeaux, Goy, Lees, Minard+ (ALEPH Collab.)
DECAMP 92B ZPHY C53 1 +Deschizeaux, Goy, Lees, Minard+ (ALEPH Collab.)
LEP 92 PL B276 247 +ALEPH, DELPHI, L3, OPAL (LEP Collabs.)
ABE 91E PRL 67 1502 +Amidei, Apollinari+ (CDF Collab.)
ABREU 91 PL B260 240 +Adam, Adami+ (DELPHI Collab.)
ABREU 91E PL B268 296 +Adam, Adami, Adye, Akesson+ (DELPHI Collab.)
ABREU 91F NP B367 511 +Adam, Adami, Adye, Akesson+ (DELPHI Collab.)
ACTON 91B PL B273 338 +Alexander, Allison, Allport, Anderson+ (OPAL Collab.)
ADACHI 91 PL B255 613 +Anazawa, Doser, Enomoto+ (TOPAZ Collab.)
ADEVA 91C PL B261 177 +Adriani, Aguilar-Benitez, Akbari+ (L3 Collab.)
ADEVA 91E ZPHY C51 179 +Adriani, Aguilar-Benitez, Akbari, Alcaraz+ (L3 Collab.)
AKRAWY 91B PL B254 293 +Alexander, Allison+ (OPAL Collab.)
AKRAWY 91D ZPHY C50 373 +Alexander, Allison, Allport, Anderson+ (OPAL Collab.)
AKRAWY 91E PL B263 311 +Alexander, Allison+ (OPAL Collab.)
AKRAWY 91F PL B257 531 +Alexander, Allison, Allport, Anderson+ (OPAL Collab.)
ALEXANDER 91B PL B262 341 +Allison, Allport, Anderson, Arcelli+ (OPAL Collab.)
ALEXANDER 91C PL B264 467 (OPAL Collab.)
ALEXANDER 91D PL B266 201 +Allison, Allport, Anderson+ (OPAL Collab.)
ALEXANDER 91E PL B264 219 +Allison, Allport+ (OPAL Collab.)
ALEXANDER 91F ZPHY C52 175 +Allison, Allport, Anderson, Arcelli+ (OPAL Collab.)
ALEXANDER 91G PL B266 485 +Allison, Allport+ (OPAL Collab.)
DECAMP 91B PL B259 377 +Deschizeaux, Goy+ (ALEPH Collab.)
DECAMP 91E PL B263 325 +Deschizeaux, Goy+ (ALEPH Collab.)
DECAMP 91J PL B266 218 +Deschizeaux, Goy, Lees+ (ALEPH Collab.)
JACOBSEN 91 PRL 67 3347 +Koetke, Adolphsen, Fujino+ (Mark II Collab.)
SHIMONAKA 91 PL B268 457 +Fujii, Miyamoto+ (TOPAZ Collab.)
ABE 90I ZPHY C48 13 +Amako, Arai, Asano, Chiba+ (VENUS Collab.)
ABREU 90H PL B252 140 +Adam, Adami, Adye+ (DELPHI Collab.)
ADEVA 90D PL B238 122 +Adriani, Aguilar-Benitez, Akbari+ (L3 Collab.)
ADEVA 90E PL B241 416 +Adriani, Aguilar-Benitez, Akbari+ (L3 Collab.)
ADEVA 90K PL B250 199 +Adriani, Aguilar-Benitez, Akbari, Alcarez+ (L3 Collab.)
AKRAWY 90F PL B241 133 +Alexander, Allison, Allport+ (OPAL Collab.)
AKRAWY 90J PL B246 285 +Alexander, Allison, Allport, Anderson+ (OPAL Collab.)
BEHREND 90D ZPHY C47 333 +Criegee, Field, Franke, Jung+ (CELLO Collab.)
BRAUNSCH... 90 ZPHY C48 433 Braunschweig, Gerhards, Kirschfink+ (TASSO Collab.)
DECAMP 90J PL B241 635 +Deschizeaux, Goy, Lees+ (ALEPH Collab.)
DECAMP 90L PL B244 551 +Deschizeaux, Goy+ (ALEPH Collab.)
ELSEN 90 ZPHY C46 349 +Allison, Ambrus, Barlow, Bartel+ (JADE Collab.)
HEGNER 90 ZPHY C46 547 +Naroska, Schroth, Allison+ (JADE Collab.)
KRAL 90 PRL 64 1211 +Abrams, Adolphsen, Averill, Ballam+ (Mark II Collab.)
STUART 90 PRL 64 983 +Breedon, Kim, Ko, Lander, Maeshima+ (AMY Collab.)
ABE 89 PRL 62 613 +Amidei, Apollinari, Ascori, Atac+ (CDF Collab.)
ABE 89C PRL 63 720 +Amidei, Apollinari, Atac, Auchincloss+ (CDF Collab.)
ABE 89L PL B232 425 +Amako, Arai, Asano, Chiba+ (VENUS Collab.)
ABRAMS 89B PRL 63 2173 +Adolphsen, Averill, Ballam, Barish+ (Mark II Collab.)
ABRAMS 89D PRL 63 2780 +Adolphsen, Averill, Ballam, Barish+ (Mark II Collab.)
ALBAJAR 89 ZPHY C44 15 +Albrow, Allkofer, Arnison, Astbury+ (UA1 Collab.)
BACALA 89 PL B218 112 +Malchow, Sparks, Imlay, Kirk+ (AMY Collab.)
BAND 89 PL B218 369 +Camporesi, Chadwick, Delfino, Desangro+ (MAC Collab.)
GREENSHAW 89 ZPHY C42 1 +Warming, Allison, Ambrus, Barlow+ (JADE Collab.)
OULD-SAADA 89 ZPHY C44 567 +Allison, Ambrus, Barlow, Bartel+ (JADE Collab.)
SAGAWA 89 PRL 63 2341 +Lim, Abe, Fujii, Higashi+ (AMY Collab.)
ADACHI 88C PL B208 319 +Aihara, Dijkstra, Enomoto, Fujii+ (TOPAZ Collab.)
ADEVA 88 PR D38 2665 +Anderhub, Ansari, Becker+ (Mark-J Collab.)
BRAUNSCH... 88D ZPHY C40 163 Braunschweig, Gerhards, Kirschfink+ (TASSO Collab.)
ANSARI 87 PL B186 440 +Bagnaia, Banner, Battiston+ (UA2 Collab.)
BEHREND 87C PL B191 209 +Buerger, Criegee, Dainton+ (CELLO Collab.)
BARTEL 86C ZPHY C30 371 +Becker, Cords, Felst, Haidt+ (JADE Collab.)
Also 85B ZPHY C26 507 Bartel, Becker, Bowdery, Cords+ (JADE Collab.)
Also 82 PL 108B 140 Bartel, Cords, Dittmann, Eichler+ (JADE Collab.)
ASH 85 PRL 55 1831 +Band, Blume, Camporesi+ (MAC Collab.)
BARTEL 85F PL 161B 188 +Becker, Cords, Felst+ (JADE Collab.)
DERRICK 85 PR D31 2352 +Fernandez, Fries, Hyman+ (HRS Collab.)
FERNANDEZ 85 PRL 54 1624 +Ford, Qi, Read+ (MAC Collab.)
LEVI 83 PRL 51 1941 +Blocker, Strait+ (Mark II Collab.)
BEHREND 82 PL 114B 282 +Chen, Fenner, Field+ (CELLO Collab.)
BRANDELIK 82C PL 110B 173 +Braunschweig, Gather (TASSO Collab.)

Searches for Higgs Bosons — H^0 and $H^{\pm}$

NOTE ON THE HIGGS BOSON

(by I. Hinchliffe, LBL)

The Standard Model [1] contains one neutral scalar Higgs boson, which is a remnant of the mechanism that breaks the SU(2) $\times$ U(1) symmetry and generates the W and Z boson masses. The Higgs couples to quarks and leptons of mass m_f with a strength $gm_f/2M_W$. Its coupling to W and Z bosons is of strength g, where g is the coupling constant of the SU(2) gauge theory. Consequently its coupling to stable matter is very small, and its production and detection in experiments is difficult. An exception is its production in the decay of the Z boson. Since large numbers of Z's can be produced and the coupling of the Z to the Higgs is unsuppressed, experiments