also within one collaboration if different (partially correlated) methods are employed to extract the same quantity.

Extraction of $\Gamma(b\overline{b})/\Gamma$(hadrons)

Three methods have been used to tag a b quark: lepton tagging, analysis of event shape, and lifetime tagging. The latter includes impact-parameter or decay-length double tags, or in combination with the lepton or event-shape tags. The various sources of common systematic errors are:

- Semileptonic decay model;
- Semileptonic branching ratios of b and c quarks;
- $c\overline{c}$ contamination, $\Gamma(c\overline{c})/\Gamma(\text{hadrons})$;
- Variation of Monte Carlo parameters, in particular the b-fragmentation function;
- Hemisphere correlations.

Some other possible common errors due to charmed hadron composition, b,c production in uds events, *etc.* are expected to be small.

Extraction of $\Gamma(c\overline{c})/\Gamma$(hadrons)

In addition to the methods of lepton tagging, event-shape analysis, and lifetime tags, $D^*(2010)$ tagging is also used to identify c quarks. The common systematic errors are basically the same as for the b-tagging case, where instead of $c\overline{c}$ contamination, it is $b\overline{b}$ contamination.

Extraction of $A_{FB}^{(0,b)}$ and $A_{FB}^{(0,c)}$

For determining the asymmetry, it is essential to identify the charge of the quark in addition to tagging an event as due to $b\overline{b}$ or $c\overline{c}$. Thus, asymmetry measurements have utilized a lepton tag and a lifetime tag in combination with a jet-charge measurement and a $D^*(2010)$ tag. The values of $A_{FB}^{(0,b)}$ are corrected for the effect of $B^0\overline{B^0}$ mixing. The common errors in $A_{FB}^{(0,b)}$ are due to:

- Semileptonic decay model and branching ratios;
- Fragmentation;
- $\Gamma(b\overline{b})$ and $\Gamma(c\overline{c})$;
- $B^0\overline{B^0}$ mixing;
- $A_{FB}^{(0,c)}$.

For $A_{FB}^{(0,c)}$ the first four common errors are the same as for $A_{FB}^{(0,b)}$. The fifth error is due to $A_{FB}^{(0,b)}$; the sixth is due to the uncertainty in the probability of producing a $D^*(2010)$ in $c\overline{c}$ and $b\overline{b}$ events and in the $D^*(2010)$ branching ratio.

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Z MASS

The fit is performed using the Z mass and width, the Z hadronic pole cross section, the ratios of hadronic to leptonic partial widths, and the Z pole forward-backward lepton asymmetries. We believe that this set is the most free of correlations. Common systematic errors are taken into account. For more details, see the the 'Note on the Z Boson.'

The Z-boson mass listed here corresponds to a Breit-Wigner resonance parameter. The value is 34 MeV greater than the real part of the position of the pole (in the energy plane) in the Z-boson propagator. Also the LEP experiments have generally assumed a fixed value of the $\gamma - Z$ interferences term based on the standard model. Keeping this term as free parameter leads to a somewhat larger error on the fitted Z mass. See ADRIANI 93H for a detailed investigation of both these issues.

VALUE (GeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
91.187±0.007 OUR FIT					
91.188±0.007 OUR AVERAGE					
91.187±0.007±0.006	1.15M	[1] ABREU	94	DLPH	E^{ee}_{cm}= 88–94 GeV
91.195±0.006±0.007	1.2M	[1] ACCIARRI	94	L3	E^{ee}_{cm}= 88–94 GeV
91.182±0.007±0.006	1.33M	[1] AKERS	94	OPAL	E^{ee}_{cm}= 88–94 GeV
91.187±0.007±0.006	1.28M	[1] BUSKULIC	94	ALEP	E^{ee}_{cm}= 88–94 GeV
90.9 ±0.3 ±0.2	188	[2] ABE	89C	CDF	$E^{p\overline{p}}_{cm}$= 1800 GeV
91.14 ±0.12	480	[3] ABRAMS	89B	MRK2	E^{ee}_{cm}= 89–93 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
91.181±0.007±0.006	512k	[4] ACTON	93D	OPAL	Repl. by AKERS 94
91.195±0.009	460k	[5] ADRIANI	93F	L3	Repl. by ACCIARRI 94
91.160±0.010	463k	[6] ADRIANI	93H	L3	E^{ee}_{cm} = 88–94 GeV
91.187±0.009	520k	[7] BUSKULIC	93J	ALEP	Repl. by BUSKULIC 94
91.187±0.007	2.2M	[8] LEP	93	RVUE	E^{ee}_{cm}= 88–94 GeV
91.187±0.007	1.9M	[9] QUAST	93	RVUE	E^{ee}_{cm}= 88–94 GeV
91.74 ±0.28 ±0.93	156	[10] ALITTI	92B	UA2	$E^{p\overline{p}}_{cm}$= 630 GeV
91.177±0.006±0.02	550k	[11,12] BANERJEE	92	RVUE	E^{ee}_{cm}= 88–94 GeV
91.182±0.009±0.02	190k	[12] DECAMP	92B	ALEP	Repl. by LEP 93
91.175±0.021	650k	[13] LEP	92	RVUE	Repl. by LEP 93
91.177±0.010±0.02	150k	[12] ABREU	91F	DLPH	Repl. by ABREU 94
91.181±0.010±0.02	125k	[12] ADEVA	91E	L3	Repl. by LEP 93
91.161±0.009±0.02	184k	[12] ALEXANDER	91F	OPAL	Repl. by LEP 93
93.1 ±1.0 ±3.0	24	[14,15] ALBAJAR	89	UA1	$E^{p\overline{p}}_{cm}$= 546,630 GeV

[1] The second error of 6.3 MeV is due to a common LEP energy uncertainty.
[2] First error of ABE 89 is combination of statistical and systematic contributions; second is mass scale uncertainty.
[3] ABRAMS 89B uncertainty includes 35 MeV due to the absolute energy measurement.
[4] The systematic error in ACTON 93D is from the uncertainty in the LEP energy calibration.
[5] The error in ADEVA 91E includes 6 MeV due to the uncertainty in LEP energy calibration.
[6] ADRIANI 93H use the S-matrix approach to determine the pole position for the Z boson. Note the shift of this result with respect to the standard Breit-Wigner parametrization.
[7] BUSKULIC 93J supersedes DECAMP 92B. The error includes 6 MeV due to the uncertainty in LEP energy calibration.
[8] The LEP 93 error is due to the experiments is 4 MeV and the uncertainty due to the absolute LEP energy scale is 6 MeV.
[9] QUAST 93 is a combined analysis of LEP results as of Feb. 1993. A common systematic error of 6 MeV is taken into account.