

Issues in Top Quarks

- Encoder: K. Hagiwara (KEK)
- Overseer: J.L. Feng (UC Irvine)
- Coordinator: J. Beringer (LBNL), replaces W. Yao (LBNL)
- Minireview authors: M. Mangano (CERN), T. Trippe (LBNL)
need new authors for 2006 edition



New in RPP 2004

- New measurements encoded:
 - Limits on $t \rightarrow \gamma q$ ($q=u,c$) from ZEUS and L3
 - Limits on $t \rightarrow Z q$ ($q=u,c$) from L3 and ALEPH
 - Preliminary result of improved 1+jets top mass analysis of Run I data from D0 (mentioned only in minireview)
- “The Top Quark” by M. Mangano and T. Trippe
 - Updated January 2004
- Expect many new measurements from CDF/D0 from Run II for RPP 2006:
 - O(10) new top mass measurements
 - Production cross section measurements
 - Branching ratios
 - ...



Top Quark Mass

Table 2: Top mass measurements from DØ and CDF.

m_t (GeV/ c^2)	Source	Ref.	Method
$173.3 \pm 5.6 \pm 5.5$	DØ	[18]	$\ell + \text{jets}$
$(180.1 \pm 3.6 \pm 4.0)^\dagger$	DØ	[19]	$\ell + \text{jets}$
$168.4 \pm 12.3 \pm 3.6$	DØ	[20]	$\ell\ell$
$172.1 \pm 5.2 \pm 4.9$	DØ	[18]	DØ comb.
$176.1 \pm 5.1 \pm 5.3$	CDF	[21-23]	$\ell + \text{jets}$
$167.4 \pm 10.3 \pm 4.8$	CDF	[21]	$\ell\ell$
$186.0 \pm 10.0 \pm 5.7$	CDF	[13,21]	all jets
176.1 ± 6.6	CDF	[21,23]	CDF comb.
$174.3 \pm 3.2 \pm 4.0^*$	DØ & CDF	[24]	PDG best

[†] DØ finds a significantly improved preliminary result for the mass, using the same data as for the Ref. 18 result, but analyzed using a method similar to that of their dilepton analysis. This value is not used in the "DØ combined" mass of 172.1 GeV/ c^2 , nor in the "PDG best" (DØ & CDF combined) mass.

* PDG uses this Top Averaging Group result as its best value. In spite of the new $\ell + \text{jets}$ CDF result [23], this average, given in Ref. 24, still applies within rounding errors.

- Now published: Nature 2589 - 26/5/2004: $180.1 \pm 3.6(\text{stat}) \pm 3.9(\text{syst}) \text{ GeV}/c^2$
- Increases "world average" from Tevatron Electro-Weak WG to: $178.0 \pm 4.3 \text{ GeV}/c^2$
- Shifts best-fit value of expected Higgs mass from 96 GeV/ c^2 to 117 GeV/ c^2

