Tevatron is,

$$M_t = 174.3 \pm 5.1\ GeV\ . \tag{60}$$

The systematic error is dominated by the uncertainty on the jet energy scale,

$$\begin{aligned} &\pm 4.4\ GeV\ \ CDF \\ &\pm 4\ GeV\ \ D0\ . \end{aligned} \tag{61}$$

With increased data from Run II, the mass measurement at the Tevatron will be improved to $\delta M_t \sim 3\ GeV$ with an integrated luminosity of 2 fb^{-1}.

Fig. 12 shows the impact of a precise measurement of the top quark mass combined with a W mass measurement for the prediction of the Higgs boson mass. Clearly, for the precision measurements of the W and top masses to be useful, the experimental error on both measurements needs to be comparable. The Higgs mass prediction extracted from precision measurements can be compared with the direct measurement of the Higgs mass at the LHC and the consistency of the Standard Model tested. Tevatron Run II with $2fb^{-1}$ should achieve accuracies:

$$\begin{aligned} \delta M_W &\sim 27\ MeV \\ \delta M_t &\sim 3\ GeV\ , \end{aligned} \tag{62}$$

yielding a prediction for the Higgs mass with an uncertainty of[25]

$$\frac{\delta M_h}{M_h} \sim 40\%\ . \tag{63}$$

The LHC will have large statistics on top quark production due to the large rate and can use the lepton+jets channel with 10 fb^{-1} of data to obtain a measurement[26]

$$\delta M_t \sim .07\ GeV\ . \tag{64}$$

3.8. *Top Spin Correlations*

When pair produced in either e^+e^- or $q\bar{q}$ collisions, the spins of the $t\bar{t}$ pair are almost 100% correlated.[27] The top decays before the spin can flip, and so spin correlations between the t and $\bar{t}$ result in angular correlations among the decay products. At threshold, the $t\bar{t}$ cross section is s-wave, and the e^+e^- or $q\bar{q}$ spins are translated directly to the $t\bar{t}$ spins. The incoming $q, \bar{q}$ have opposite helicities, since they are interacting through a gauge interaction and the $t\bar{t}$ spins aligned along the beamline. At high energy,