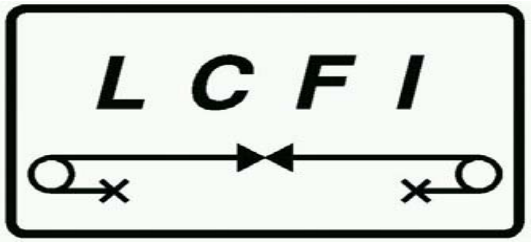

ttbar - Analysis

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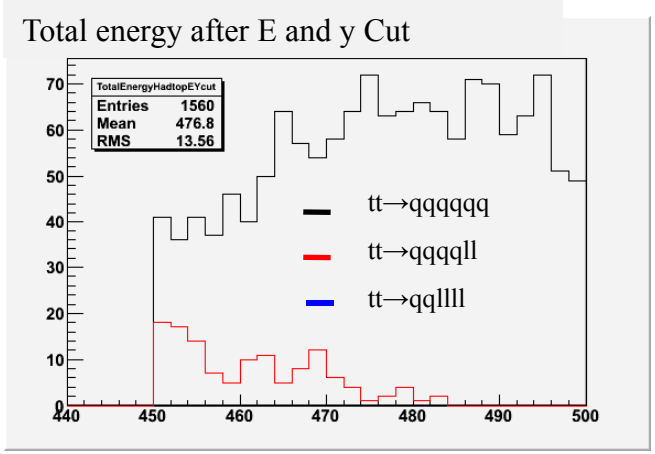
18/09/2008

In the last 4 months…

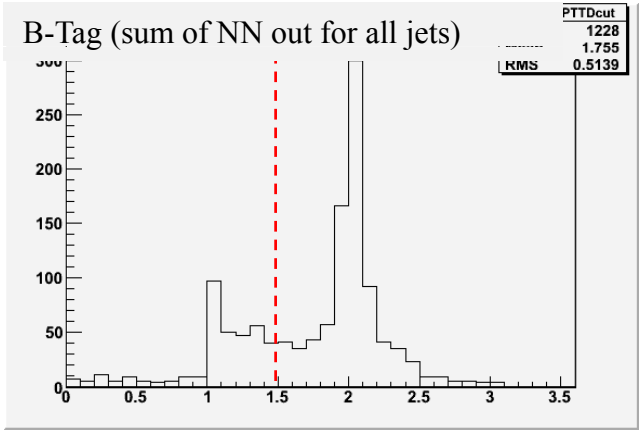
- **Updated kinematic fitter constraints. (make better use of W mass and b tagging)**
- **Combined vertex Charge and Jet Charge in a single parameter (reconstructed quark charge)**
- **Plotted asymmetries of the b and bbar quarks in the center of mass frame (agreement with standard model)**
- **First calculations of acceptances (proper implementation still needed)**
- **Moved from fast MC to PFA (first test of PFA at analysis level – looks very good!)**
- **Implemented top mass calculation Via template Fitting (not in this talk but first results to be expected very soon)**

Defining a hadronic top (cut list)

- **Missing Energy < 50GeV**
- **log($Ycut_{min}$) (forced 6 jets events) > -8**
- **Sum of b tag of all jets > 1.5, b-tag highest >0.7, second highest >0.5**
- **2 Ws and 65Gev < Mass Ws< 95 GeV**
- **Also cuts on:**
  - **number of particles**
  - **difference between mass of tops**
  - **difference between mass of Ws**



Cut for quality of reconstruction and on leptonic events. (need lepton ID, then relax cut)



Cut on B-Tag

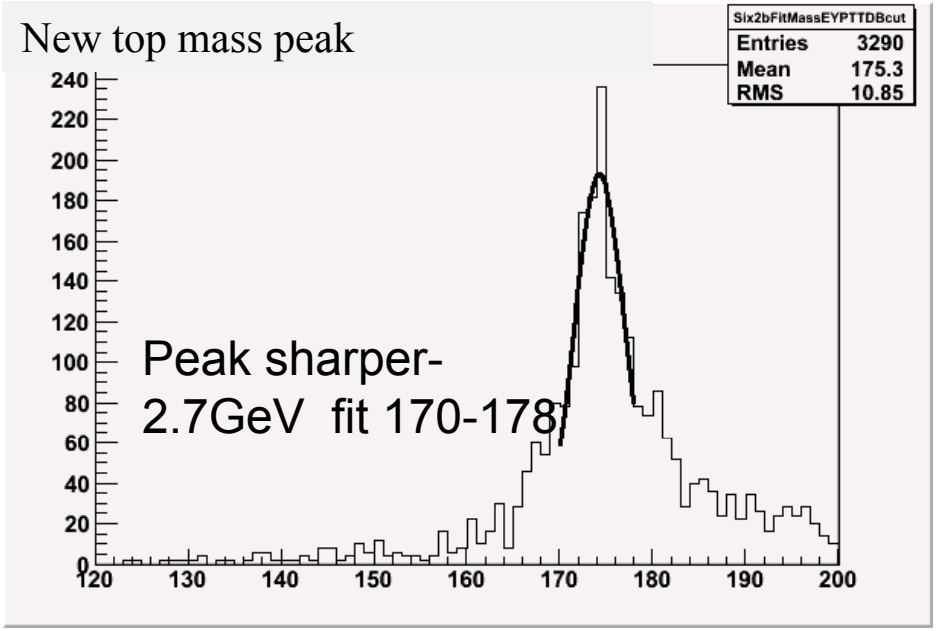
Kinematic fitting

BEFORE

Do Kinematic fitting with 6 jets + cuts (W mass, b-tag, …)

NOW

- **Do Kinematic fitting with 4W jets + 2b jets (lower combinatorics)**
- **Add W mass as a constrain to the fitter.**
- **Relax Cuts**

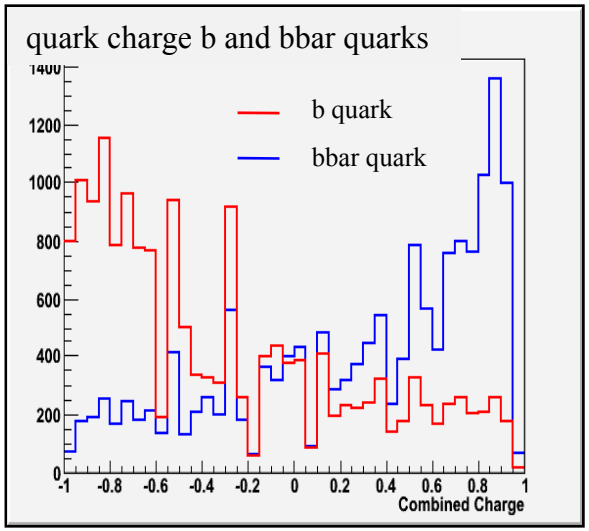


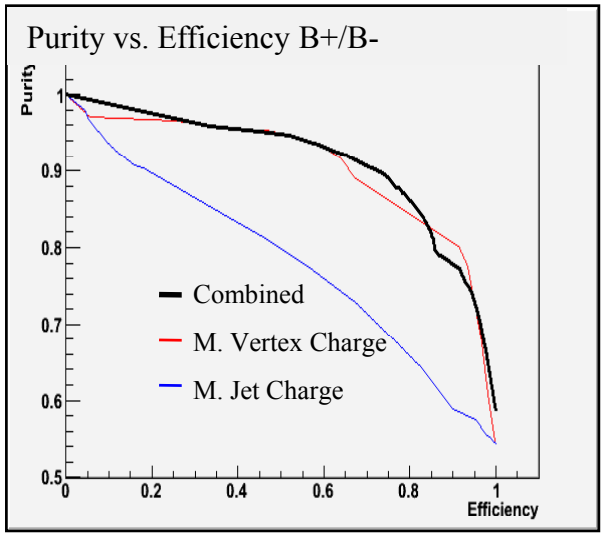
IMPROVEMENTS

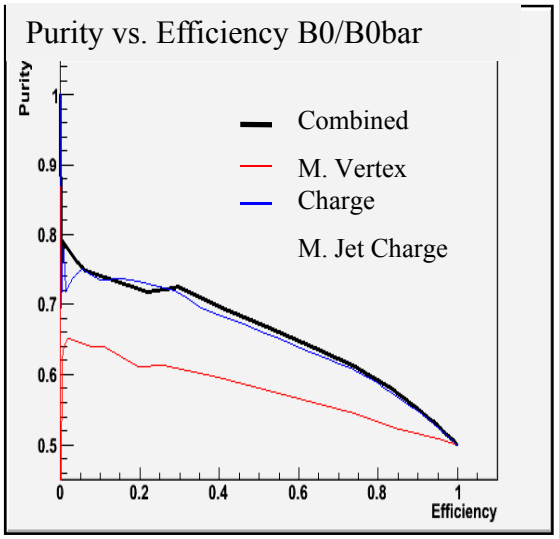
- **Sharper Peak (σ = 2.7 GeV)**
- **Efficiency improved! (now keep ≈ 1/3 of events)**
- **Purity >95% (remainder from leptonic channels, no other BG)**

Quark Charge

- **Two charge reconstruction algorithms implemented:**
  - **Momentum weighted secondary vertex charge**
  - **Momentum weighted Jet charge**
- **Ratio of PDFs used to combine the two variables according to significance of variable. Can algorithms in the future.**

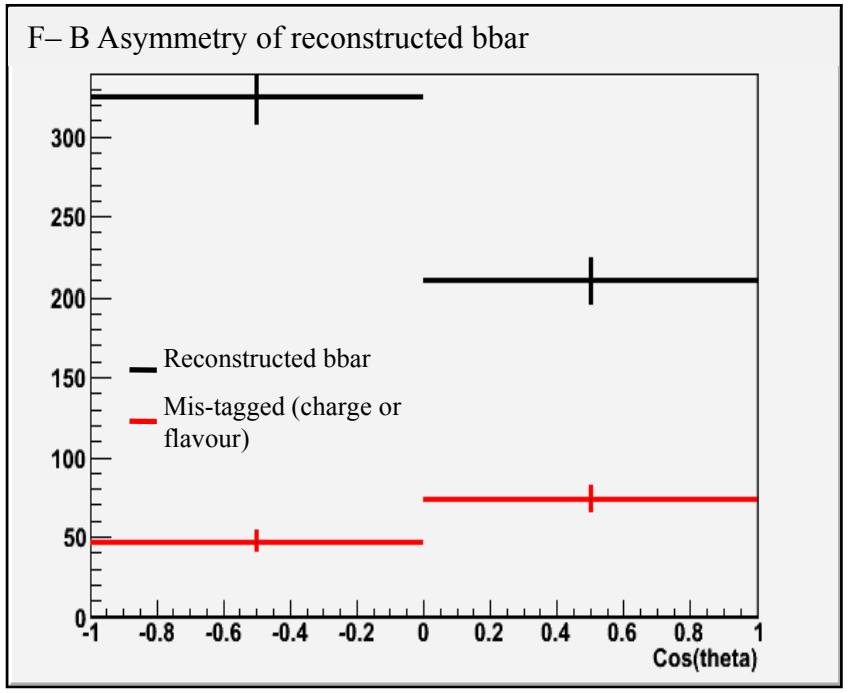






b-bbar Asymmetries (in CoM frame)

- **Mis-tag the b jet in 2% of events**
- **Wrongly reconstruct charge in 19% of events**
- **Asymmetry for the bbar quark is 0.33 +/- 0.07**
- **Asymmetry for the b quark is 0.14 +/- 0.09**
- **Combining the results: 0.26 +/- 0.06 (consistent with 0.28)**
- **Better sensitivity from: improved algorithm, statistics, polarized beam**
- **Need to include systematic errors (acceptance)**

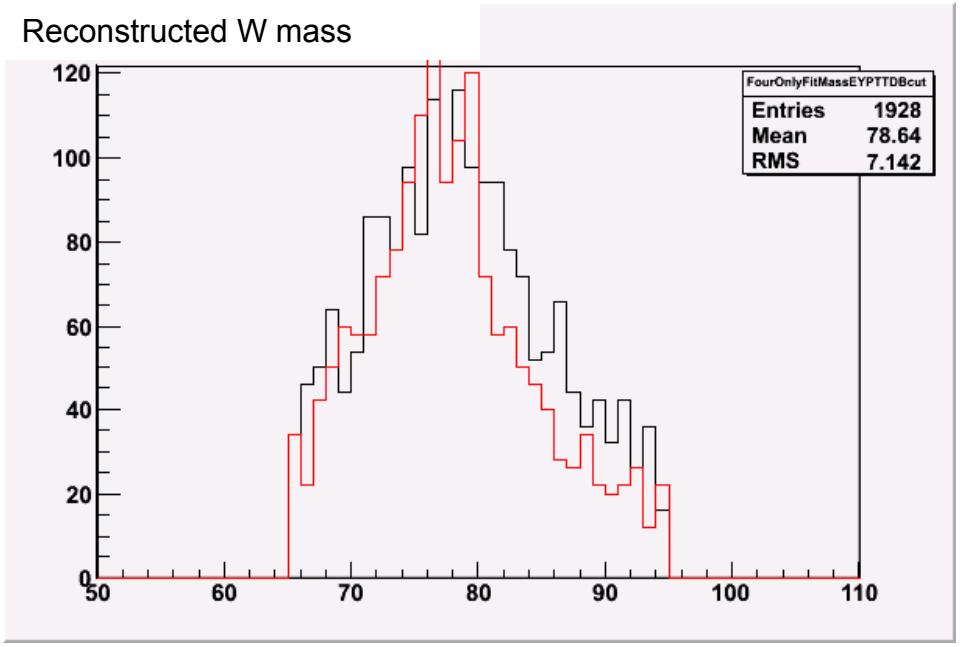


Moving: FastMC → PFA

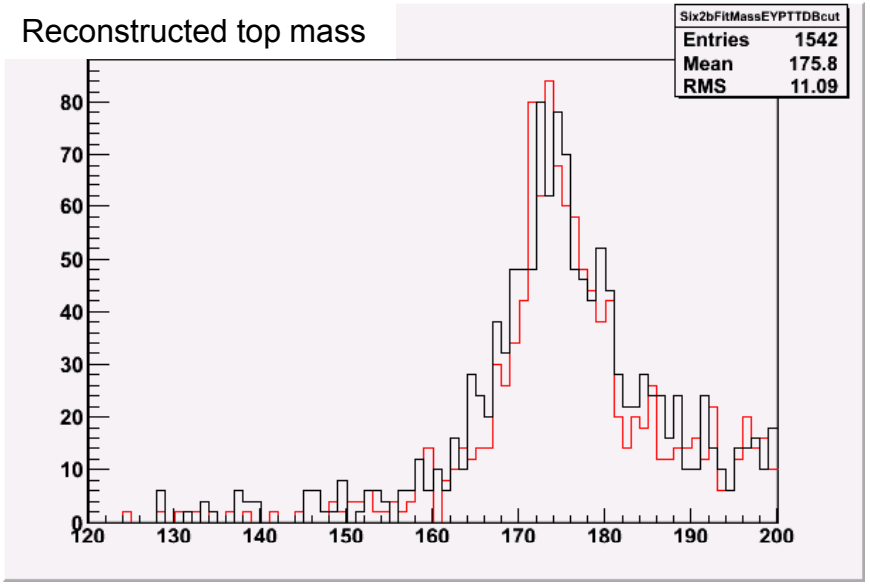
N.B.: Weighting of events not correct, performance degraded, used for comparison between PFA and fastMC

- **Relatively easy, works well!**
- **Results only slightly degraded (as expected resolution slightly worse)**
- **Needs still some more testing**

Reconstructed W mass



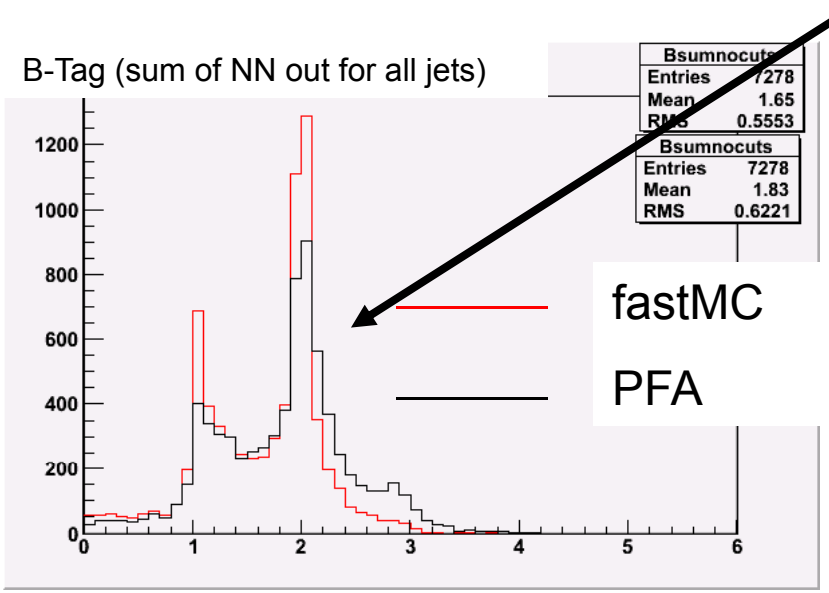
Reconstructed top mass

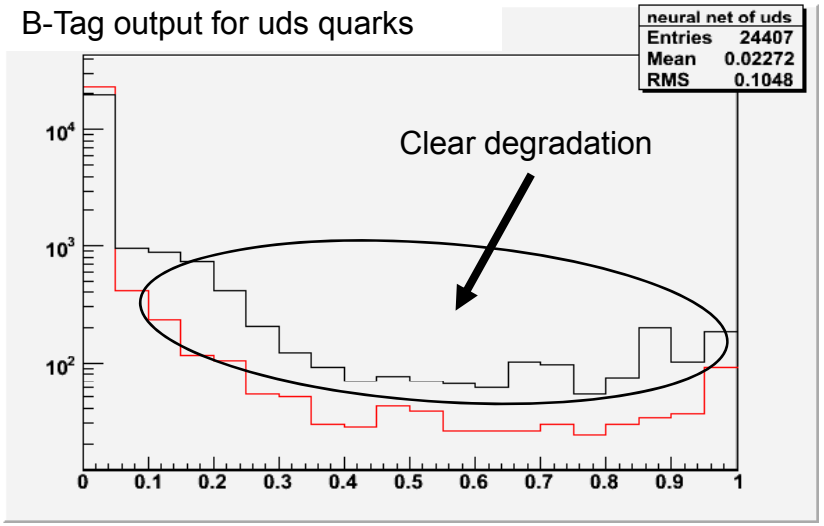


fastMC

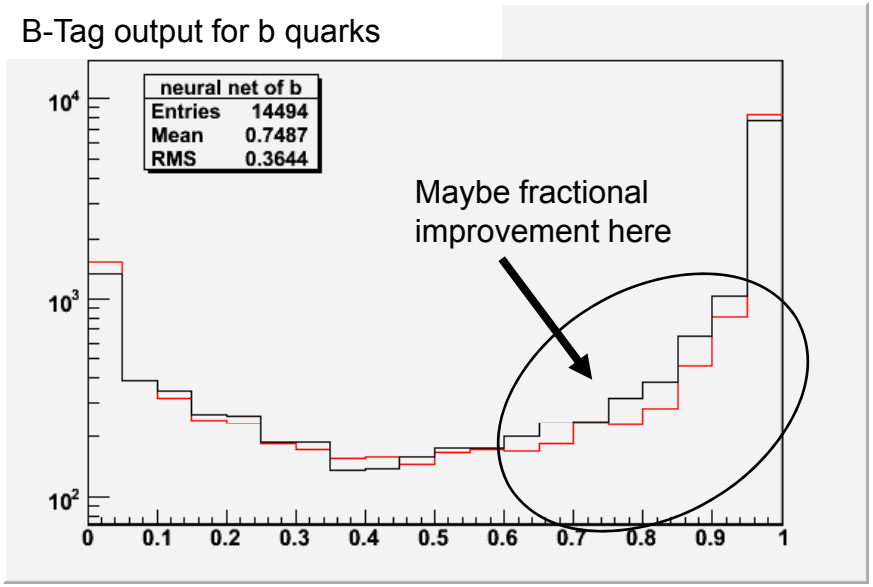
PFA

b-tagging in PFA…





- **Good, better than fastMC?**
- **Is it real or from V0s?**



- **Known issues with V0s.**
- **Looking at running V0 finder to improve this.**

The way forward

- **Move on SiD02 and test (+ proper weights implemented)**
- **Deal with V0s**
- **Get first results from template mass fitting**
- **Introduce background and test**
- **Implement acceptances into the asymmetry calculation**
- **Get electron + muon ID and use it in the cuts.**