

PDF Uncertainty on W Mass using CTEQ6 Method

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Introduction

- Parton Distribution Functions effect W mass measurement through effects on acceptance cuts
- Currently in the process of setting up a procedure to estimate associated systematic uncertainty on W mass
- Intend to use CTEQ6 method

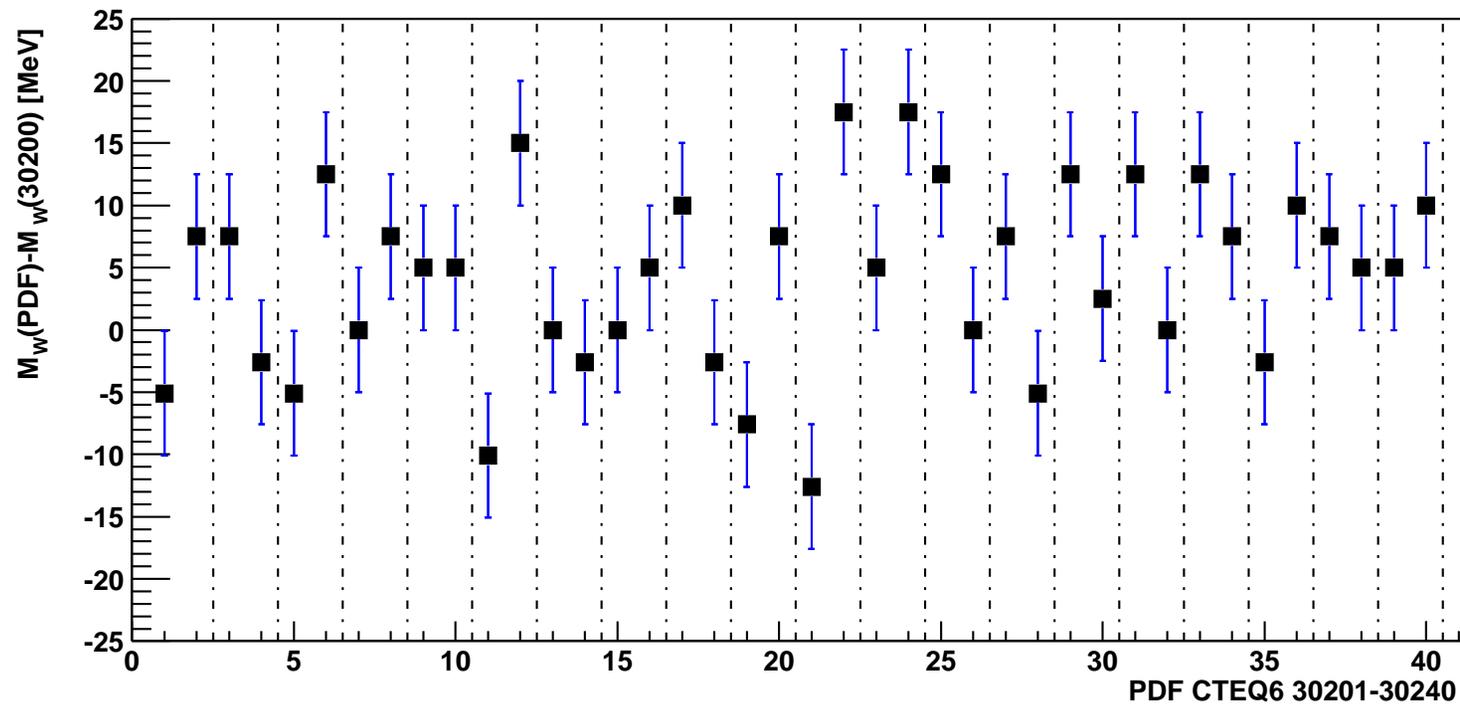
Event Generation

- Use framework provided by Pasha Murrat
- Pythia generator (6.208) and CTEQ6 PDF's interfaced to ROOT
- Obtain $p_T^\mu, y^\mu, p_T^\nu, y^\nu, \Delta\phi^{\mu,\nu}$ from each event (store in txt file)
- Generate 40 Million Events for 40 CTEQ6 PDF's (30201-30240) in parallel (~ 56h 2.4GHz processors)
- Produced vector file is input to fast simulation

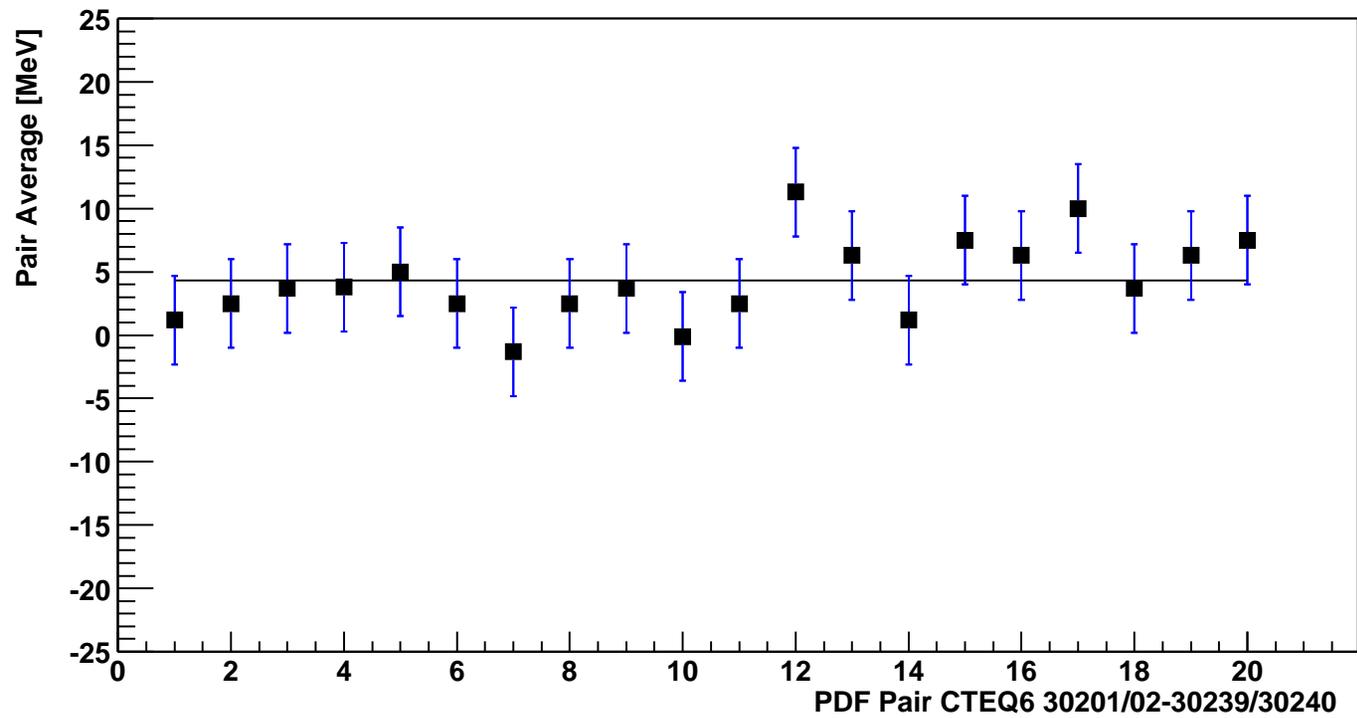
Detector Simulation/Template Fitting

- Use Ashutosh's fast detector simulation
→ Includes COT hit level simulation, multiple scattering, ionization energy loss etc.
- Detector simulation makes fiducial cuts based on geometric description of COT, calorimeter and muon chambers
- Apply detector simulation to the 40 generated vector files
(~ 32h 2.4GHz processors)
- Template is generated with default PDF CTEQ6 30200
- Each mass value is extracted from a binned maximum likelihood fit to transverse mass spectrum

Mass shifts due to PDF choice



Average Shift of PDF Pair



→ Fitted average: 4.3 ± 0.8 MeV

Summary/Outlook

- We are in the process of setting up a procedure to extract systematic uncertainty on W mass due to the choice of PDF
- Currently studying the CTEQ6 method
- Possibly want to increase statistics
- Which values should be best used to extract the PDF systematic?
→ Are some pairings more important than others?