EMC Calibration for the next run

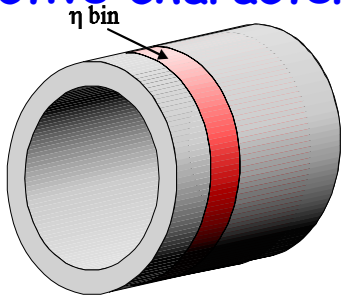
- EMC calibration goes with the analysis of the data
  - EMC dynamic range from ~60 GeV (η = 0) to ~ 90 GeV (η=1)
  - Need to have calibration points in all possible range of energy -> different calibration methods
    - Low energy range ~ 300 MeV -> MIP
    - Medium energy range ~ 2-15 GeV -> electrons, π^0's
    - High energy range >15-20 GeV and up – rare processes, direct photons, electrons, etc…

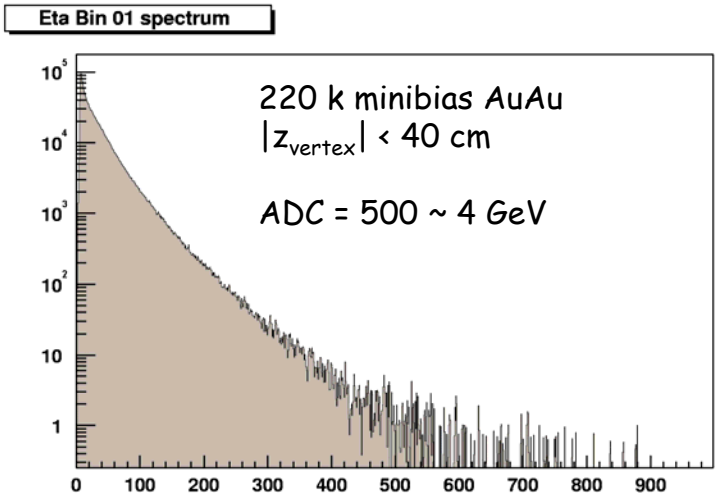
Tower MIP calibration

- Minimum inonizing particles
  - High-p hadrons
    - Energy deposited ~ 300 MeV of electron equivalent energy
- Method (two steps)
  - EMC Equalization
    - Find relative gain between towers in the same η
  - MIP accumulation
    - Project high-p tracks into EMC surface
    - Constrains on track selection to reduce background
      - Track must be isolated in a 3x3 patch
      - Track must be contained in a single tower

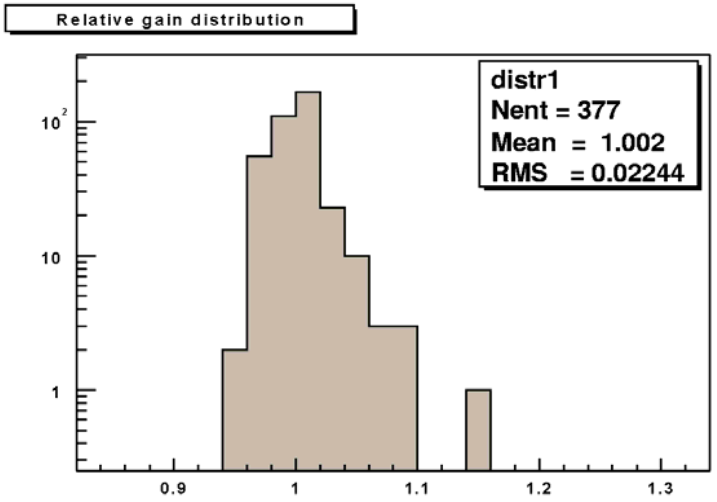
Tower calibration – η bin equalization

- Find relative gain between towers in the same η
  - Medium to high multiplicity events
  - Vertex cut to keep tower projective characteristics

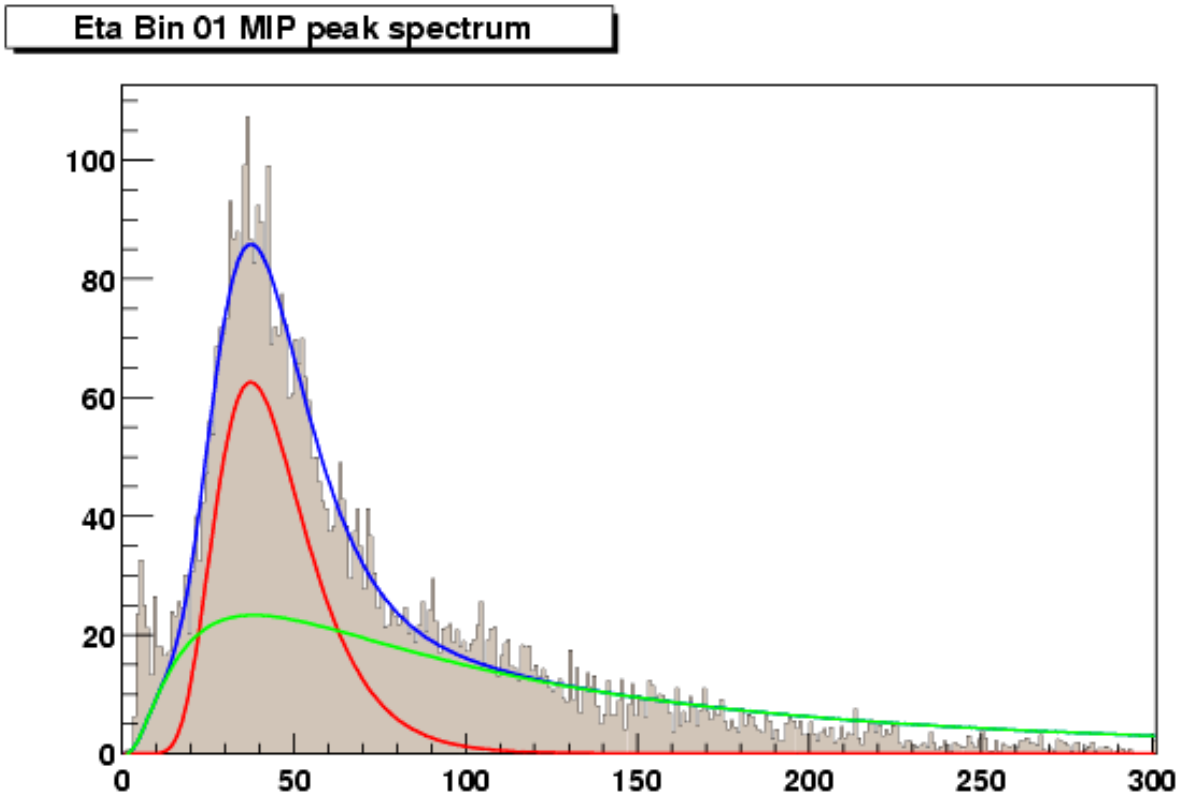




- Less number of events needed to get MIP peak
  - Sum statistics over all towers in the same η region
- Check HV settings for trigger
  - Important because it is not possible to apply calibration on trigger signal
    - tower equalization need to be checked to assure uniform trigger response

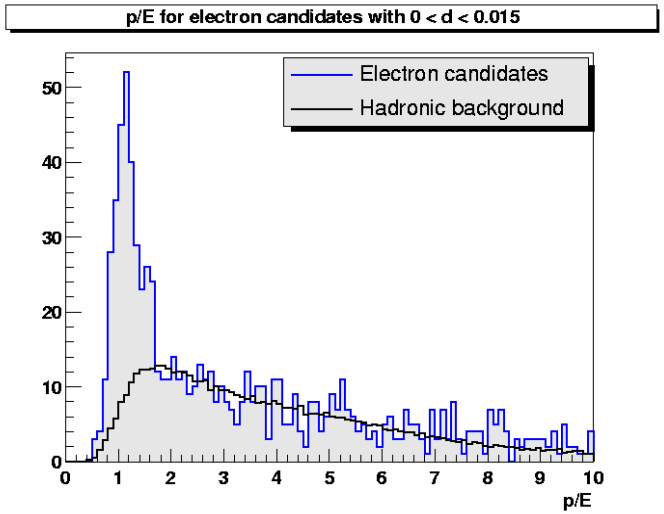


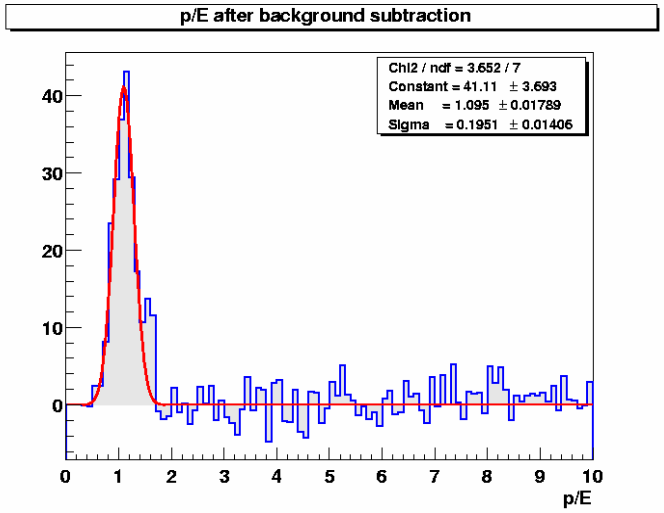
Typical Tower MIP spectrum



Electron calibration for EMC towers

- Pre-select electrons using TPC dE/dX information
  - Limited momentum range
    - ~1.5 < p < 5 GeV/c
- Isolation cuts on EMC towers
  - Track should be isolated in a 3x3 patch
  - Track should be contained in a single tower





SMD calibration

- Strips equalization is more important than absolute calibration
  - Important to define position of shower
- Method
  - Equalize the strips SMD using wire and FEE pulsers
  - Absolute calibration will be done by comparing SMD energy in one module with tower energy in the same module after strips are equalized

EMC Calibration scheme for next run

- Online pre-calibration
  - Take events from event pool
  - Will run on EMC online machines (not fast offline)
  - MIP calibration
  - Electron calibration
  - Gain monitoring
- Offline calibration
  - Wait for analysis production
  - MIP calibration
  - Electron calibration to wider range of energy
  - π^0 analysis
  - Other physics analysis
- Needs about 2-3 M minibias events (from last year pp calibration) to get initial MIP calibration