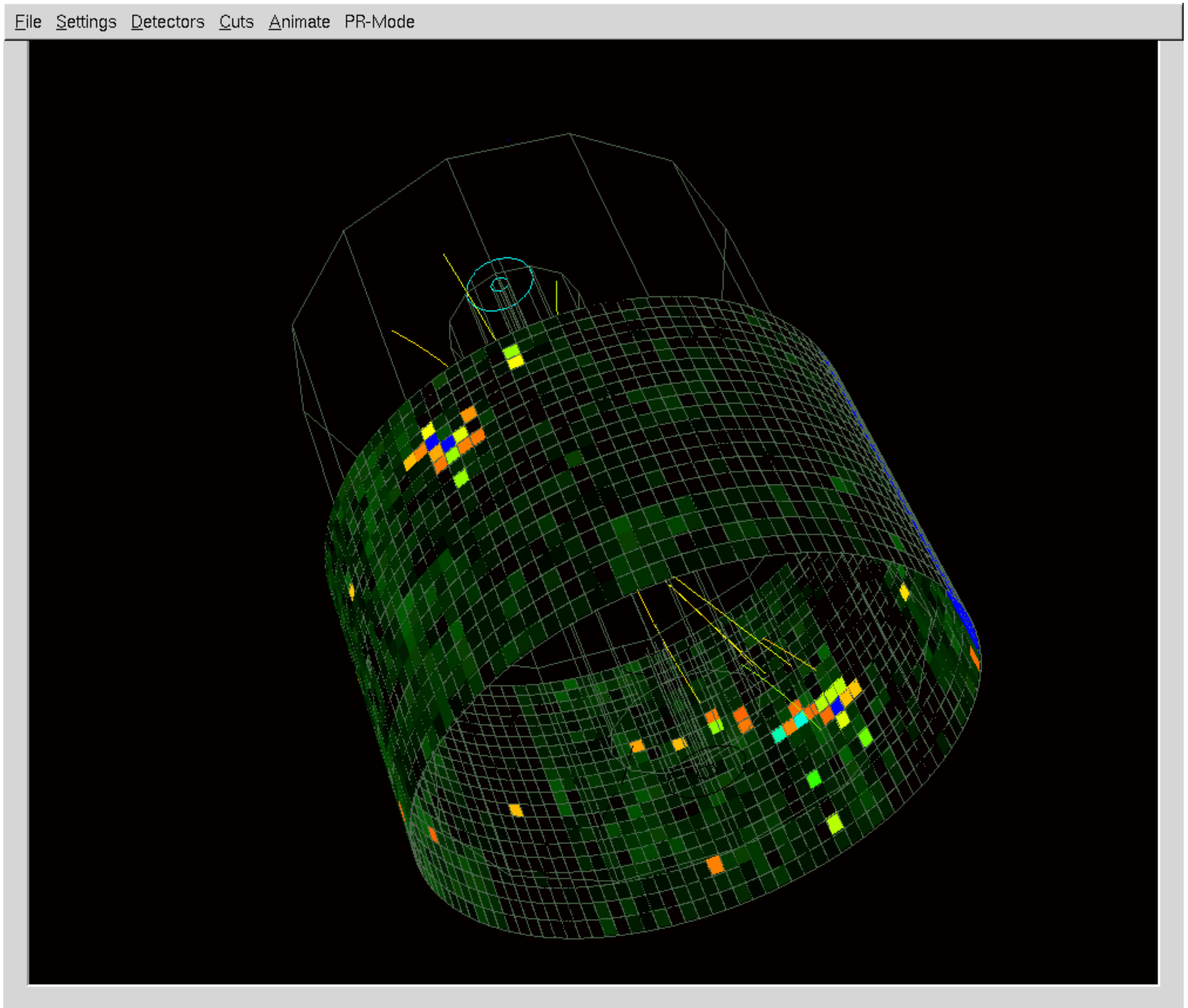
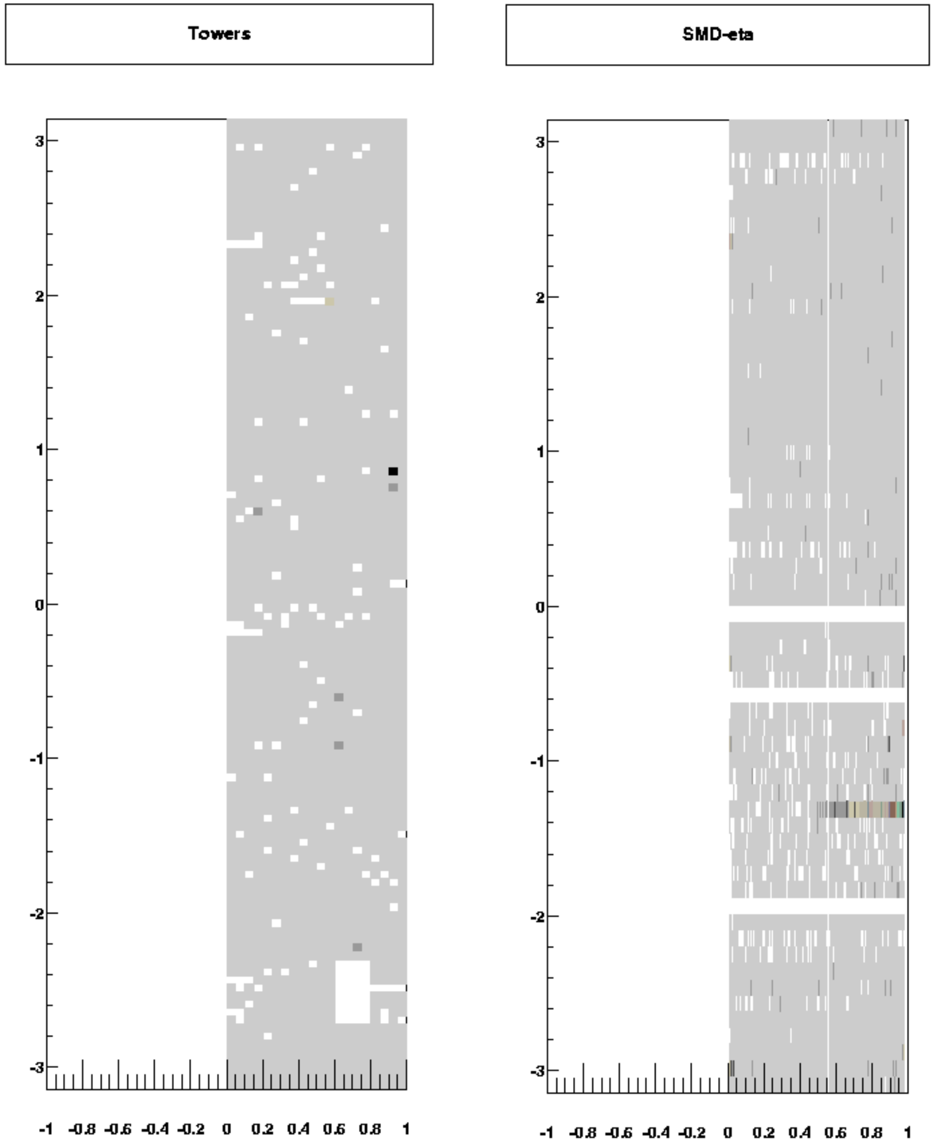
EMC Software and analysis update

- Update on EMC
  - News from last run
  - Calibrations
  - Status of data analysis
- Software update
  - Offline software
  - Online software
  - Task list and service work



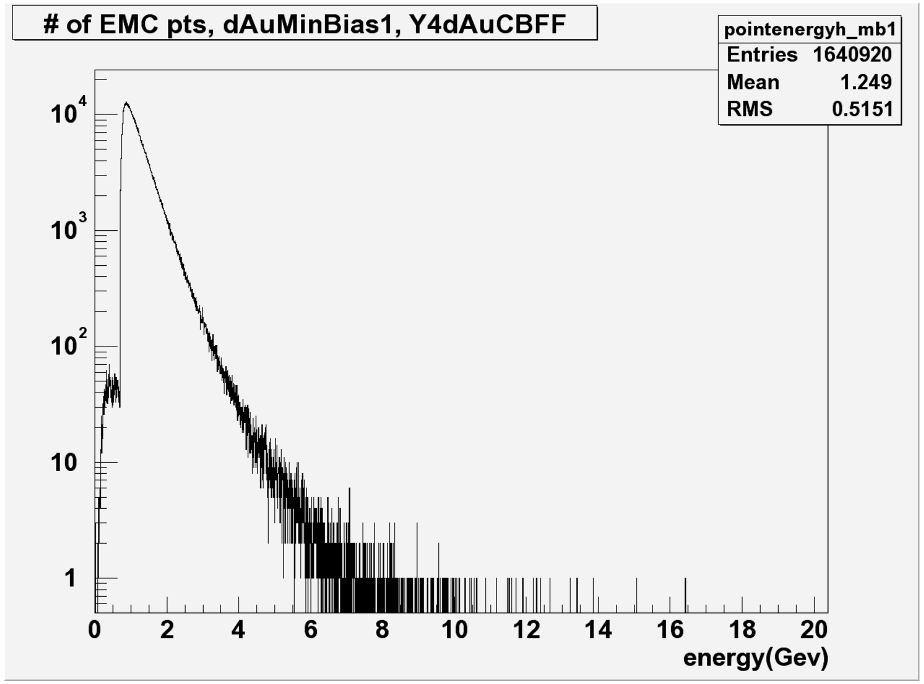
What worked during the last run

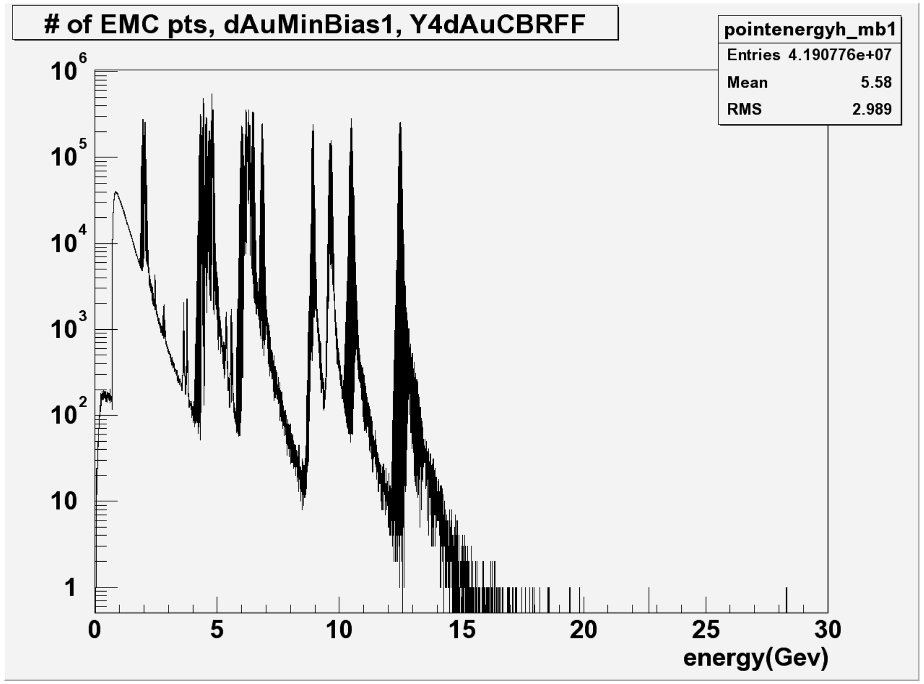
- Towers
  - About 100/2400 dead or noisy
    - 1 bad digitizer board (32) channels (replaced)
    - 68 noisy/dead channels
    - HV is set to zero for all of them
- SMD
  - 3/60 modules not working
  - Some individual channels
    - Some we know are dead
      - Zero pedestal and no readout
    - Some are noisy



Bad runs/days

- About 138 bad runs
  - Thanks to Weijiang Dong
  - List at ~suaide/badruns/2003.h

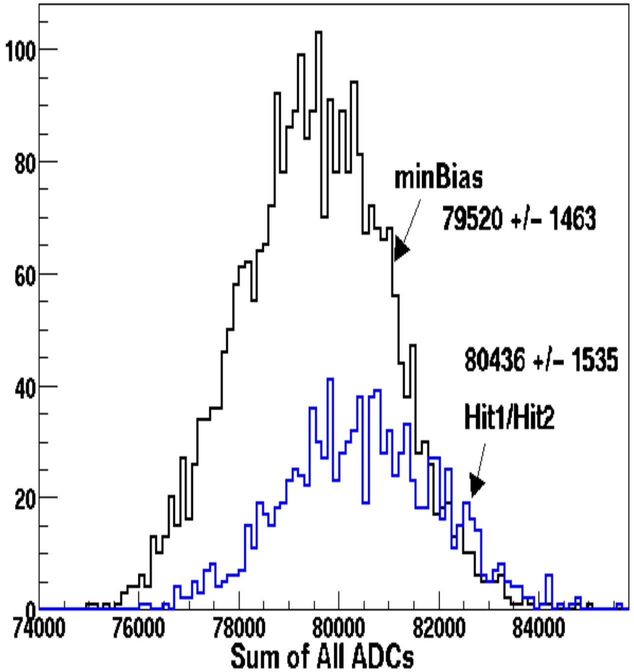


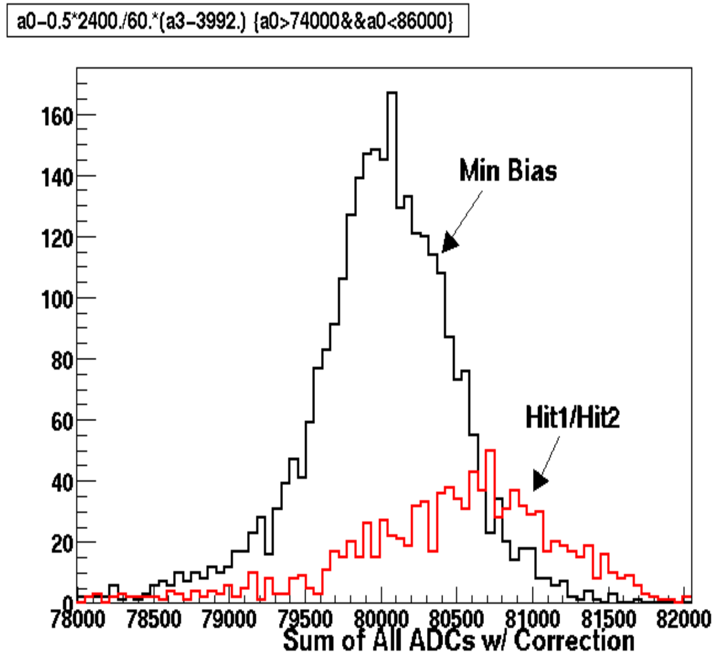


Noise

S. Trentalange

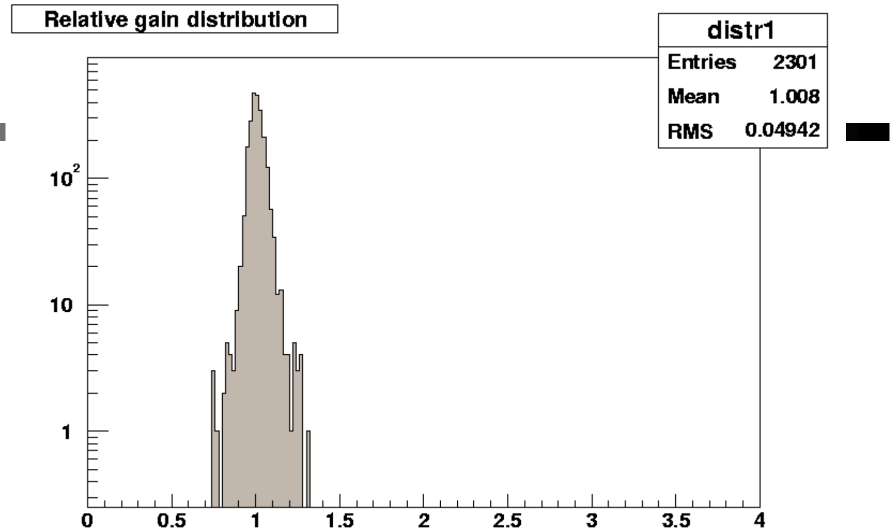
- There is a correlated noise between towers very common to calorimeters
  - Pedestal distribution has a width ob ~25 GeV that can be easly reduced to ~5-6 GeV using standard comon noise subtraction methods
    - The Energy dynamic range of EMC is 2400 towers*60 GeV = 144 TeV
      - Noise at 1:10^4 level

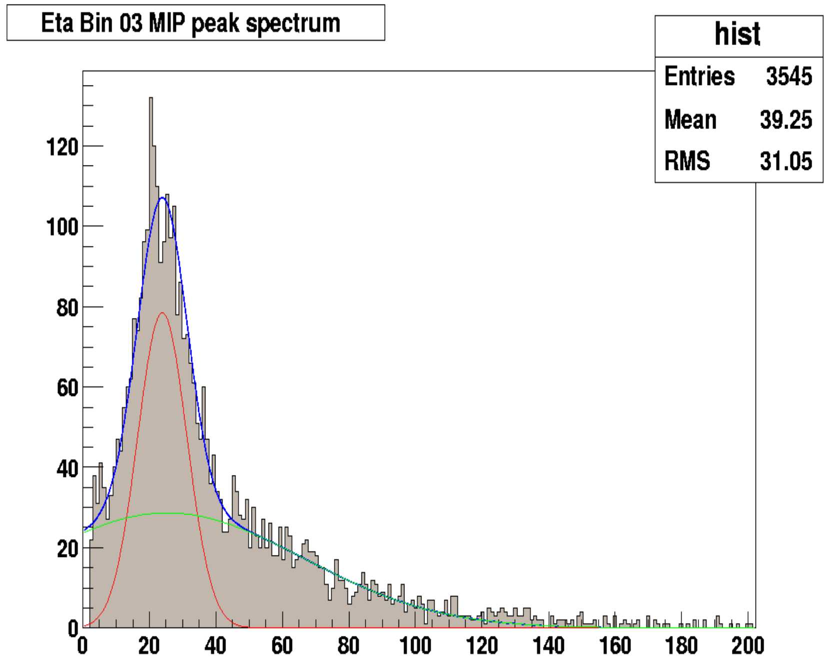




BEMC Calibration

- *Detector is calibrated using MIP peak method*
  - *Electron calibration is under way*

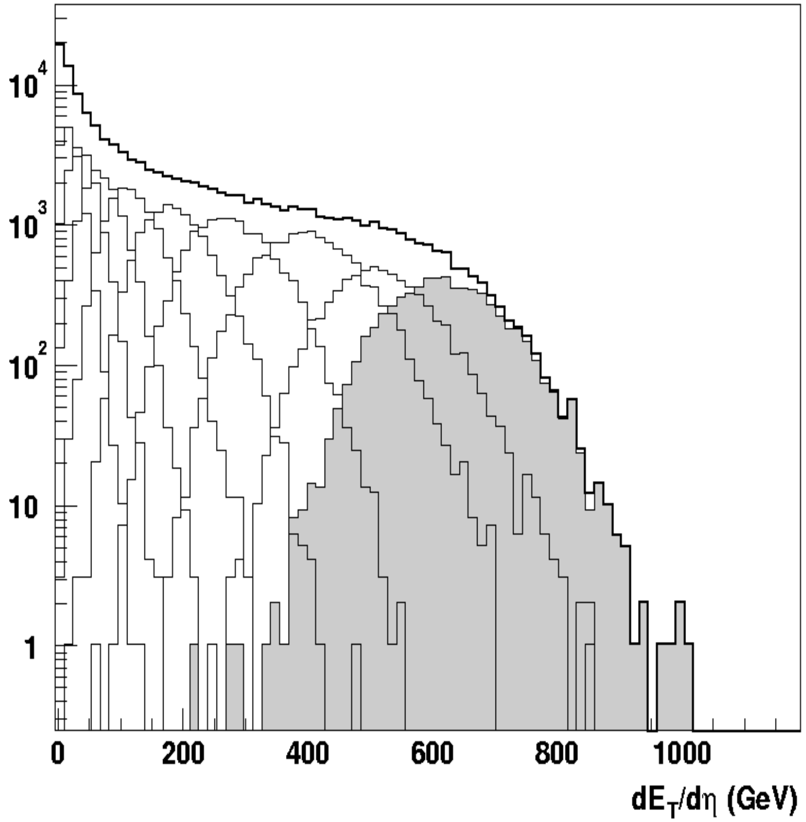


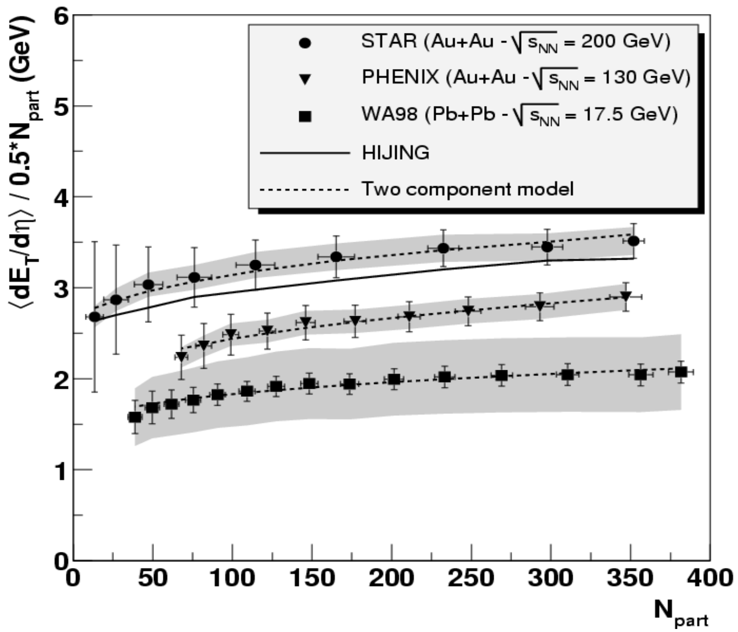


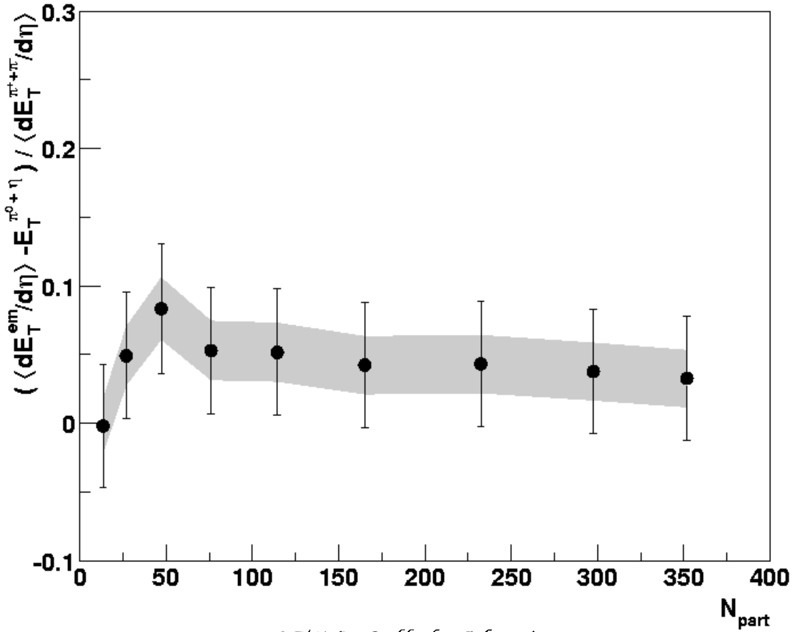
E_T measurement in Au+Au collisions

M. M. de Moura

- *Paper (PRC) being reviewed in the high-p_T PWG*

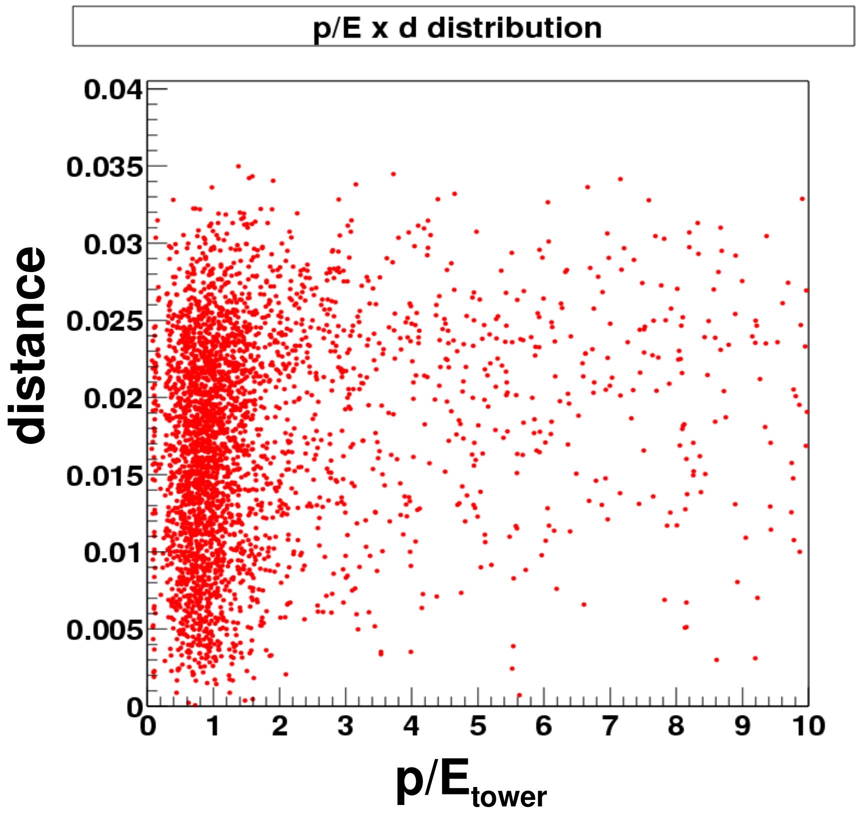


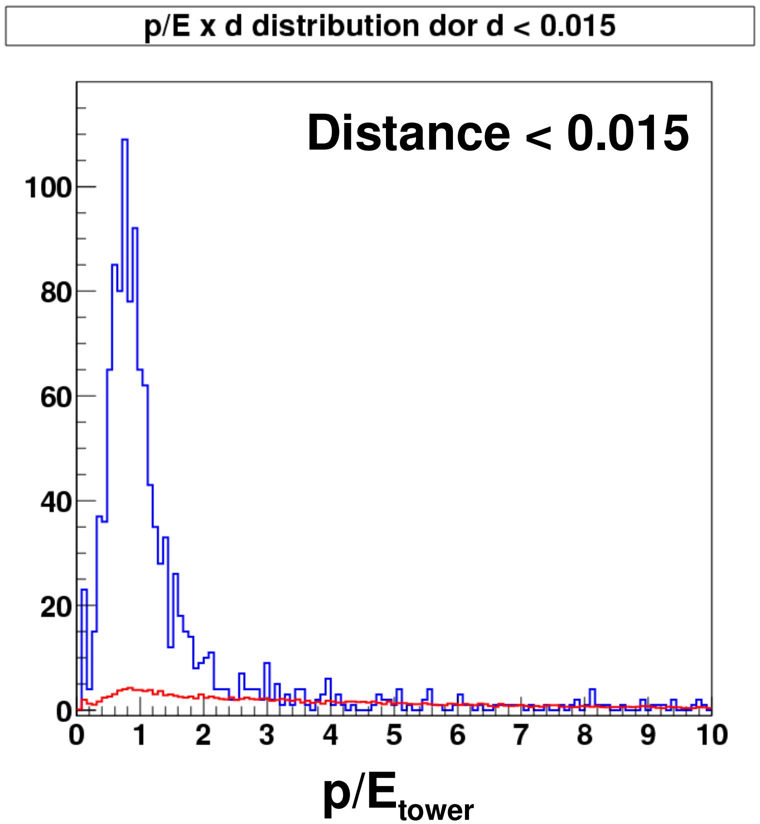




Electron identification in d+Au

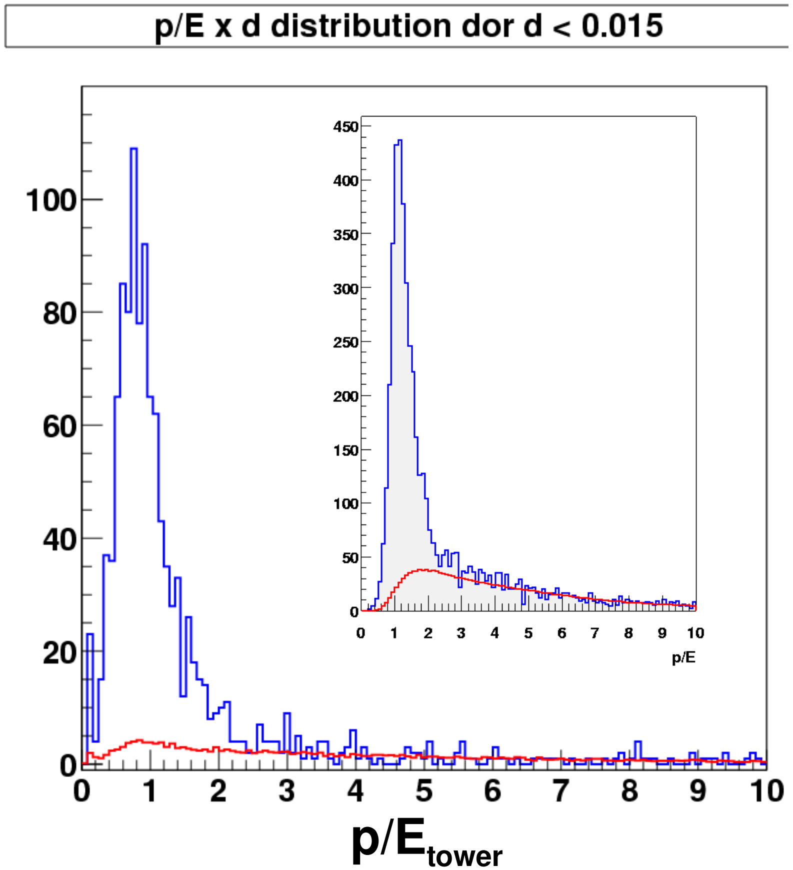
- Use TPC dE/dX to pre-select electrons in the range of 1.5 < p < 5.0 GeV/c (can extend a little more)
- Compare TPC momentum with tower energy (p/E_{tower})

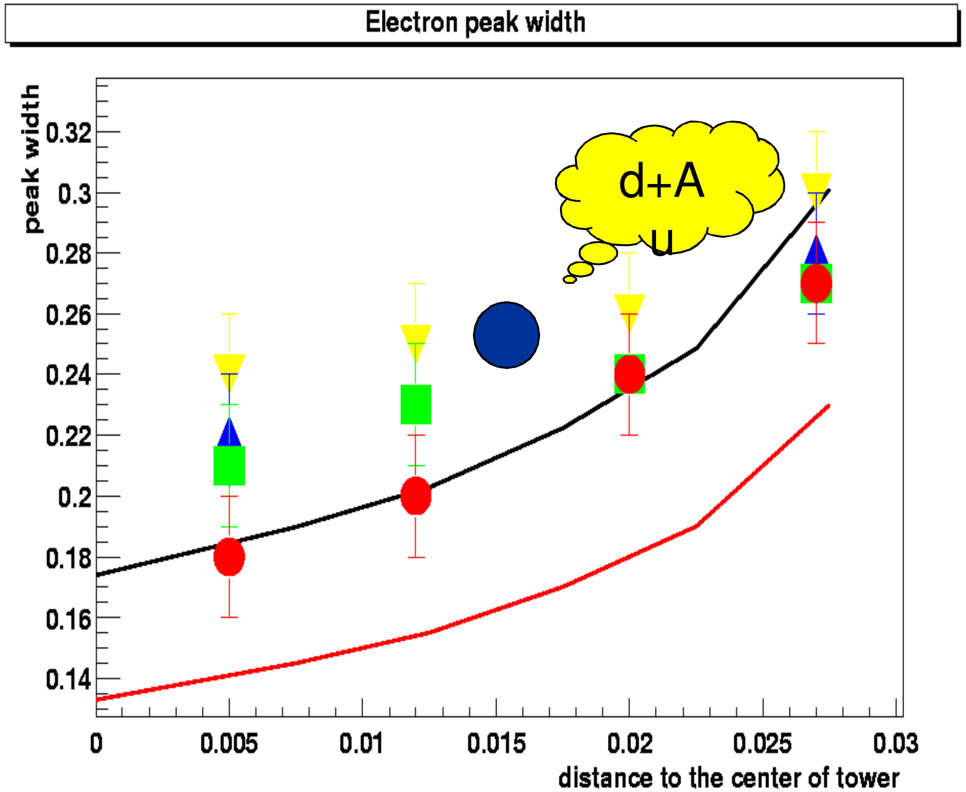




Comparison with Au+Au

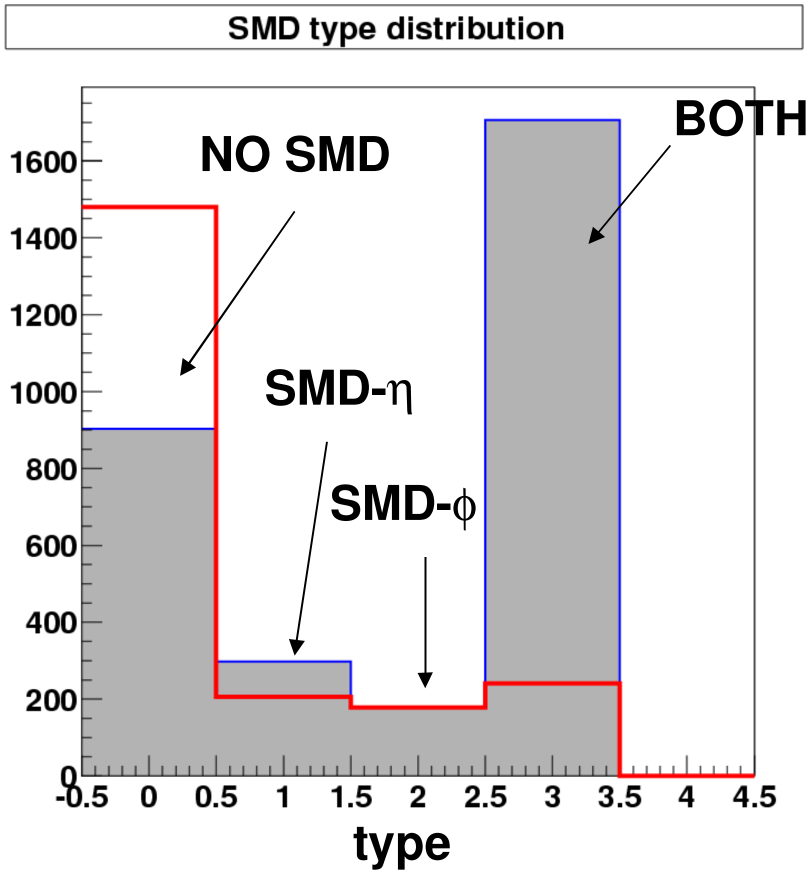
- Electron peak is wider than Au+Au
  - Lower multiplicity in d+Au makes tower equalization more difficult -> working on it
    - Current tower resolution ~ 21%/sqrt(E)

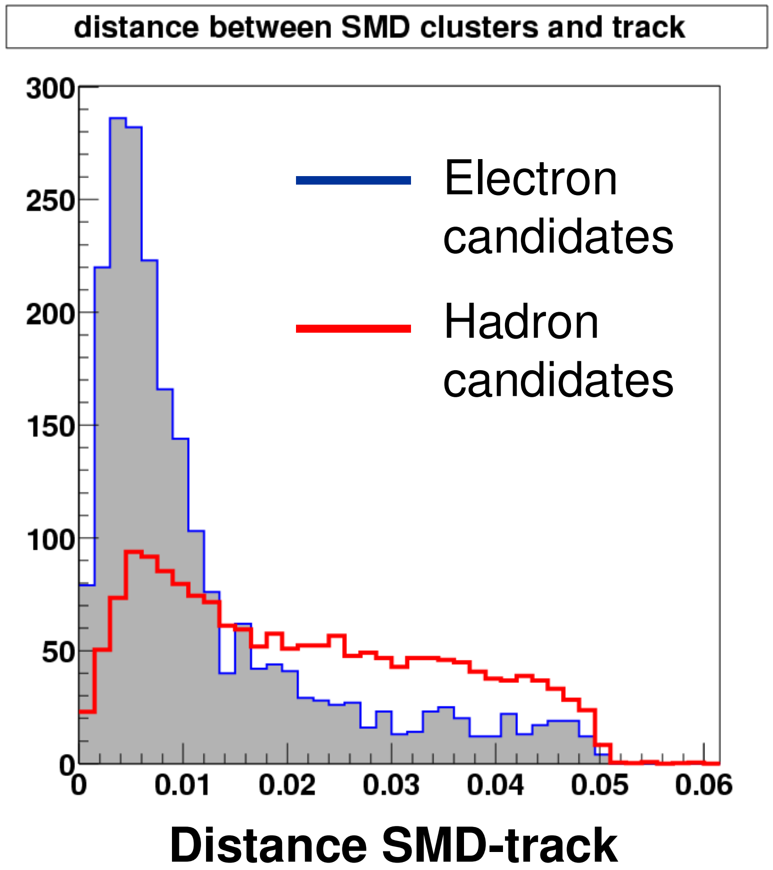




The SMD can enhance e/h discrimination

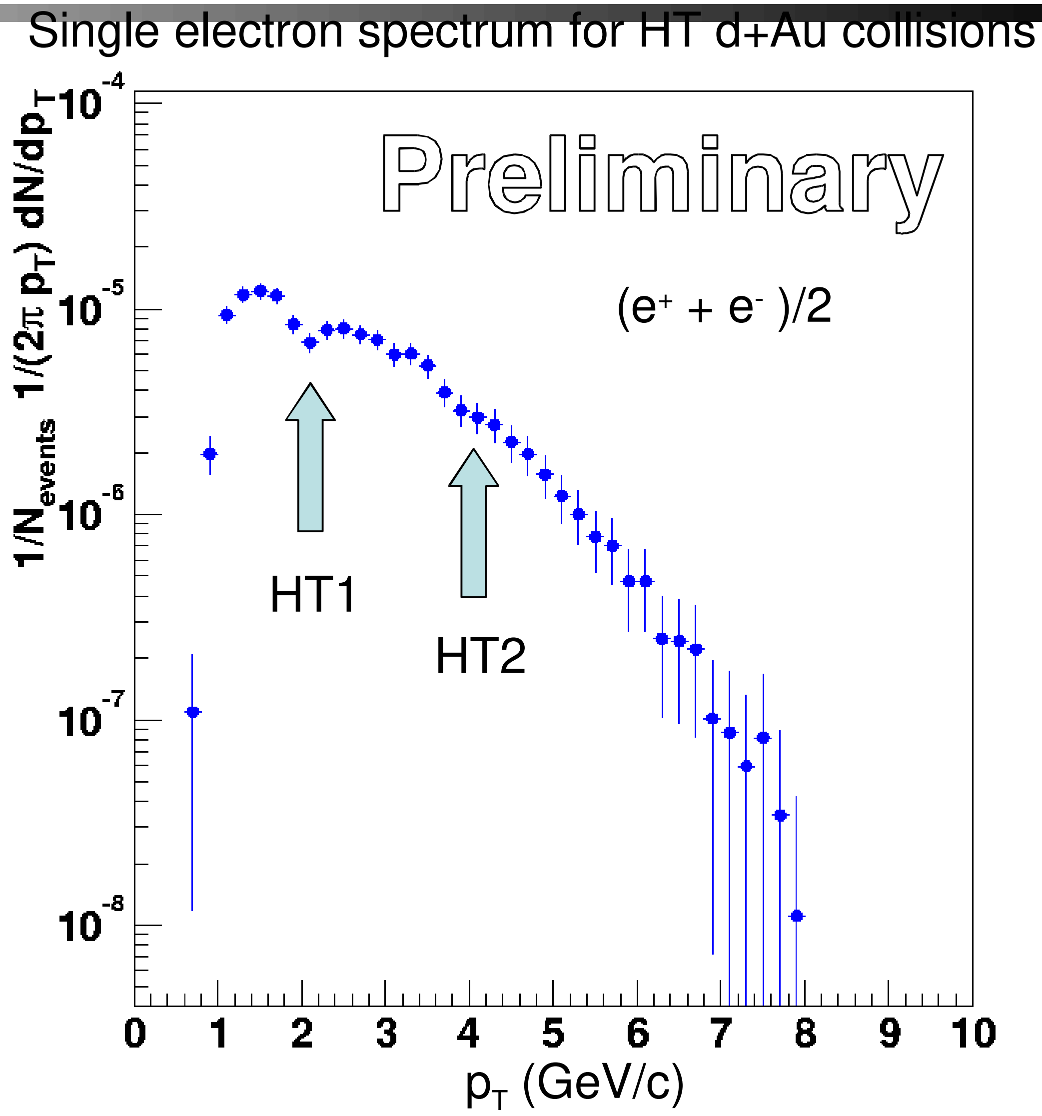
- SMD can help to discriminate electrons from hadrons
  - Most of hadrons do not have SMD clusters
  - The distance between SMD and track has different distributions





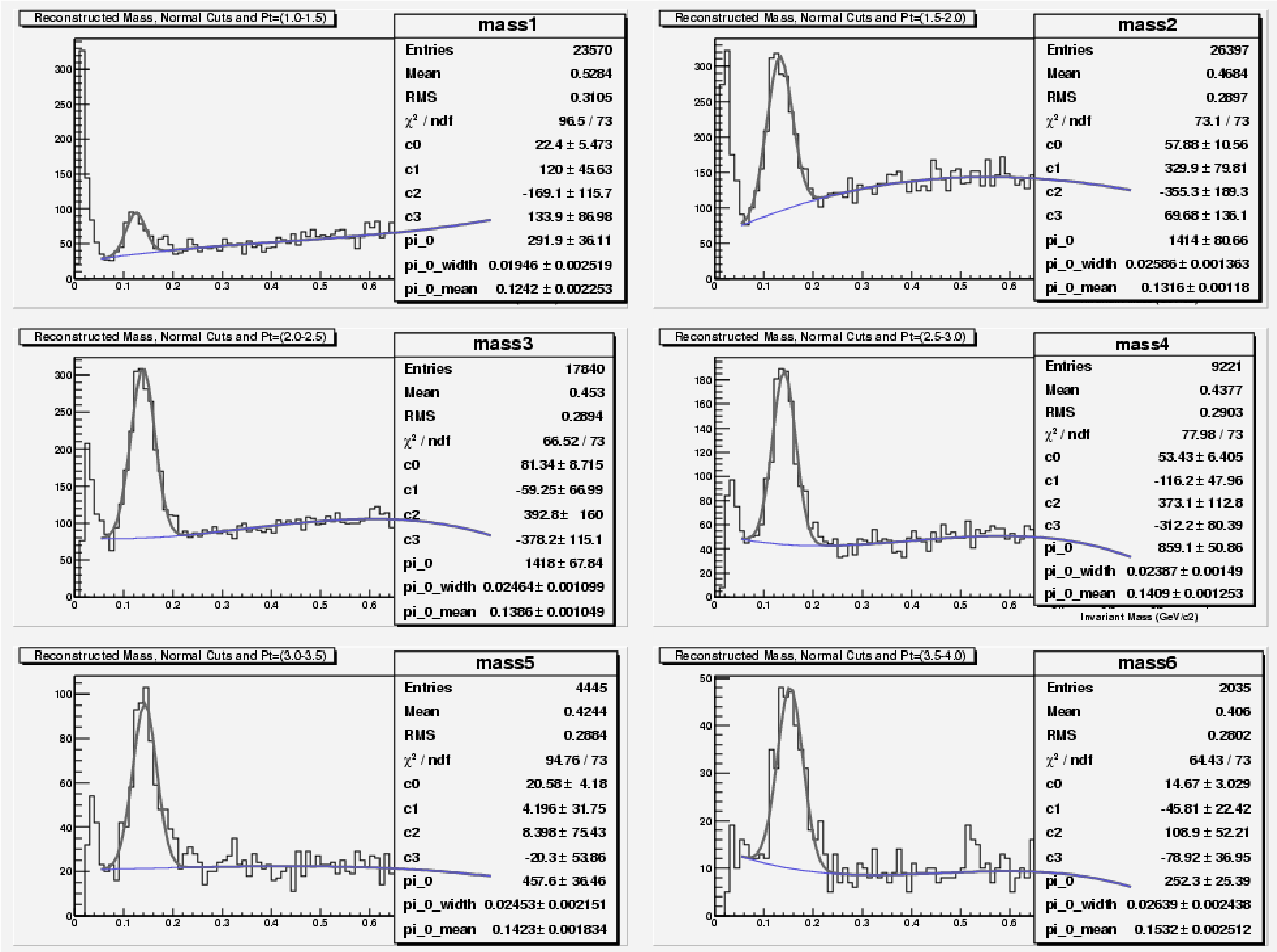
Preliminary single electron spectra for d+Au collisions

- *950 k High-tower events*
- *No corrections applied*
  - *Trigger bias*
  - *Efficiency*
  - *background*
  - *Momentum resolution, etc*
- *Need to tune up electron identification with EMC*



π^0 *mass reconstruction in d+Au*

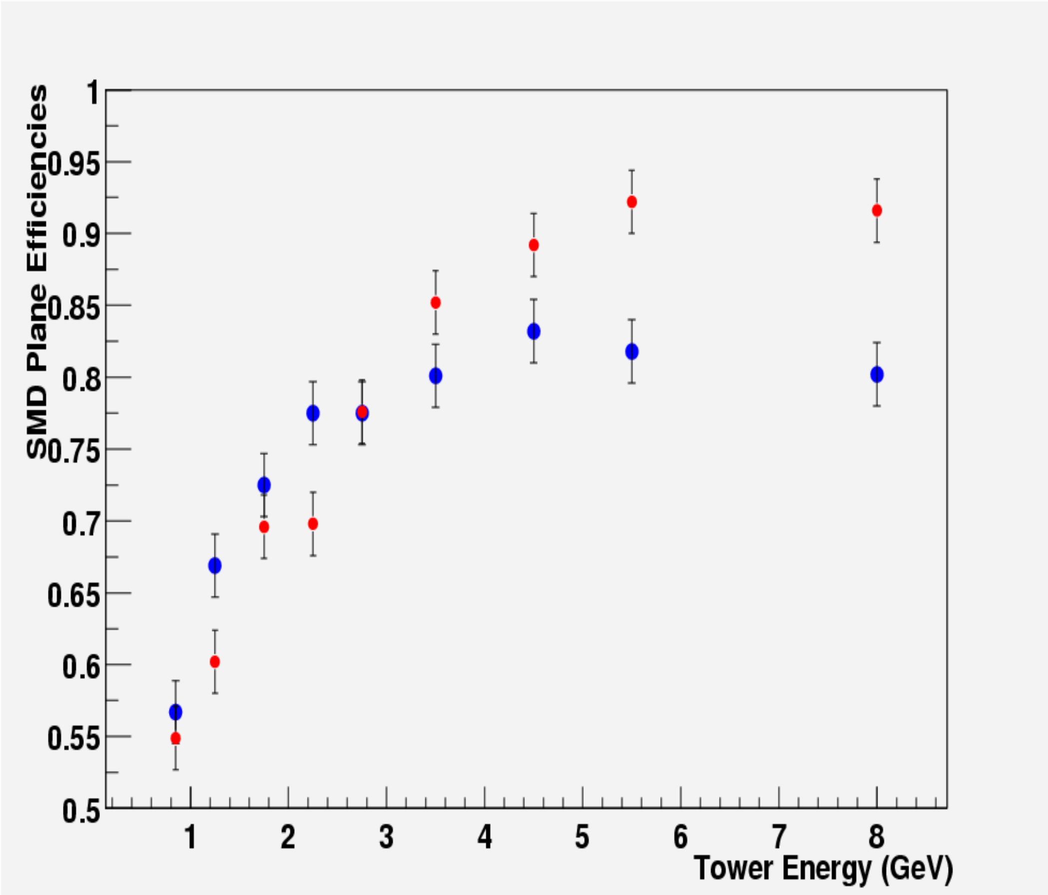
S. Trentalange and S. Guertin



π^0 reconstruction in d+Au – SMD information

S. Trentalange
and S. Guertin

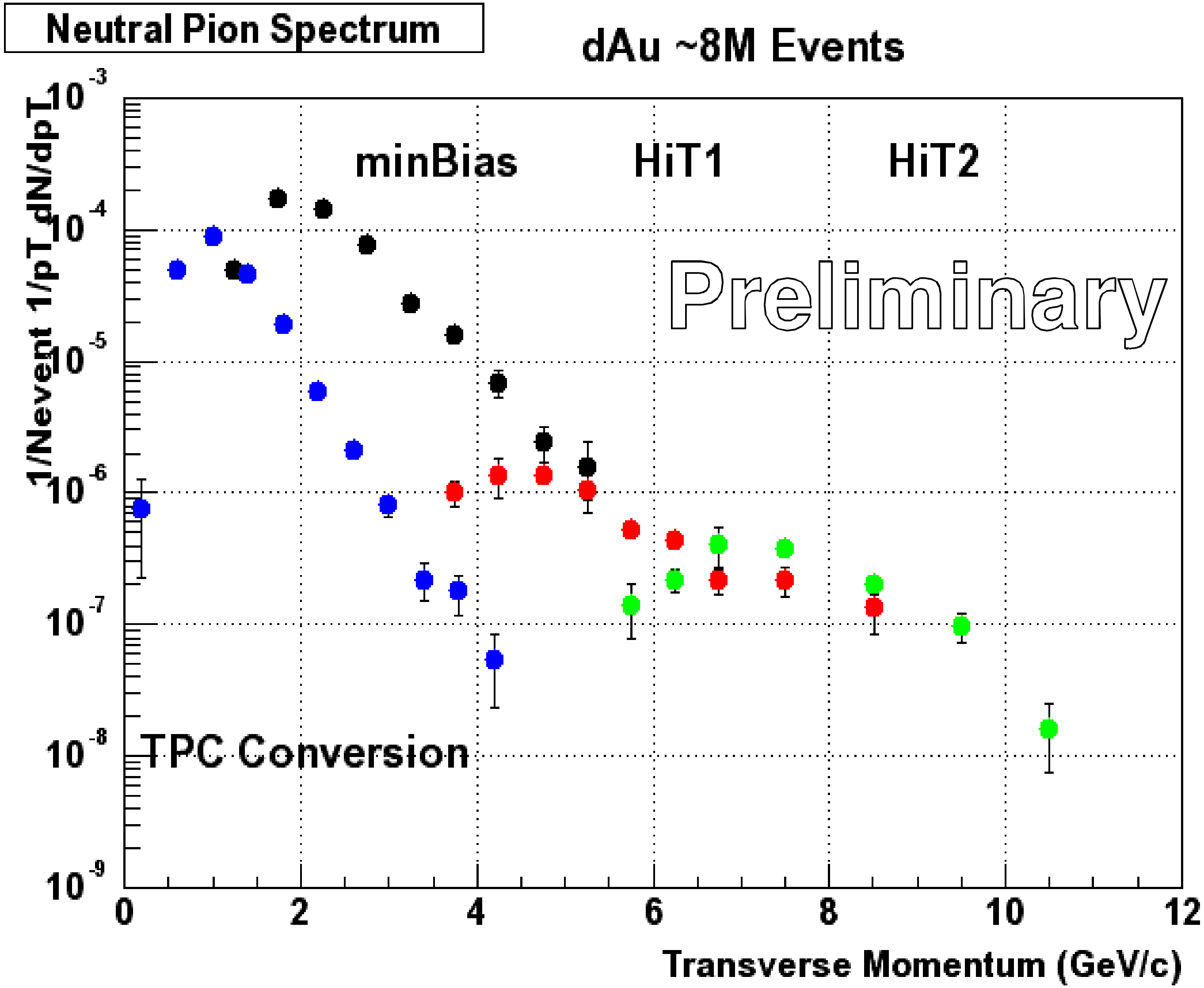
- *SMD is used to get the photon position*
  - *Need to understand efficiencies*
  - *Look how many EMC points at given energy have SMD info on it*
  - *Efficiency drops at lower energies because SMD thresholds are very high at reconstruction software*
    - *Need tune up*



π^0 spectrum in d+Au

S. Trentalange
and S. Guertin

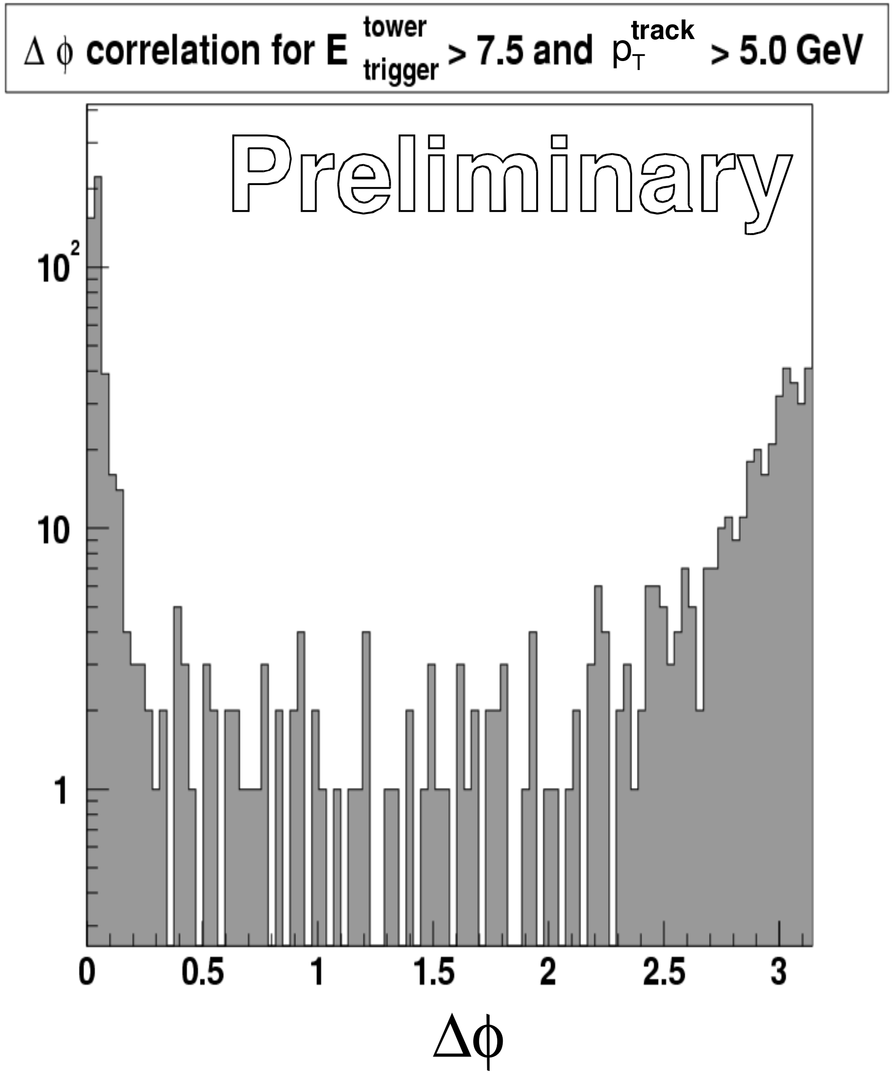
- *Much work to be done*
  - *Efficiency corrections (embedding)*
  - *Cluster thresholds*
    - *This may have huge difference at high-pt because of the very small opening angle between photons*



High tower azimuthal correlations

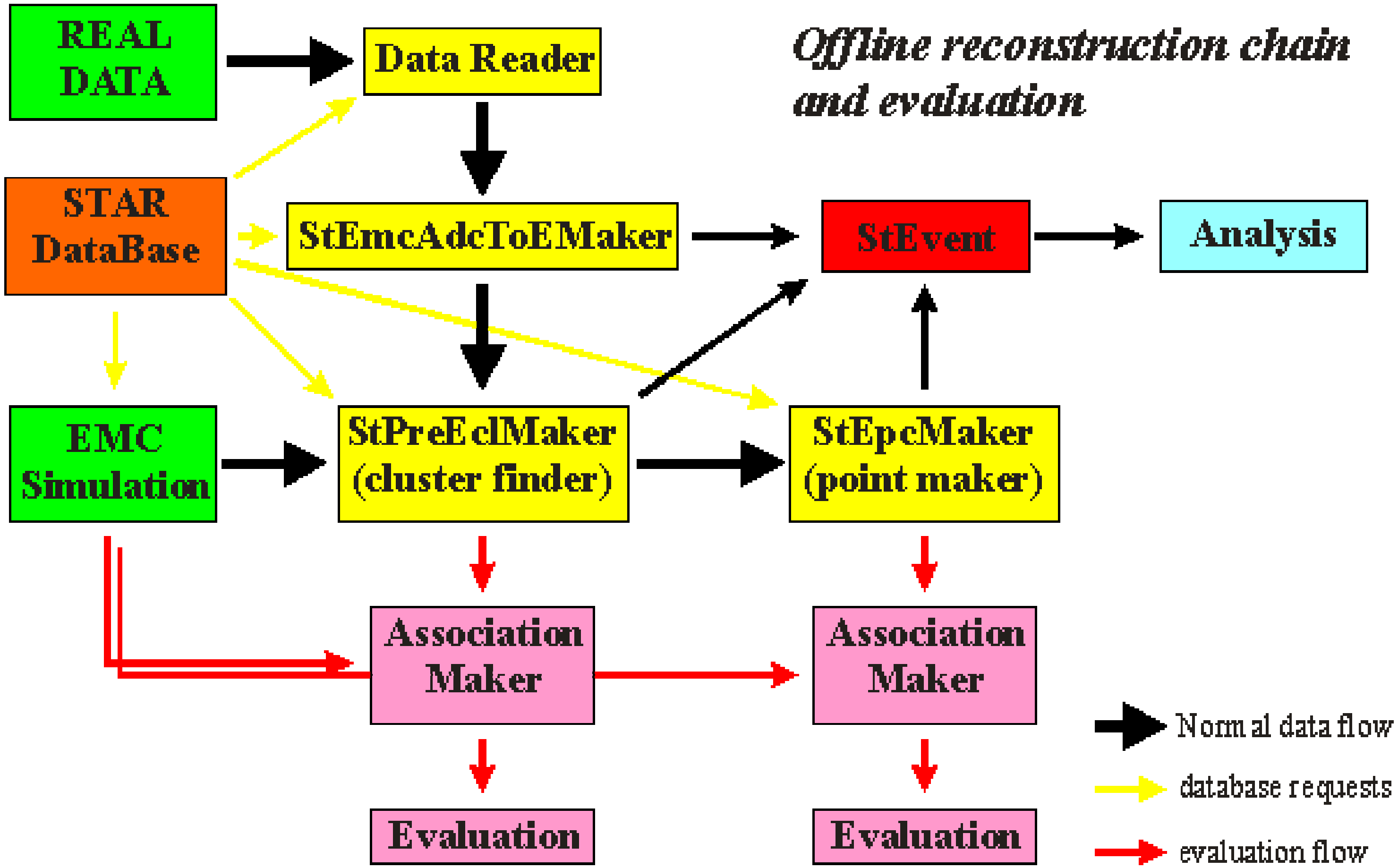
S. Chattopadhyay, S. Voloshin and A. Suaide

- Most of high tower triggered events with no tracks pointing to the tower come from π^0´s
  - HT-track correlations and HT-HT correlations is a good way to study π^0-track and π^0-π^0 correlations
- It is possible to go very high in p_T because of trigger
- Very preliminary work. Need to compare to minimum bias



EMC Software status

- *Offline reconstruction chain is fully implemented*

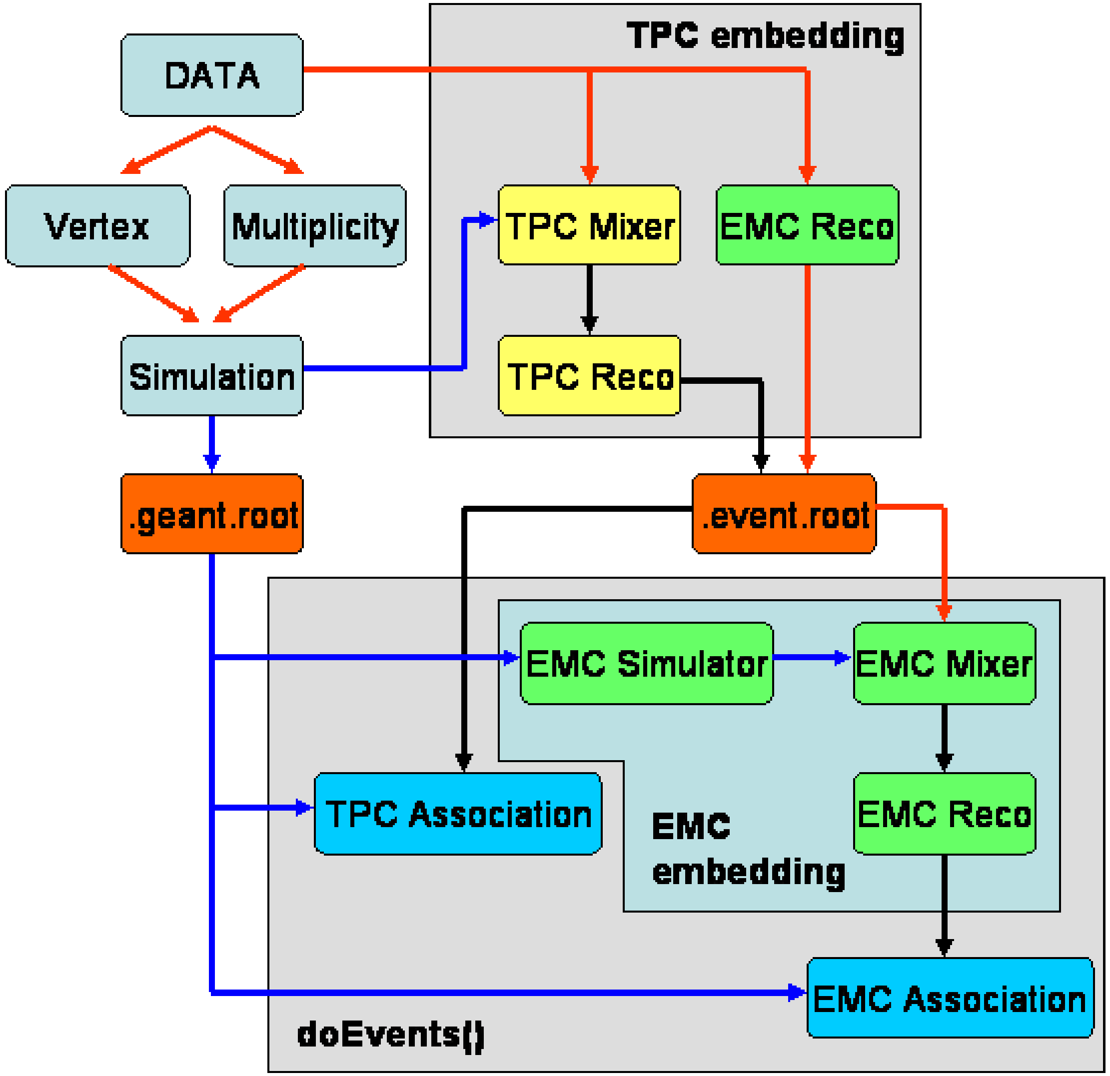


EMC Database

- Calibration and pedestals are filled in the database
  - Only MIP calibration for a while
  - Pedestals were saved every 12 hours during beam time
- Status tables
  - Only one table with the bad towers/SMD channels in the begining of the run
  - Bad runs at ~suaide/badruns/2003.h

EMC simulations and embedding

- Slow simulator (PLEASE USE ONLY Y2003a GEOMETRY)
  - Real gains, pedestal and map of dead channels from database
  - Geometry propagation to .geant.root -> Is there any hope???
- Embedding (2 steps)
  - TPC embedding
  - EMC embedding



Online software – preparation for next run

- Online calibration and pedestal measurement
  - Software is ready – Pedestal measurement, tower equalization and MIP calibration with L3 tracks
    - Need to tune up parameters
      - Multiplicity cuts, time interval for pedestal calculation
- Event display
  - Ready to go
- Online monitoring
  - EMC Monitoring – ready
  - STAR online monitoring (Panitkin's) – ready
  - Need to check for possible changes in the trigger map and event pool library

Software summary – task list and service work

- Simulations
  - Trigger simulator (very high priority)
    - Implementation of current High Tower and Patch algorithms
      - Signed but nothing has been done. NEED PEOPLE???
  - Slow simulator (moderate priority)
    - Include simulation of correlated noise
      - Signed but nothing has been done. NEED PEOPLE???
  - Embedding
    - Turn on EMC real data processing (very high priority)
      - Signed. Small problem with timestamp. Working on a solution
    - Test StEmcMixerMaker (very high priority)
      - DONE with simulation alone. Need to wait for previous item to be fixed

Software summary – task list and service work (cont.)

- Calibration
  - Electron calibration (very high priority)
    - Under way. Working on better tower equalization
  - SMD calibration
    - NEED PEOPLE HERE
- Database
  - Status tables (extremely high priority)
    - Map dead/bad towers and SMD channels
    - Time dependence of bad channels
    - NEED PEOPLE HERE
- Online Software
  - Check software for next run (moderate priority)
    - Recompile with newer libraries
    - Check for possible changes in the event pool library and possible changes in the trigger maps
    - NEED PEOPLE HERE

Final comments

- Data analysis is progressing very well (QM2004????)
  - E_T paper being reviewed in the high-p_T PWG
  - Single electron spectrum
  - π^0 spectrum and correlations
- Software development
  - All pieces in place
  - Task list
    - Offline -> Simulations, embedding, map dead channels, etc.
    - Online -> Need to prepare for next run
    - NEED VOLUNTEERS THAT ARE REALLY COMMITED TO HELP