EWK group: MC needs for the winter'2004 conferences

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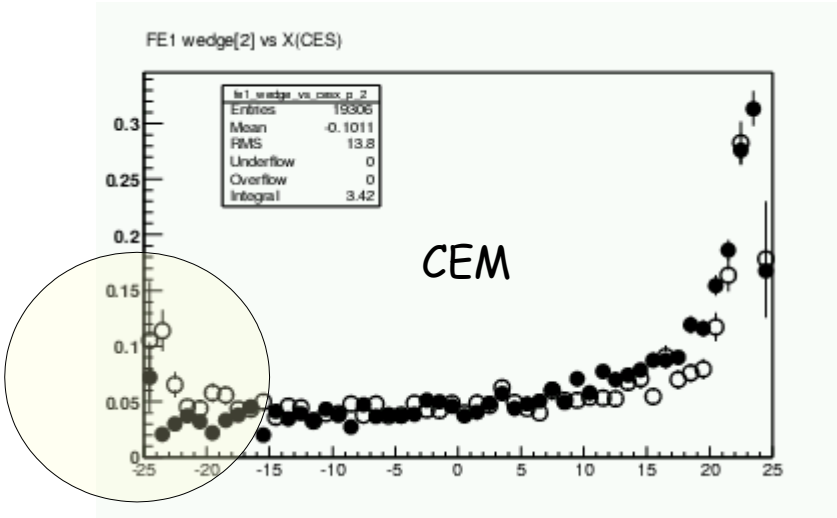
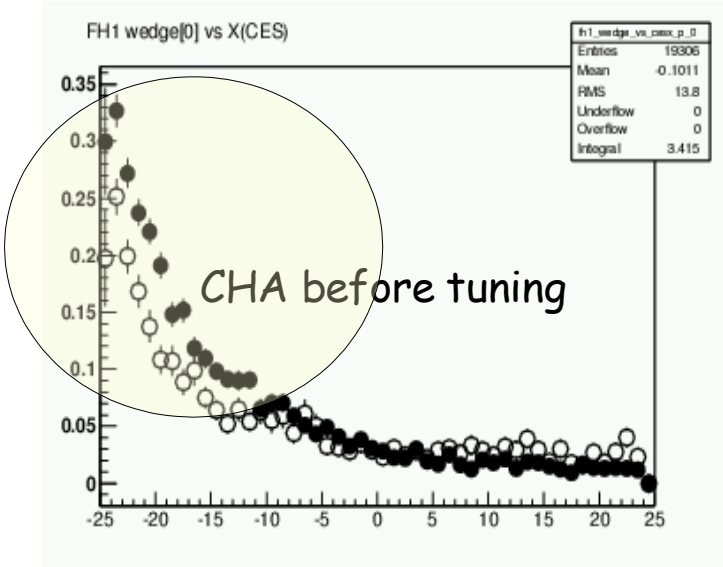
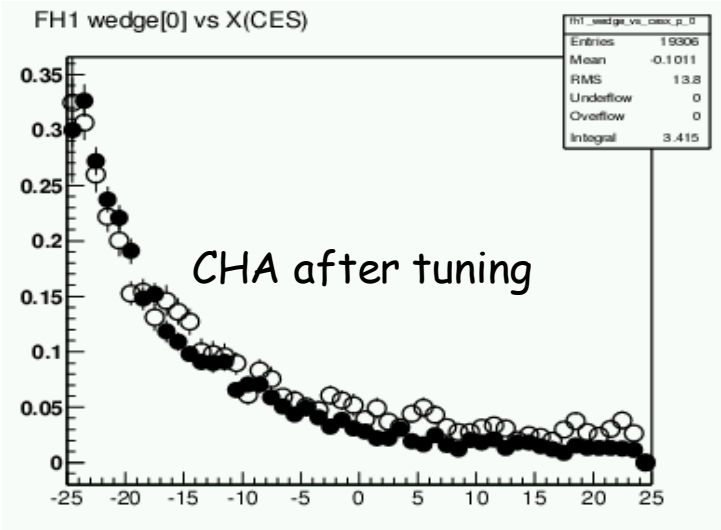
- Outline of the talk:
  - will go over the list of analyses and discuss issues progress on which **on the time of winter conferences** depends on the status of the MC
  - **event generators,**
  - **detector simulation,**
  - **MC generation needs**
- MC generators:
  - Most of the EWK analyses use Pythia, tune it where/when necessary
  - W-mass analysis: NLO QCG generators (RESBOS) do not have QED corrections (i.e. FSR), work in progress on merging output of RESBOS with the output of WGRAD/ZGRAD (I.Vollrath, U of Toronto)

Calorimeter simulation

- Tau analyses: CEM/CHA response
  - **Scales** – E/P for hadronic showers – systematics on the acceptance – 5% uncertainty (prelim)
  - shower profiles – isolation energy, em fraction of the tau jets (tau polarization)
  - Lateral profiles: CEM – ok (note crack response issue), CHA – needs tuning, Tuning converged;
  - Had shower in CHA has to be wider by 1.75+/-0.3
  - LSHR kludge







Calorimeter simulation (contd)

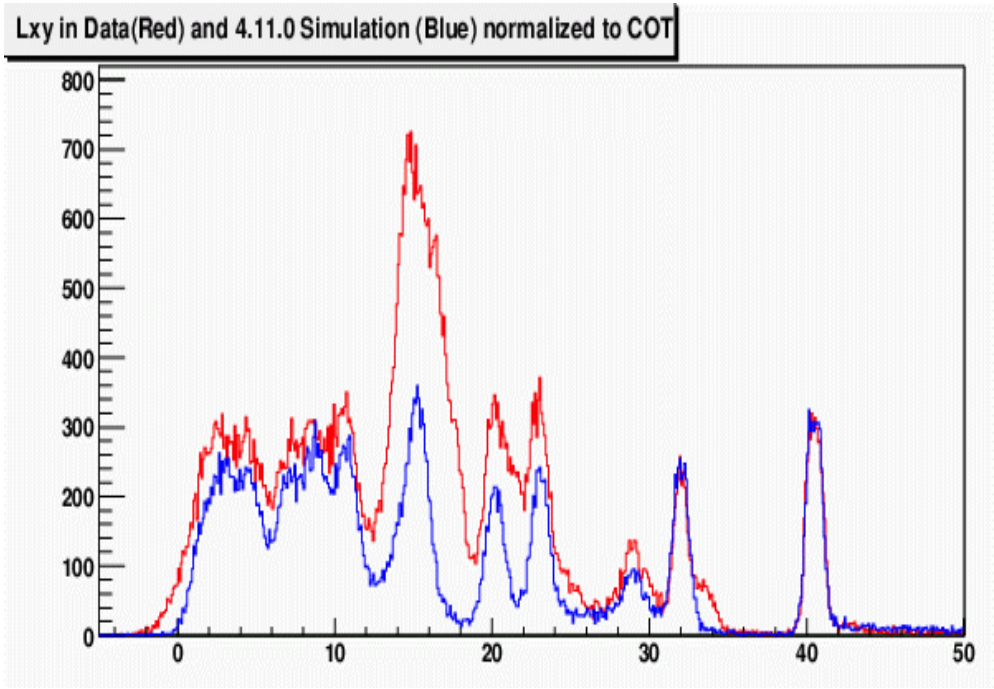
- W->tau nu: MET cut cuts out significant fraction of the signal
- W->tau nu, WW analyses use jet veto cut: require no jets in the event above certain Et
- these analyses are sensitive to the plug response,
- currently assuming 10% overall uncertainty on the scale, which **may not** be concervative
- Common issue for all the high-Pt physics groups

Muon simulation

- High-Pt muon analyses:
  - We quote 1%-2% uncertainty on muon ID (overall) , trigger, reconstruction efficiencies
  - phi/wedge distribution for the muons shows larger variations for some wedges
  - Geometry issue? Chamber efficiency?
- Muon sim infrastructure: different efficiencies for dfferent chambers ?

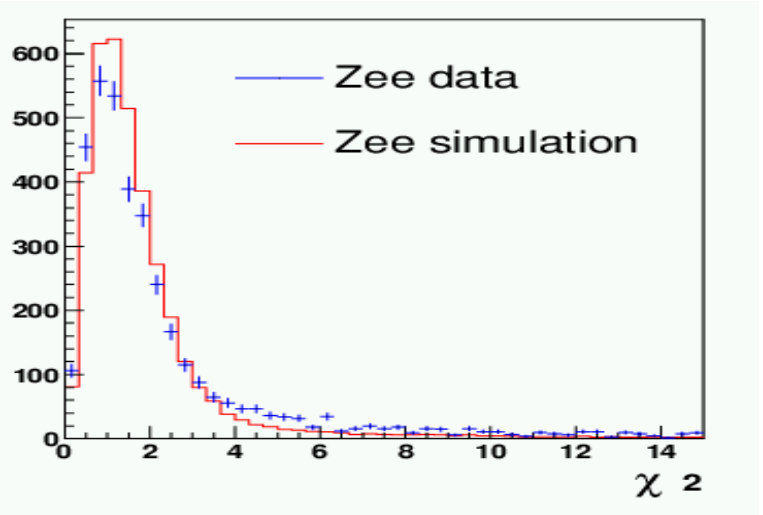
Detector material map

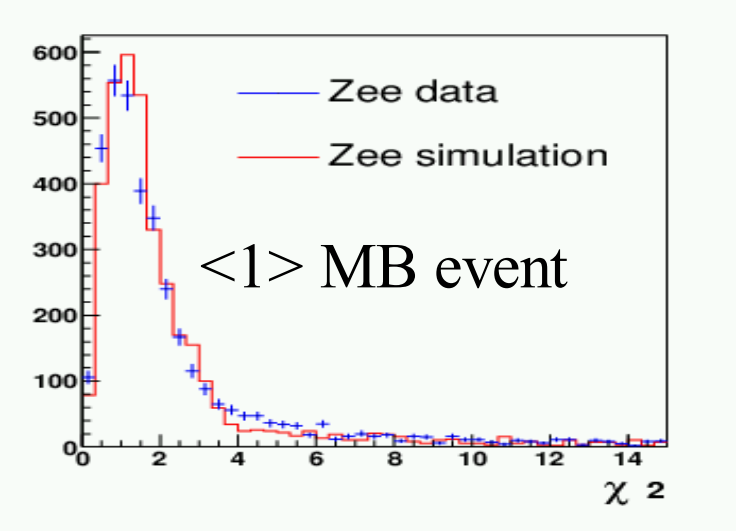
- <u>W-mass, W/Z cross section measurements:</u>
- High-precision measurements, sensitive to the amount of material in the detector
  - ~5% uncertainty in the amount of material -> ~3.5% uncertainty in R (ratio of W/Z cross sections)
- Last number from high-Pt electron studies:
  - we're missing (4.5+/-1.5)% of material in the default geometry description (about 30% of the total amount of material)
- EWK group got around by using "fantom" objects
  - layer of copper in the central at R~32cm
  - Iron disk (30% RL) in front of the plug
- Plot on the left (Vivek T.) - in the central region "missing" material is located at different radii



Luminosity effects and generation of extra minbias events

- Instantaneous luminosity of 3*10^31 corresponds to 1minbias event in average piling up on top f the interaction we triggered on.
- Example on the left (H.Gerberich): PES cluster chi2
  - Efficiency of the cut on chi2 changes by 4% when 1 extra MB event is added
- Best tuned minbias generator: Pythia
- Default RunMC framework does not allow to generate signal and minbias events with the same MC event generator
- "EWK branch" of RunMC modified to allow generation of extra minbias events with Pythia – want it to be integrated





MC generation needs for the winter

- Assume that W/Z cross section analyses will remain the major customers and will need to update their MC datasets
- Currently web page of W/Z cross-section group lists MC datasets with 11 Mln events in total
  - Significant part of that – samples for the systematic studies
  - Not all the samples listed (Z->tau tau bgr MC)
  - Some samples not generated yet (W->tau nu pending the tuning results)
  - Turnaround time for 1 Mln event sample is more than 1 week and not easily predictable.
  - Current queue in Toronto: 4M events => turnaround is defined by the manpower/network (Reda is doing a great job! But what if Roman had to deal with all the physics groups!)
  - Because of this analysis subgroups are going ahead and generating the samples they need themselves (on the CAF)
- Based on that I'd estimate the needs of EWK group in "organized MC production" at the level of 30 Mln events