First ed. board for CERN Council note

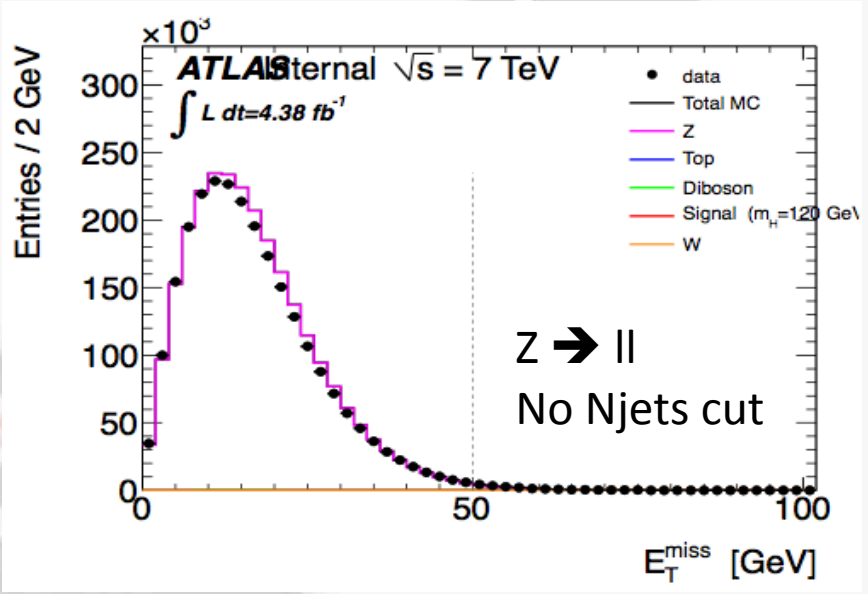
- Ed.board meeting on Friday: https://indico.cern.ch/conferenceDisplay.py?confId=163296
- Analysis is update of analysis shown at EPS: ZH->llbb and WH->lnubb (l=e/μ; τ also in MC)

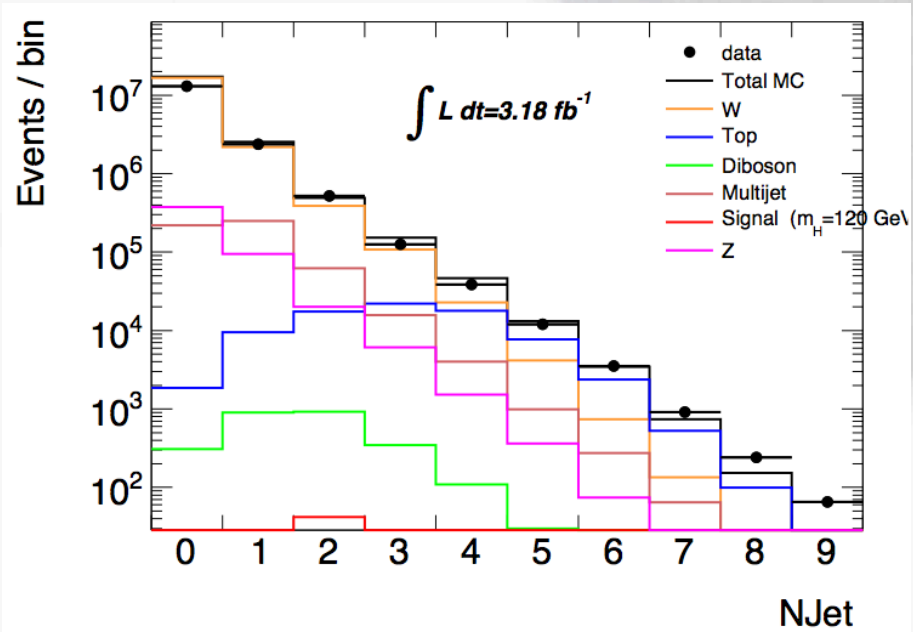
- A few changes to keep up with reconstruction recommendations etc:
  - Updated trigger - but still single-lepton triggers for WH and single- OR double-lepton triggers for ZH
  - Updated lepton quality cuts (e.g. medium++ electrons instead of tight)
  - (not yet done) move to METRefFinal instead of METLocHadTopo (+ analysis muon in muon channel)
- A few changes in analysis to improve background rejection (mostly top):
  - Tighter lepton and jet veto
  - Angular cuts between reconstructed Z->ll and H->bb in ZH channel
  - Separate categories defined by bins in p_T(W) and p_T(Z) for WH and ZH resp.

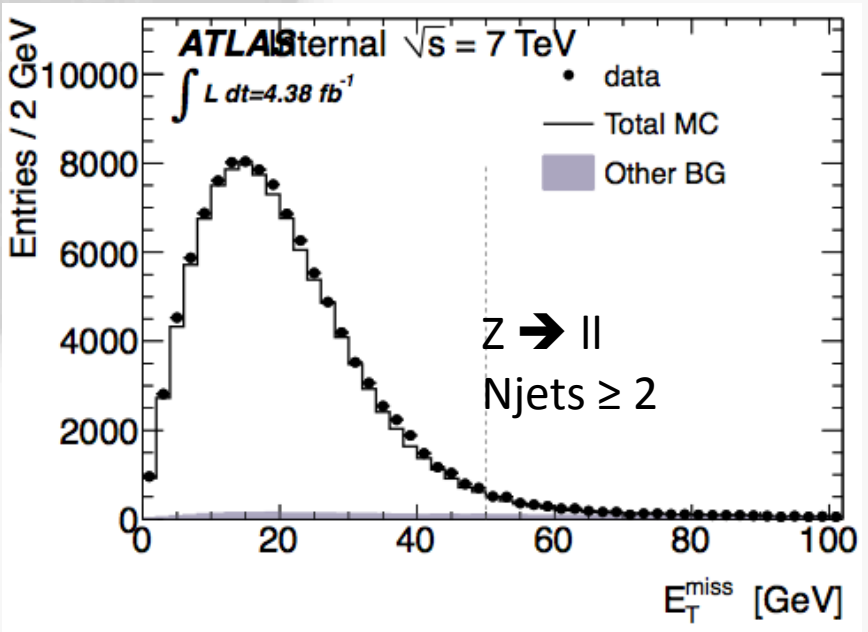
- **Not yet done:**
  - Run on all 2011 data (missed part of period M and some other data files) & on MC11b datasets
  - Move to METRefFinal done in analysis software but unchecked
  - Apply recommended electron fudge factors (made available on day of ed.board)
  - Treatment of inefficiency due to bad muon trigger region in period L (μ trigger scale factors now exist)
- **Points of concern/to follow up**
  - Availability of MC11b datasets
  - Vertex multiplicity/MET/pile-up due to pythia 8 minbias events in mc11 (ongoing)
  - Data/MC agreement **in 0-jet bin of WH** analysis (note analysis cut on Njet>2)
  - b-tagging scale factors – p_T-dependence **may sculpt signal**, especially due to bin edges (ongoing)
  - **Jet/MET systematics** – recommendations?

MC11 vs release 17 data

- First look at E_T^{miss} in release 17 – **MC11a**
- In ZH analysis (fake E_T^{miss}) effect only visible before cut on $N_{jets} \geq 2$ – $p_T^{jet} > 25$ GeV
  - Seems to confirm soft activity as source of mismatch
  - Means we're dominated by jet energy deposition and not sensitive to soft activity
  - Suggests use of cut on MET significance ($E_T^{miss}/\sqrt{\Sigma E_T}$) to avoid problem
- Disagreement (≈x2) in WH for Njets = 0
  - But no vertex reweighting applied yet etc etc
  - Not there in ZH







HSG5 preparations for Moriond

- Inclusive analyses:
  - WH->lvbb:
  - Liverpool/Birmingham have mature analysis – involved in Council analysis
  - LMU and Bonn ramping up analysis – Bonn looking into BDT for enhanced significance
  - ZH->vvbb:
    - Ac.Sinica, Liverpool/Birmingham, IFAE last Friday
    - Need to keep track of MC for Z->vv+bb/+jets, ZZ, WZ samples
    - Will divide into 3 MET bins [120GeV~160GeV], [160GeV~200GeV], [200GeV~]
  - ZH->llbb: Liverpool/Birmingham have mature analysis
  - ttH: hoping to rally troops at Glasgow, but not clear what will happen

- Boost/Jet substructure analyses:
  - Edinburgh and UCL - UCL & Argonne involved in Z->bb reconstruction
  - So far only WH->lvbb, but possible interest in ZH->llbb from Edinburgh
  - CPPM ramping up on ZH->vvbb

- Other:
  - NN energy correction tool for b-jet energy scale (Lei Zhang)
  - Looking into cutting on d0 significance instead of d0 (Philipp Fleischmann)
  - Truth-level study of di-jet mass (Maaike Limper)
  - MC generator studies of WH and ZH (Michiel Sanders)
  - Atlfast II validation for Jx_muFIXED samples needed by b-tagging group