Embedding in 2010 data

m-tautau intermediate meeting

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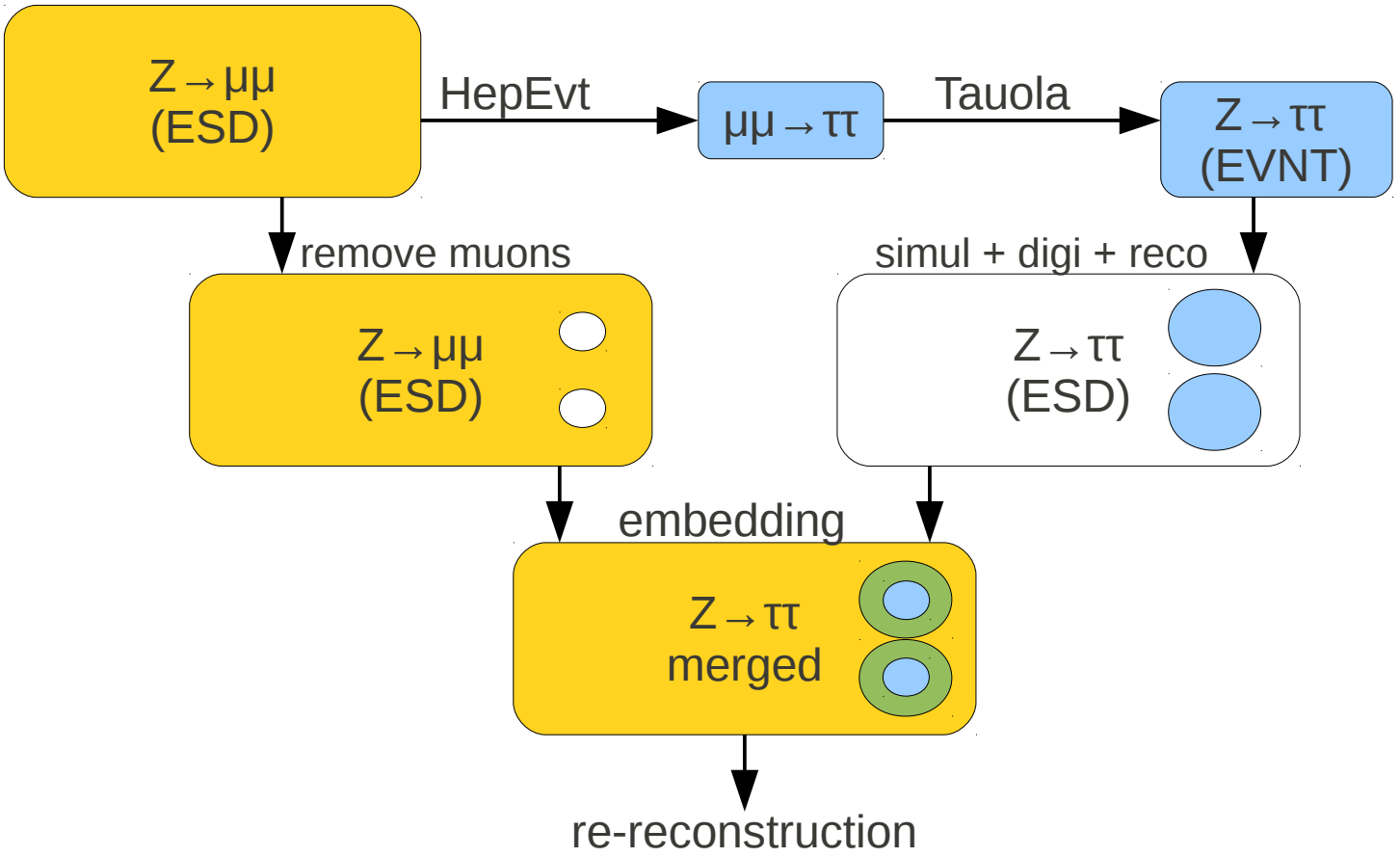
Embedding: Reminder

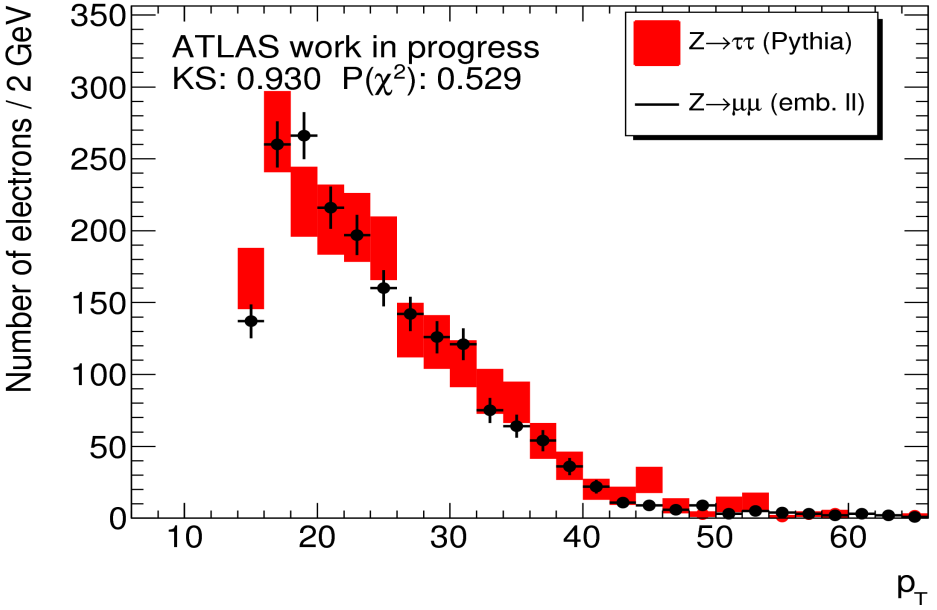


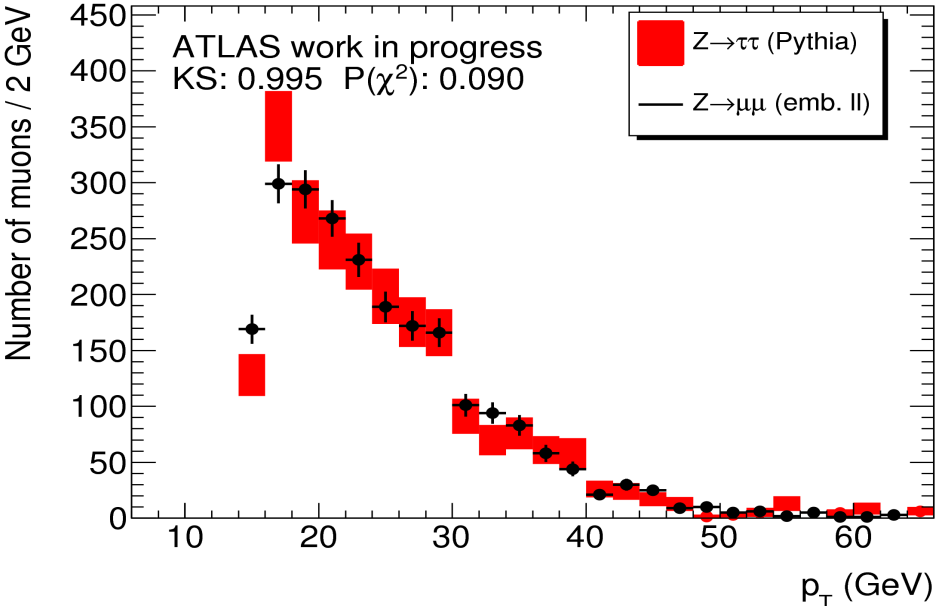
Important: re-calculate missing ET

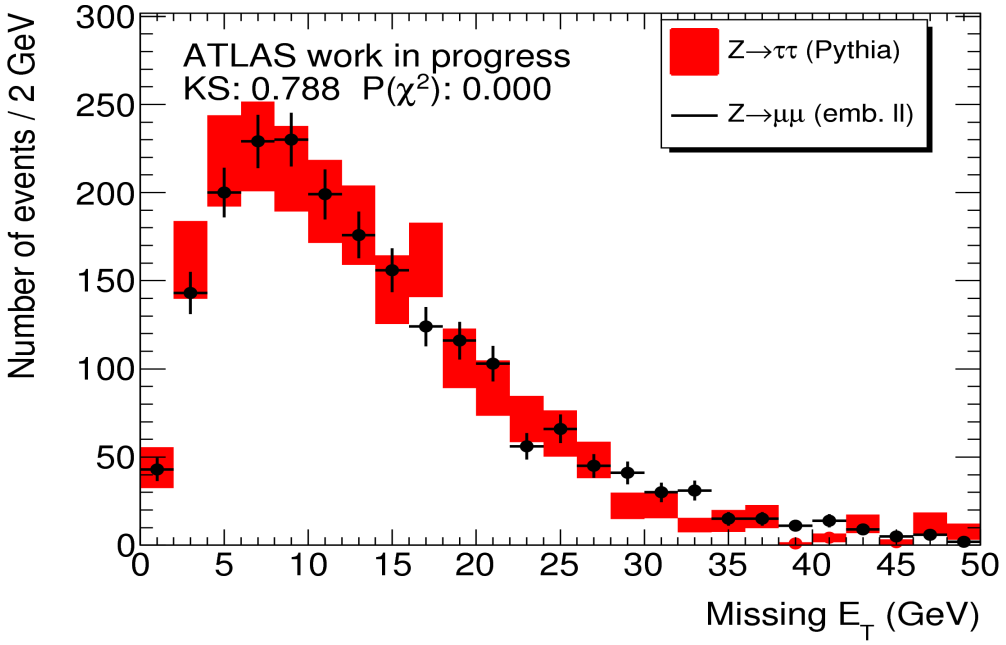
$Z \rightarrow \mu\mu$ data selection

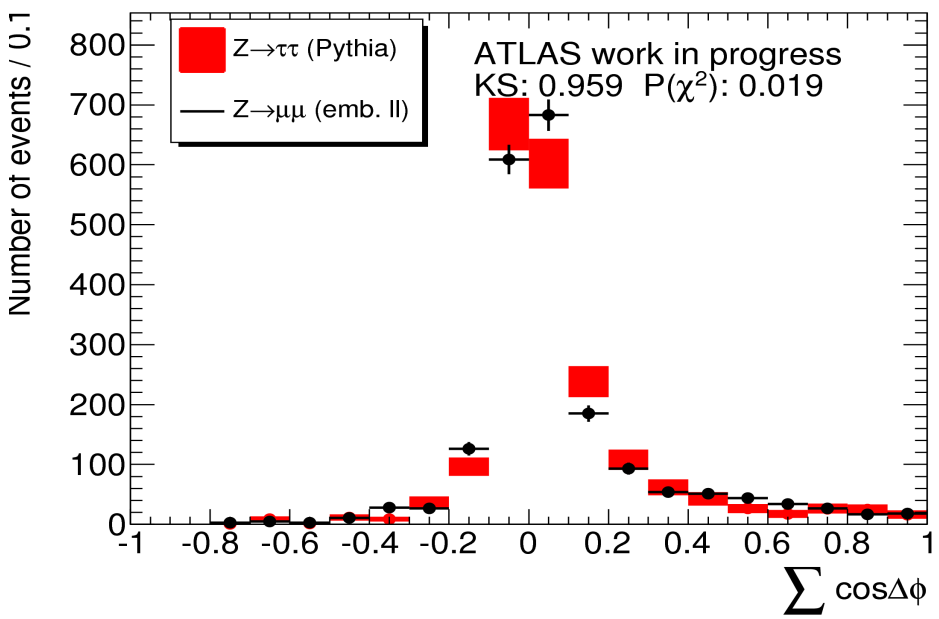
- Embedding dedicated $Z \rightarrow \mu\mu$ skims
  - before: used event list to pick from all data
- Using ~40 pb^{-1} from good run list
  - pT > 20 GeV in region $-2.4 < \eta < 2.4$
  - pT(MS)>10 GeV, | pT(MS)-pT(ID) | / pT(ID) < 0.5
  - Isolation: pT(cone20) < 1.8 GeV
  - Mass requirement: 71 GeV < M(μμ) < 111 GeV
- After all cuts (+ embedding losses): 13k events
  - embedded as lep-lep and as lep-had
    - pT(l,τ) > 15 GeV in region $-2.4 < \eta < 2.4$
    - match to truth τ-decays from input muons

$Z \rightarrow \tau\tau$: lep-lep channel

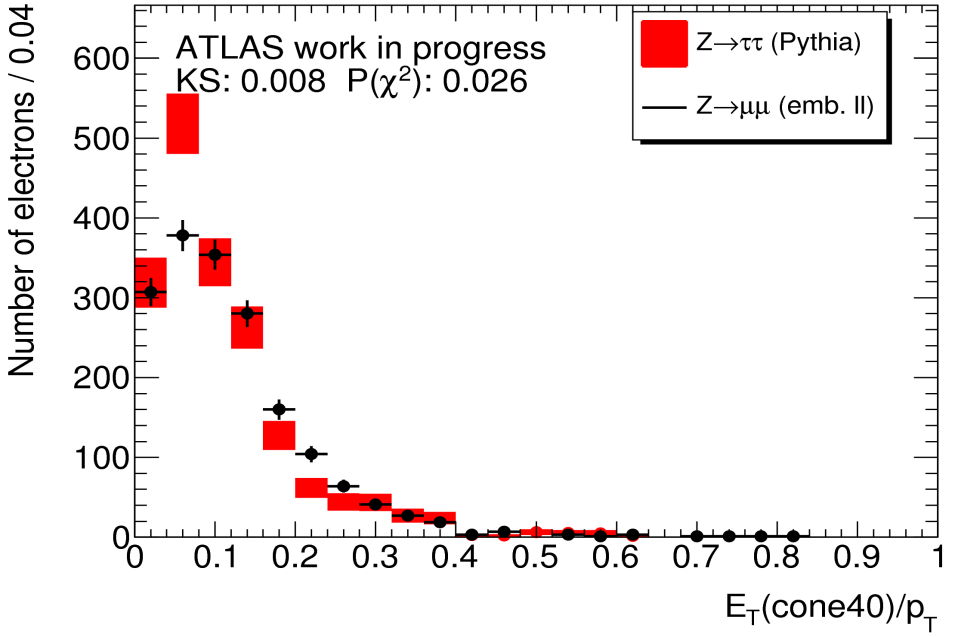


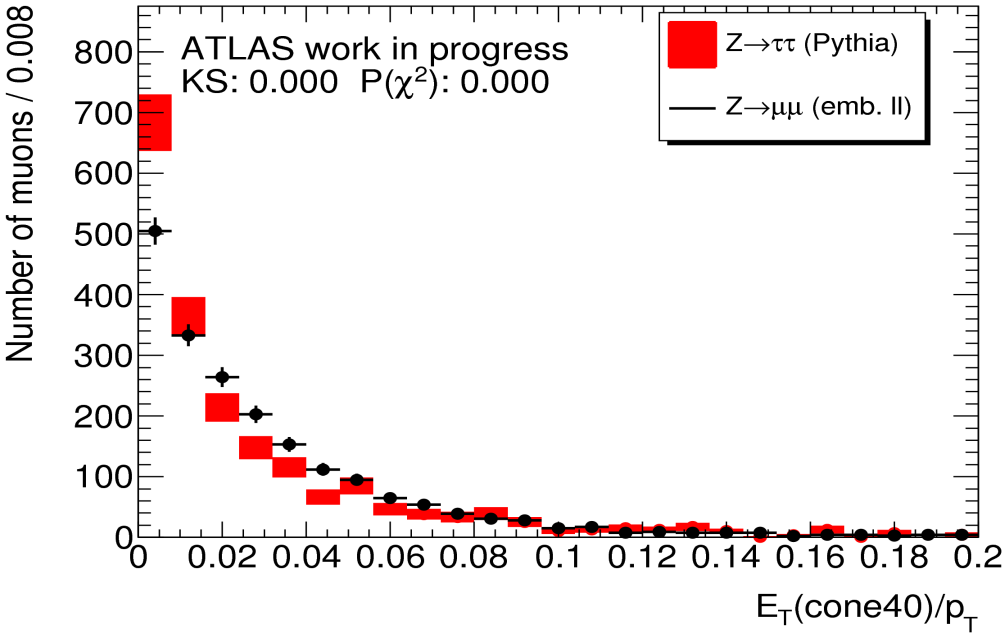






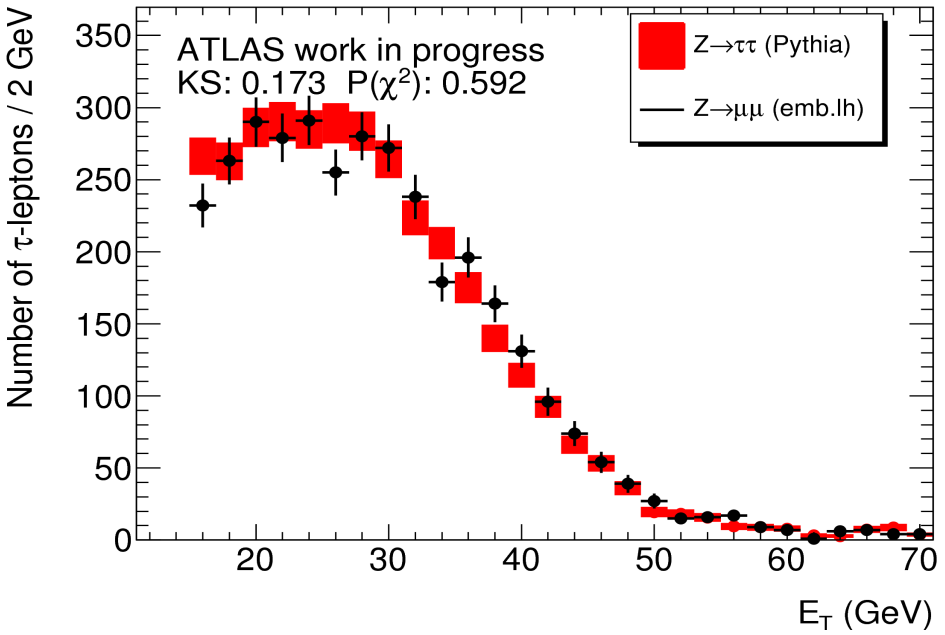
$Z \rightarrow \tau\tau$: lep-lep isolation

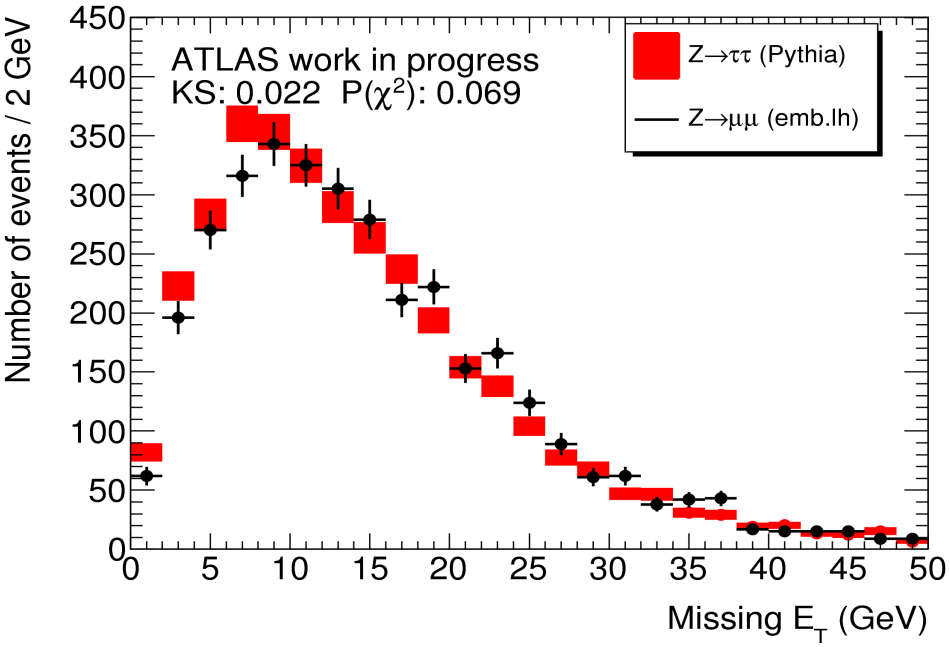


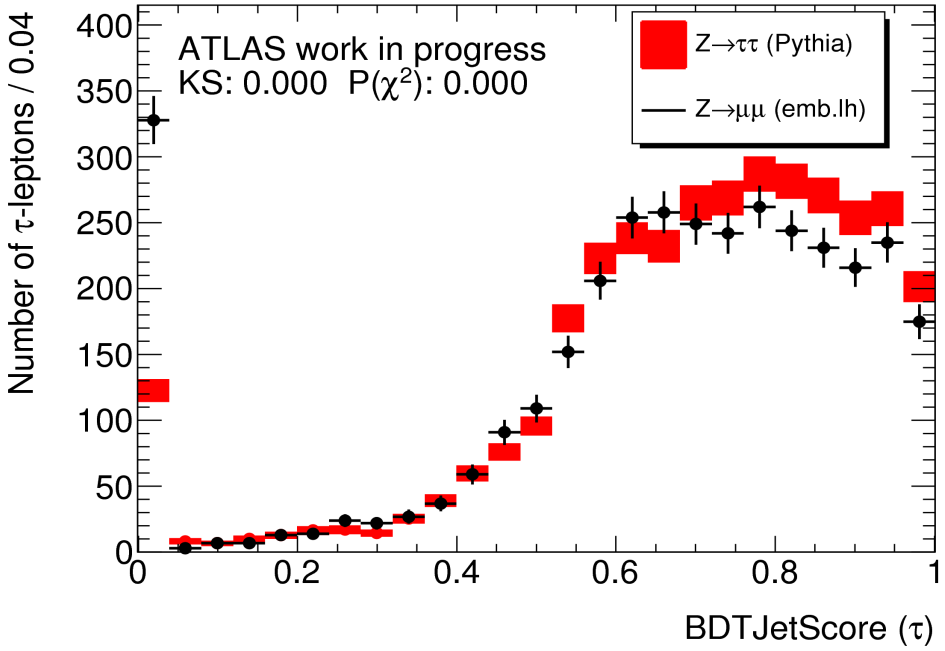


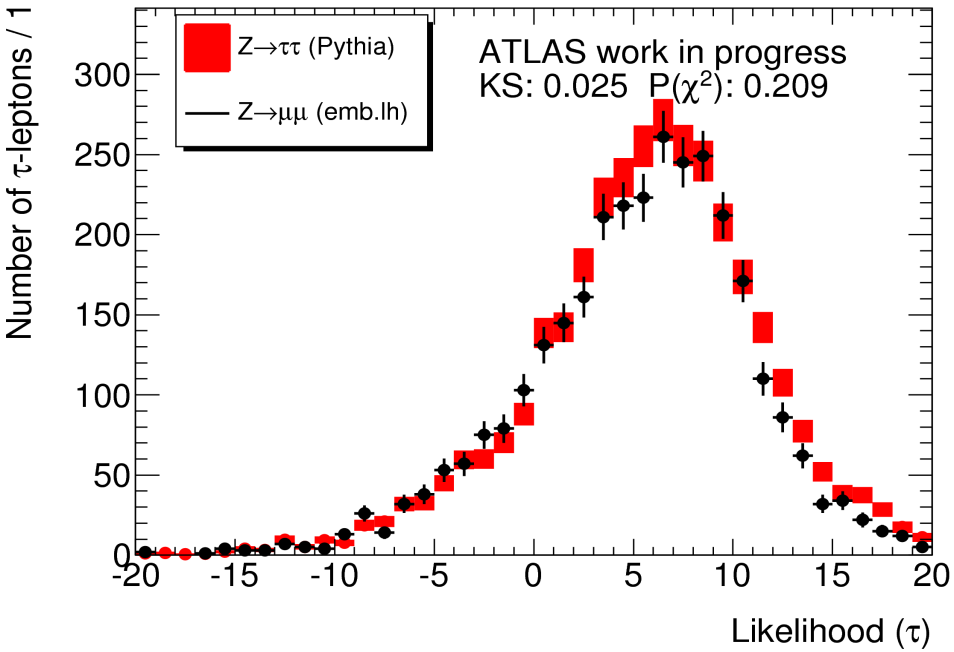
- Lepton isolation differs from MC expectation
  - better agreement seen before with low pile-up
  - have to investigate in embedding as well as in data

$Z \rightarrow \tau\tau$: lep-had channel

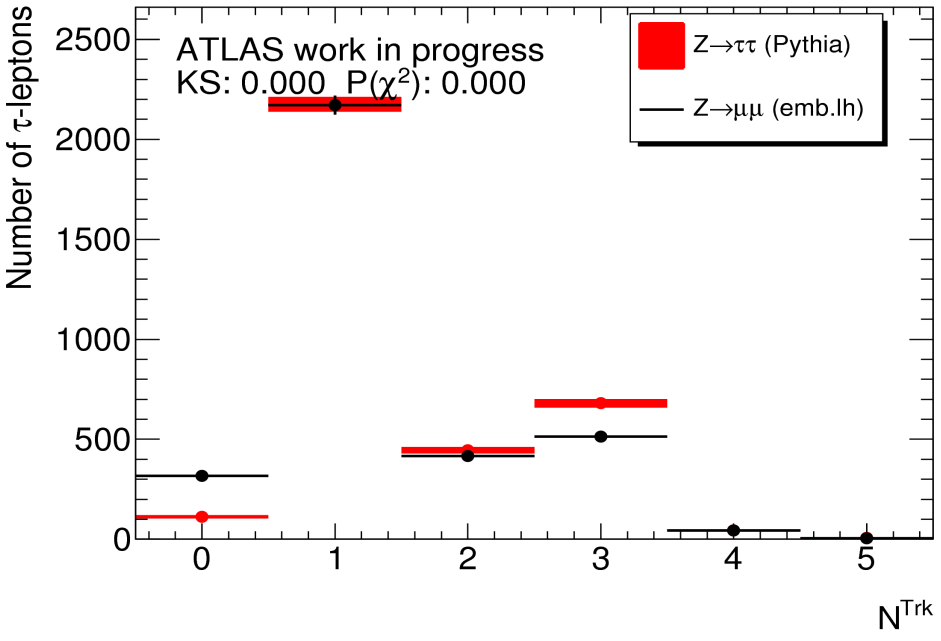


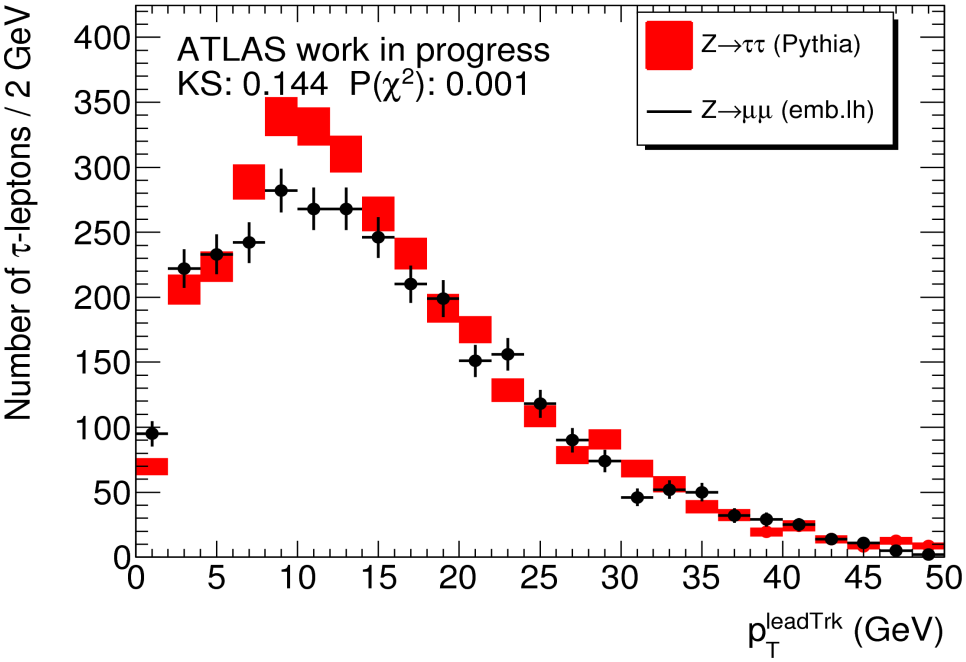






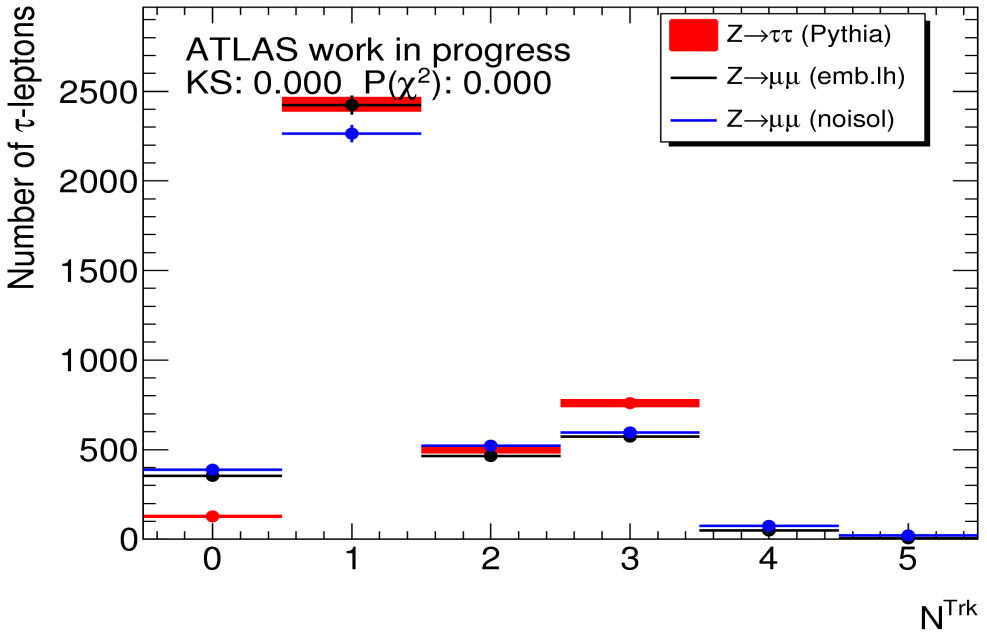
Z→ττ: tracks in hadronic taus

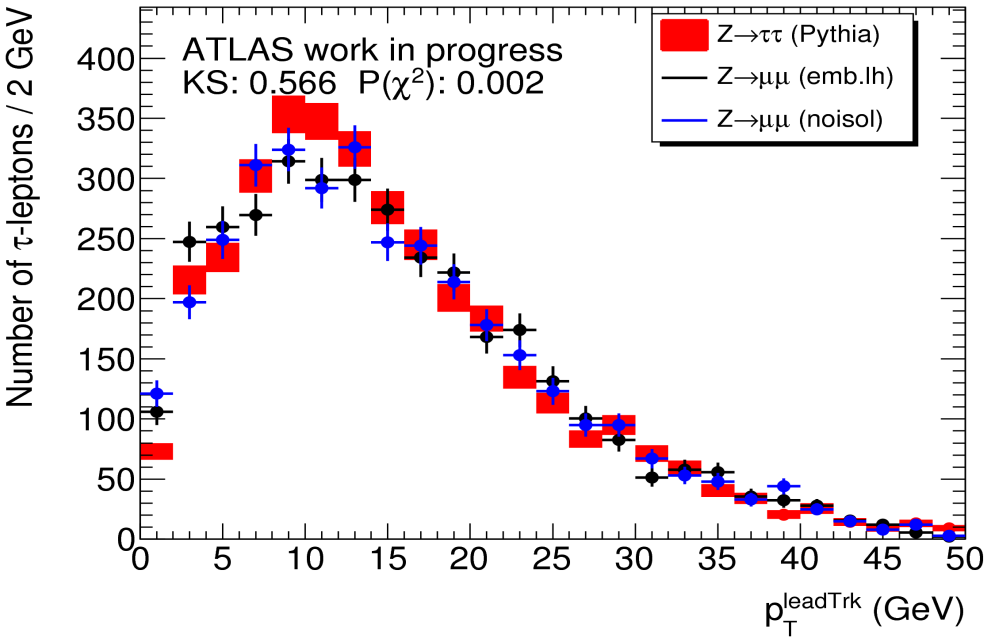




- Identification of embedded τ-leptons crucial
  - Calorimeter observables in agreement (not shown)
  - Tracks in taus show discrepancies with increasing pile-up
    - (Good performance in low pile-up shown before)
- First guess: isolation of input muons for embedding

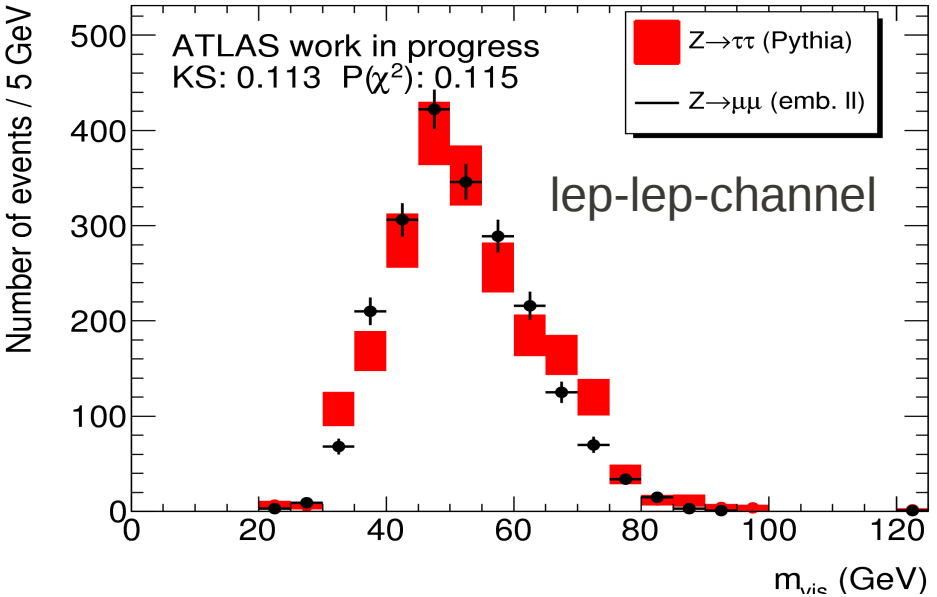
isolation of input muons

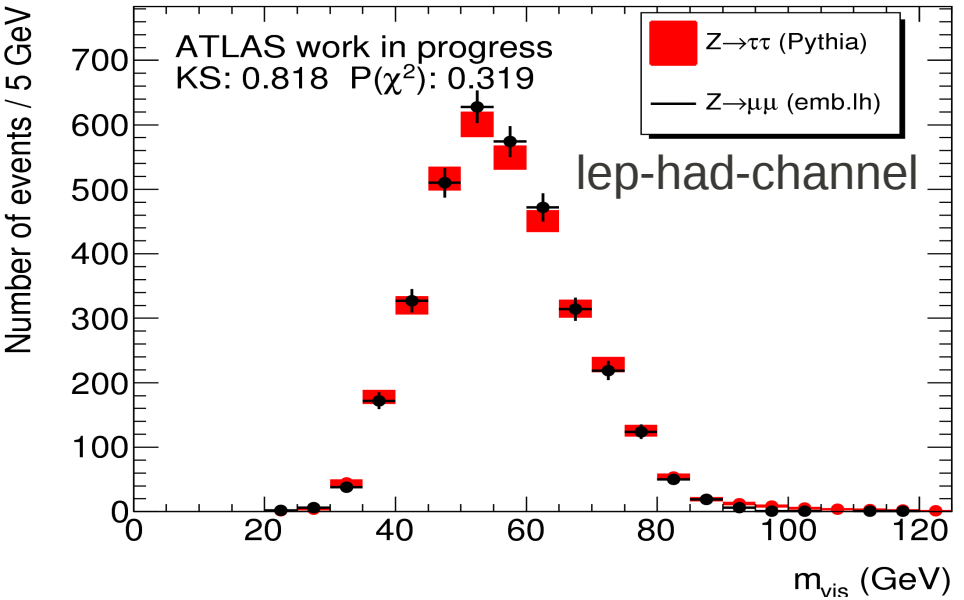


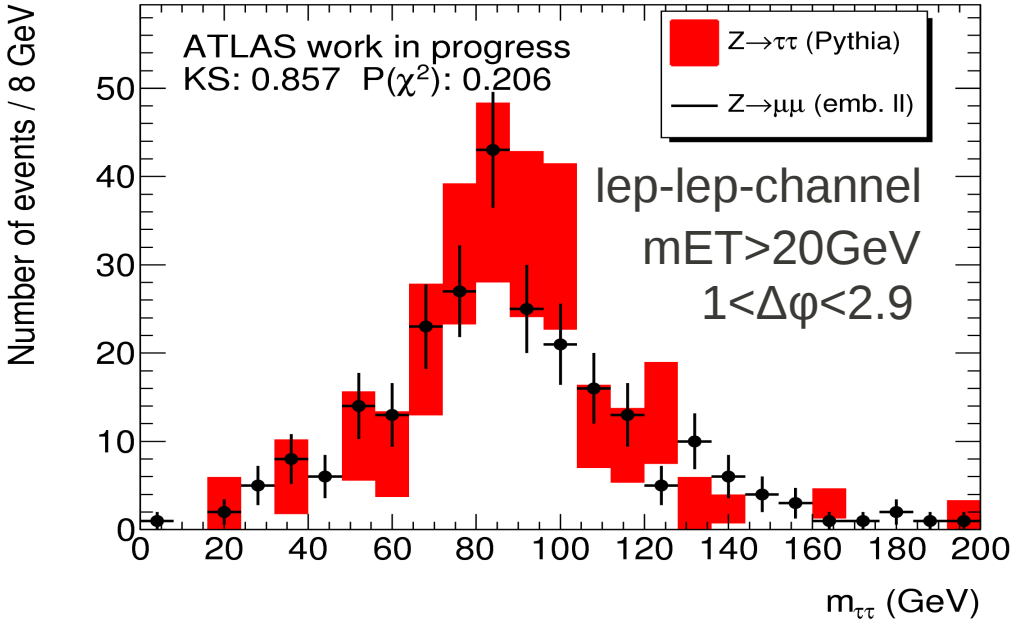


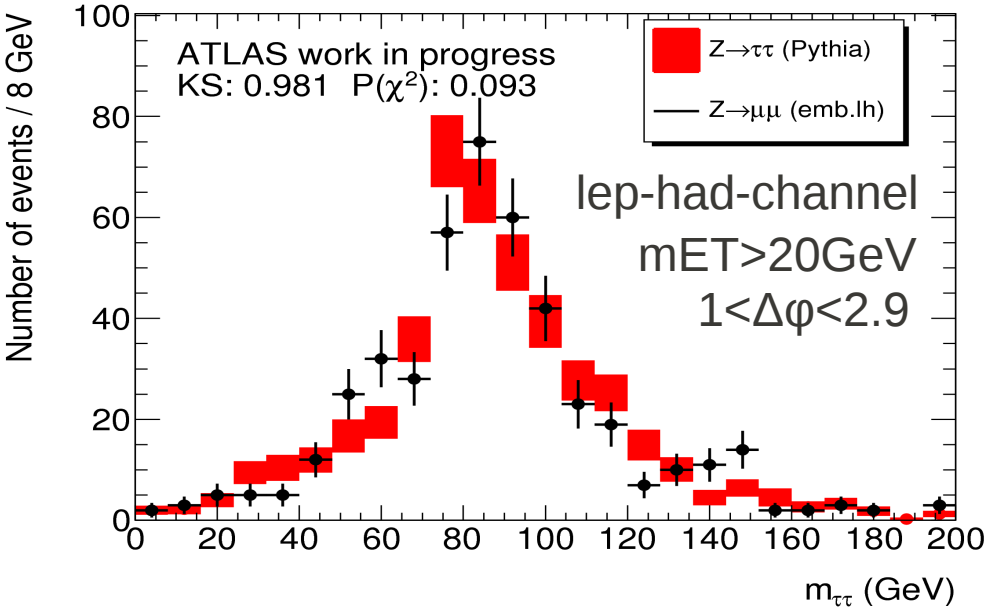
- Left out cut on isolation for $Z \rightarrow \mu\mu$ selection
  - influence of isolation surprisingly small
  - no real improvement observed in taus
  - results even worse for lepton isolation (not shown)
- Todo: investigate track qualities in pile-up

Mass distributions









Summary & Outlook

- Embedding in general in good shape
  - MET and angular distributions described well
  - Invariant mass peak as expected from MC
- Identification variables to be investigated
  - Too few tracks in hadronic taus (quality?)
  - Some discrepancies in lepton isolation
- Comparison to $Z \rightarrow \tau\tau$ data soon possible
  - check Monte Carlo expectation vs. real data
- Apply embedding for different studies
  - Implement trigger information, study $W \rightarrow \tau\nu$ ...