

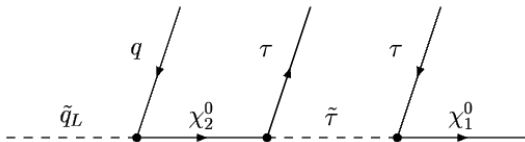
Current work and plans on SUSY SU1 analysis

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- ▶ We are studying the decay chain

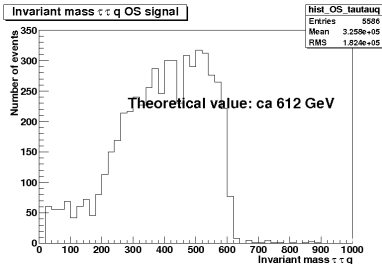
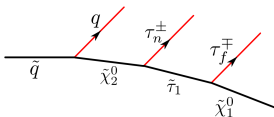


- ▶ From these particles, four invariant mass distributions can be constructed; $m(\tau\tau)$, $m(\tau\tau q)$, $m(\tau_N q)$, $m(\tau_F q)$
- ▶ We start by looking at the invariant mass distributions at generator level, before checking the distributions at reconstructed level
- ▶ first we start with *true* tau info with particles *directly* from the signal chain (using mother and daughter info), ...

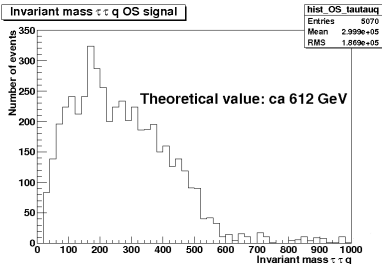
- ▶ We are working on making data sets with the “new” (or merged) tau algorithm - since the cut on reconstructed tau p_T is lowered from 9 GeV till 6 GeV (hopefully very good for us).
- ▶ Alex plan to use the CSC 12.06 samples and just rerun the tau algo if it works (last time it crashed), and then to submit the jobs to Parallab
- ▶ if it works we will have “updated” samples that master students can use for their analyses
- ▶ We also need to develop good selection criteria for choosing the right jet and combine it with the right tau, and also to reject SM bg (particularly $t\bar{t}b\bar{b}$) → see next presentation

Some invariant mass distributions at GLVL:

$m(\tau\tau q)$ directly from signal chain:

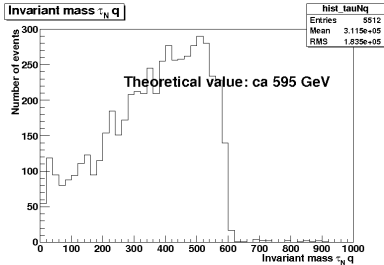
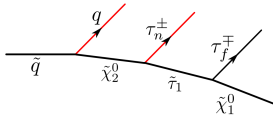


True

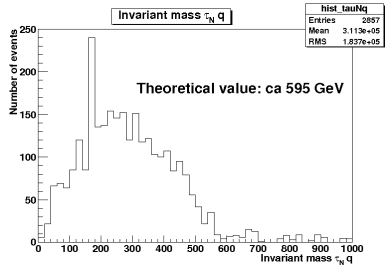


hadronic

$m(\tau_N q)$ directly from signal chain:

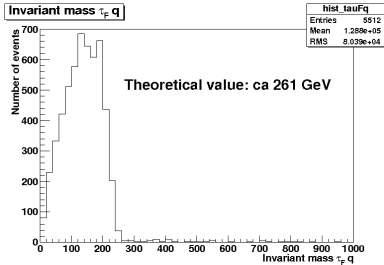
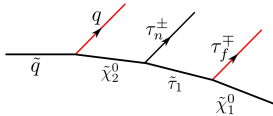


True

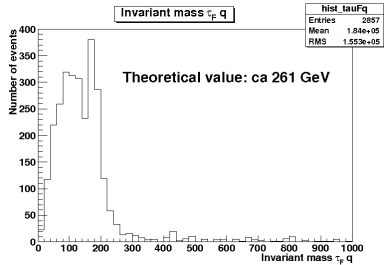


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$m(\tau_F q)$ directly from signal chain:



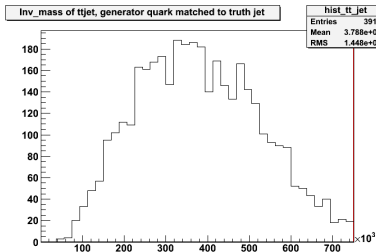
True



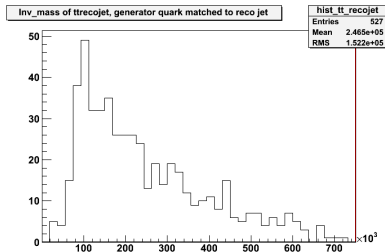
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$m(\tau\tau q)$ at two different stages:

We match the quark produced in the squark decay to a truth jet and a reconstructed jet respectively.



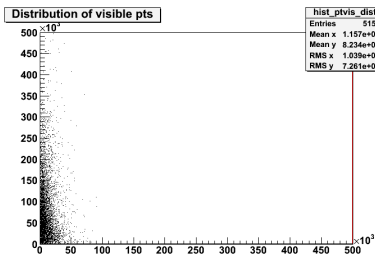
Truth jet



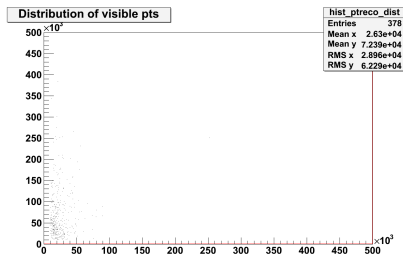
Reconstructed jet

The efficiency of matching is surprisingly low for the jets as well, which is perplexing.

Energy of taus at reconstructed versus generator level



Truth(visible)



Reconstruction

At reconstructed level the distribution is shifted as the reconstruction efficiency is lower for very low energetic taus.

Status for analysis on reconstructed level:

- ▶ So far so good, but for reconstructed level it is much more messy. We need:
 - ▶ Improved statistics
 - ▶ Alex has written most of code needed, but selection criteria for finding right jet and tau may be improved.
 - ▶ Furthermore, efficiency of tau reconstruction very low in this P_T region.
 - ▶ This can be improved by using the newer reconstruction algorithm.
 - ▶ Method to extract endpoint information from the distributions (some fit-function or linear fits?).
 - ▶ Statistical/uncertainty analysis.
 - ▶ General bg suppression methods.
- ▶ Depending on the data production time, we hope to have a note finished after Easter...