



Top analysis in Milano

- The involvement of Milano in top analysis is much more recent than the participation in SUSY studies.
- Our first presentation at the top WG was in last meeting.
- Nevertheless, we will devote an high level of effort in top studies in 2008
- The $t\bar{t}$ production is the main background to SUSY in the search channels we are interested in, and we need to understand the $t\bar{t}$ production before we can say something about SUSY
- Results on top physics are possible with less integrated luminosity than SUSY
- Top events will also be very useful for commissioning



people and activities

People actively involved: Clara Troncon, Tommaso Lari (staff), Simone Montesano, Lidia dell'Asta (PhD) Massimiliano Uslenghi (borsista), Maria Chiara Conidi, Ilaria Besana (graduate students)

Current activities:

- $t\bar{t}$ cross section, semileptonic channel (commissioning analysis)
- $t\bar{t}$ cross section, di-lepton analysis
- $t\bar{t}$ background to SUSY, and SUSY bias to $t\bar{t}$ cross section measurement



Past/ongoing work

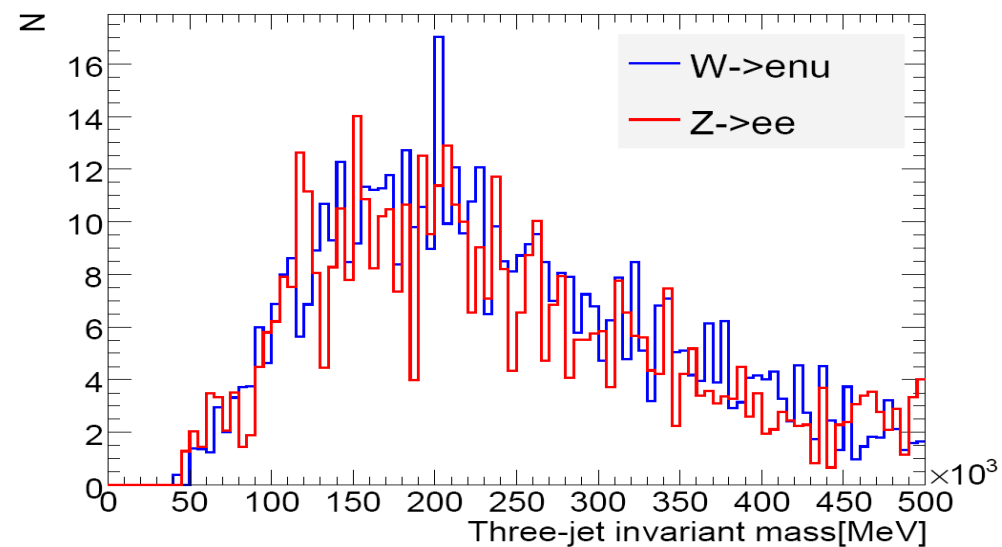
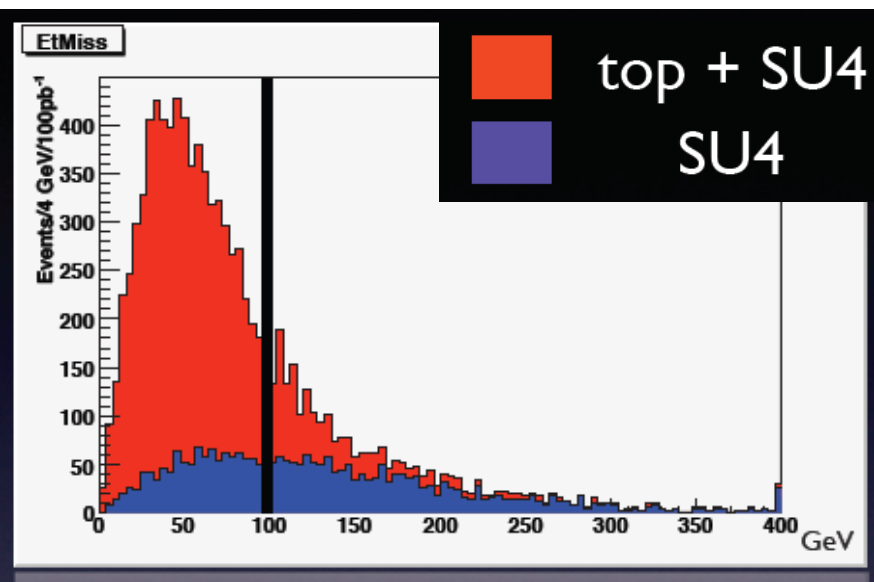
SUSY “background” to semileptonic $t\bar{t}$ (S. Montesano)

- Estimation of the bias to the $t\bar{t}$ cross section measurement from low-scale SUSY, definition of a top-like region (with reduced SUSY contamination) and a susy-like region (“control region” dominated by low-scale SUSY).
- *Minimal goal*: check if there is something not understood in our top signal selection. *Best case*: combined measurement of top and new physics cross section.

W+jets background to semileptonic top (I. Besana)

- Data-driven measurement of the W+jets background from Z(l \bar{l})+jets.

$t\bar{t}$ cross section in dileptonic channel (M.C. Conidi)





Short-term (FDR) plans

We are giving top priority to the FDR exercise. What we would like to do for the semileptonic channel (commissioning cross section analysis) is

- Compare cut efficiencies and basic distributions for CSC MC, rel13 MC and FDR-2 “data”
- Estimate the W +jets background from Z +jets
- Invariant mass plots, show evidence for $t\bar{t}$ production, measure cross section
- Do we get the same $t\bar{t}$ cross section with the inclusive, top-like and susy-like selection?

Need to discuss with Udine and Bologna how to collaborate in FDR data analysis (starting this afternoon)



Technicalities

Analysis developed on well validated release 12 MC. 3 different approaches:

- dileptonic analysis: based on TopView ntuples (downloaded in Milano)
- W+jets background analysis: private ntuples, created by athena jobs processing AOD in distributed analysis (ganga)

😊 I. Besana is the 1st italian user for last 3 months, 1870 jobs (1310 succeeded)

😞 Most samples needed not available in the catalog in Italian Tier-2, so nearly all jobs are sent abroad. Not that it makes any difference for our analysis.

- SUSY-top hybrid analysis: private ntuples (susyphys package) created by athena jobs running on Milano Tier-2 via grid tools.

For release 13 validation data, we are using an AthenaROOTAccess based package (Arana) we are contributing to develop. Can run on AOD or DPD.

For FDR-2 (14.1.0 reconstruction) we are desperately trying to

- get AthenaRootAccess working in rel. 14 (requires checkout of 24 tags on top of 14.1.0 – 400MB of libraries!)
- learn how to produce DPD with athena distributed analysis jobs.

By the way, all release 13 dataset I have checked are not in Italy according to ganga – jobs will go where the data are. Volunteers to organize subscriptions?



Longer (post-FDR) term

- We are willing to contribute to the top semileptonic and dileptonic cross section measurements
- Let's discuss which items we should take responsibility of. Things we are particularly interested in are
 - Combined performance: electron selection, missing energy
 - Background studies: W +jets from Z +jets.
 - Non-SM effects

We have not started yet, but we have an interest in doing b-tagging efficiency studies using $t\bar{t}$