Update on Kinematic Fits

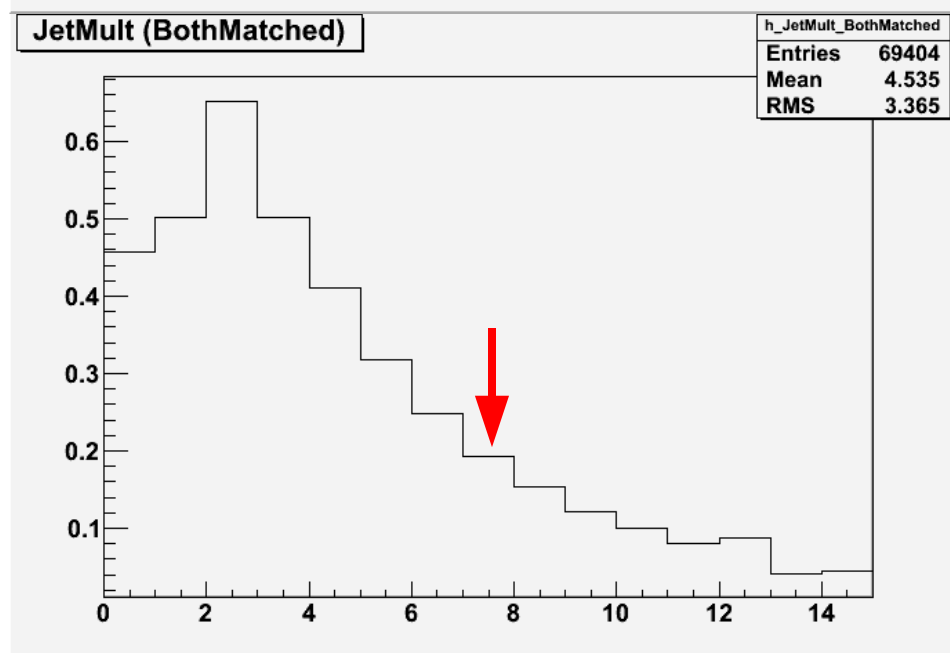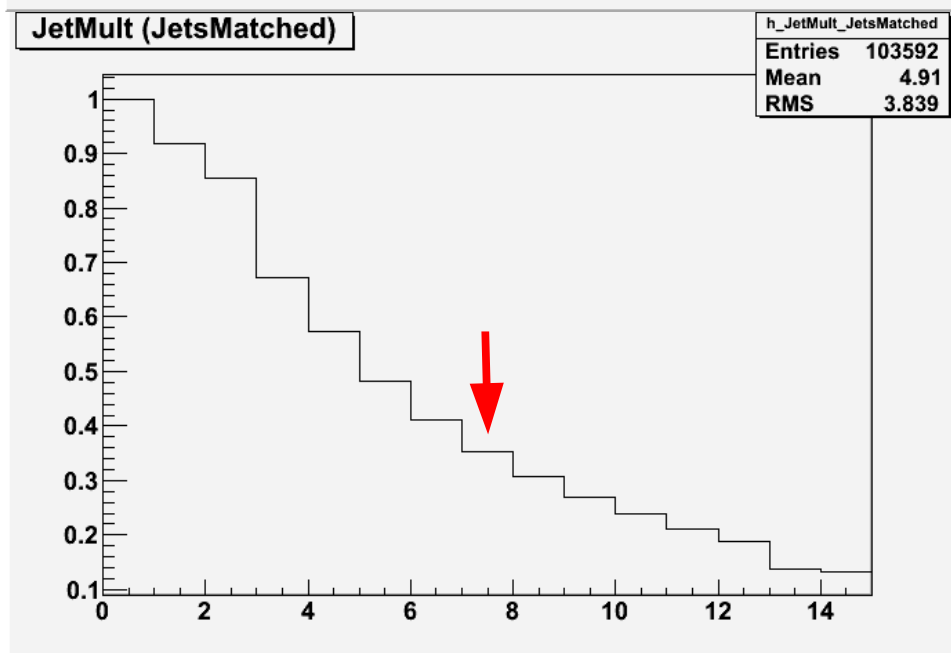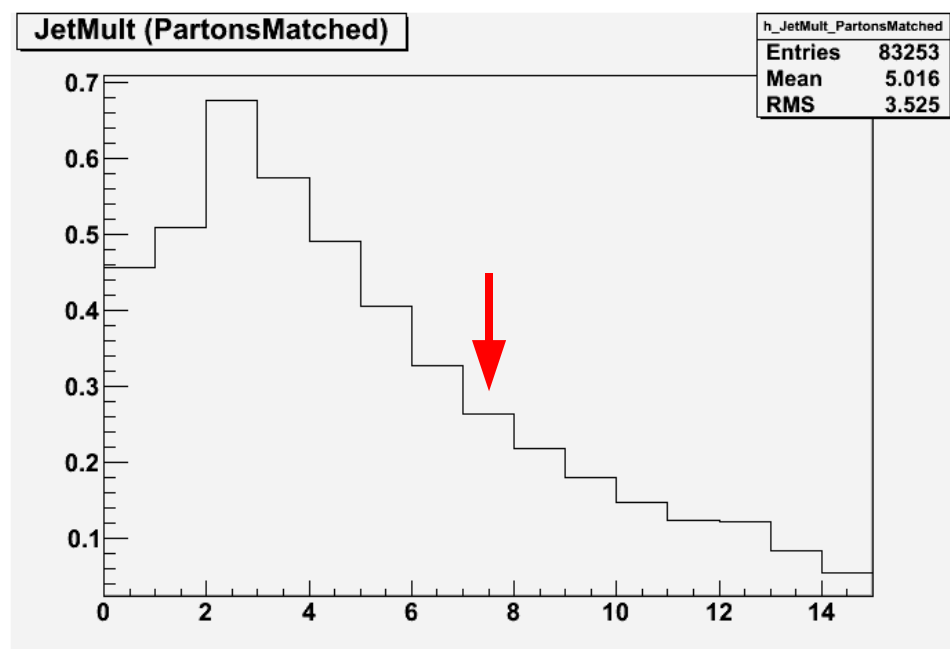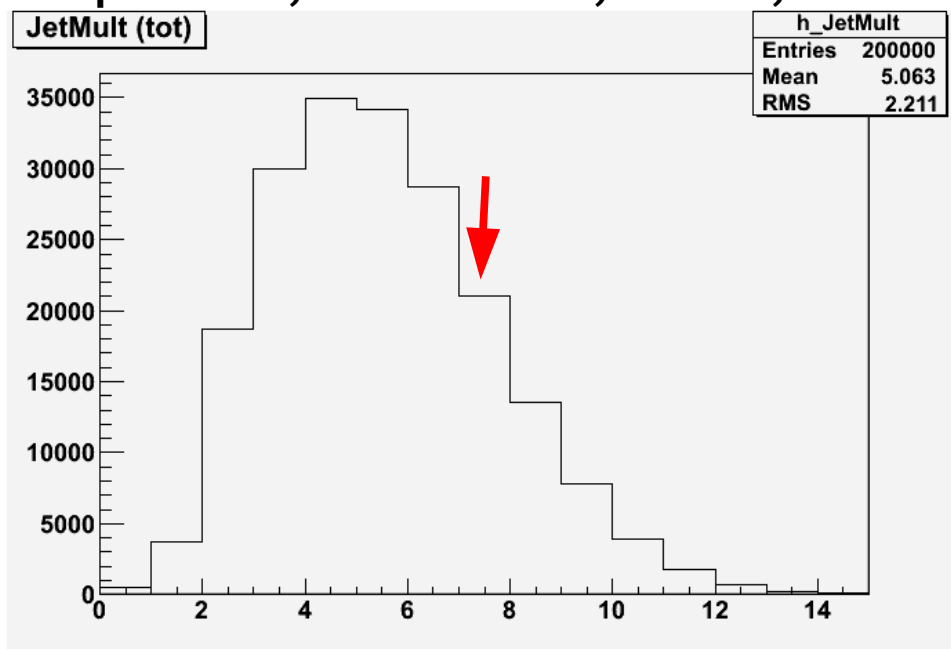C. Sander

Susy Group Meeting – Hamburg – 14th January 10

- Is comparison of GA and LM fair; can we offer the LM the same amount of CPU resources (smearing of start values?)

- Convergence criteria (for LM and GA); dependence on algorithm parameter settings (in particular: maximum number of generations/iterations)

- Realistic scenario including jet clustering:

  - Positive effect: merging of FSR and associated parton of hard process to one object

  - Negative effect: Merging of final state particles due to overlapping jets
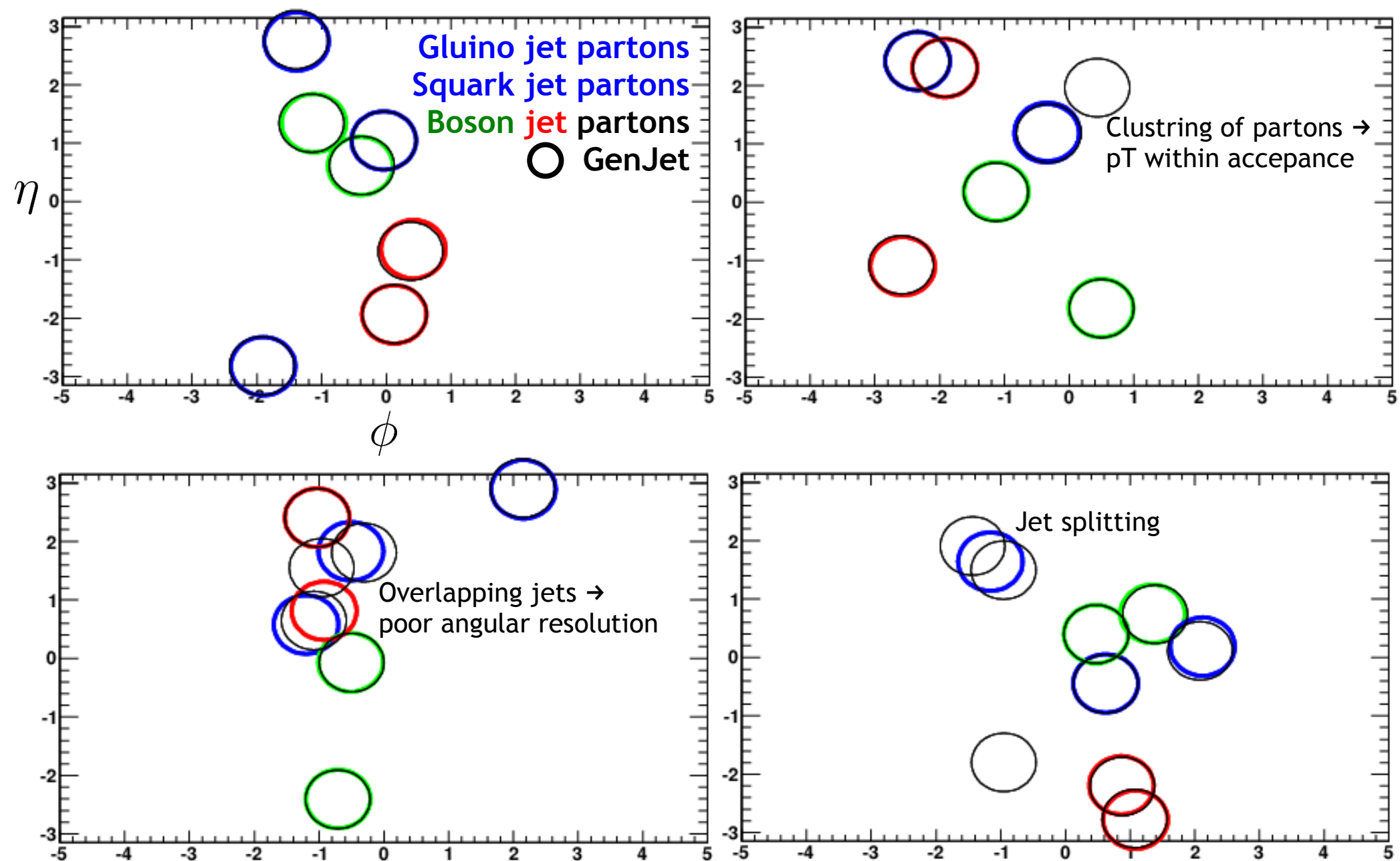
- GenJet collection: `ak4GenJets`

- Final state partons (hard process): `status == 3` and no LSP or neutrino

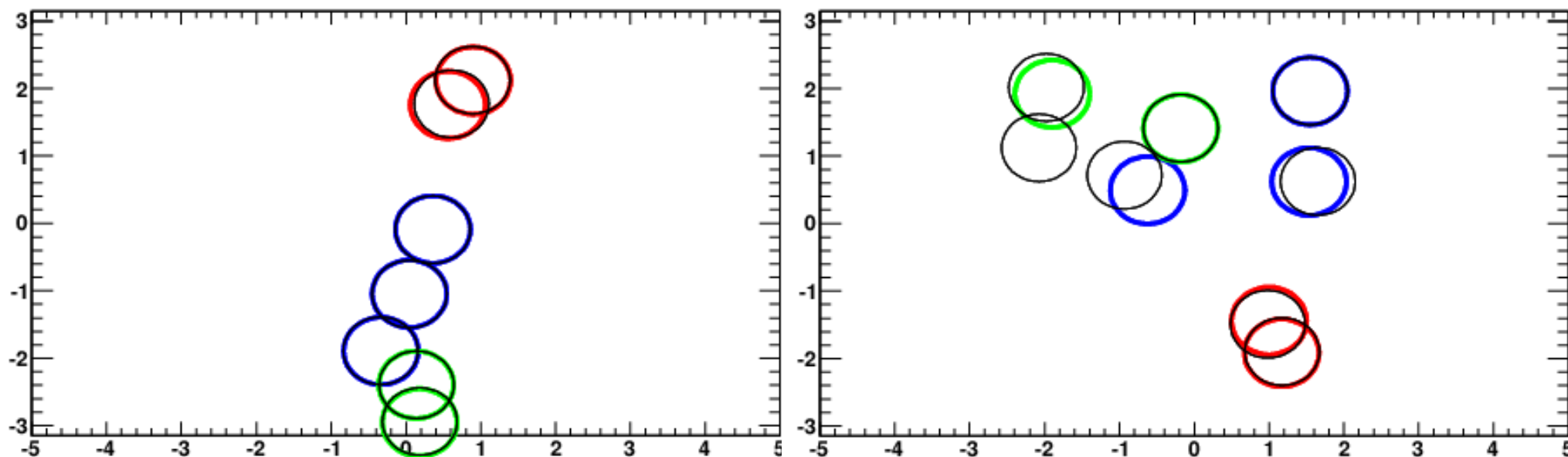- Final state partons (ISR || FSR): `status != 3` and `pid == 21 || pid == 22`

Matching procedure:

- For each GenJet within acceptance (`Pt > 30 && fabs(Eta) < 3`)

  - Find hard process parton with smallest `Delta R < 0.15`

  - If no matching hard process parton found: test ISR and FSR partons with same critrion

- If one GenJet is not matched that way: `JetsMatched = false`

- If one parton of the hard process within the acceptance is not matched to: `PartonsMatched = false`

Sample: LM5, 200k events, 10 TeV, with ISR and FSR

Gluino jet partons
Squark jet partons
Boson jet partons
◯ GenJet

Clustring of partons →
pT within accepance

Overlapping jets →
poor angular resolution

Jet splitting

- First few events indicate that merging of boson jets is not critical; problem of accidentally overlapping jets is more severe

- Low "1-to-1" matching efficiency (~20%) obviously reduces S/B → **Is this a show stopper in the fully hadronic mode?**

- However, signal events might be selected more efficiently due to merging of FSR partons with jets from hard process (to be checked)
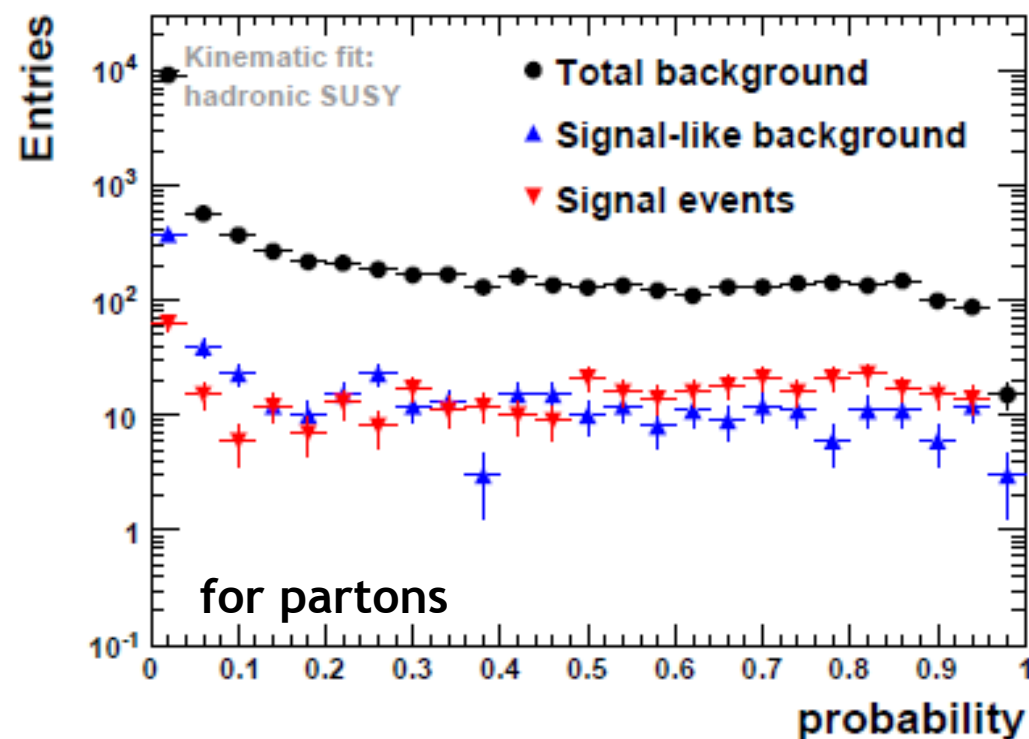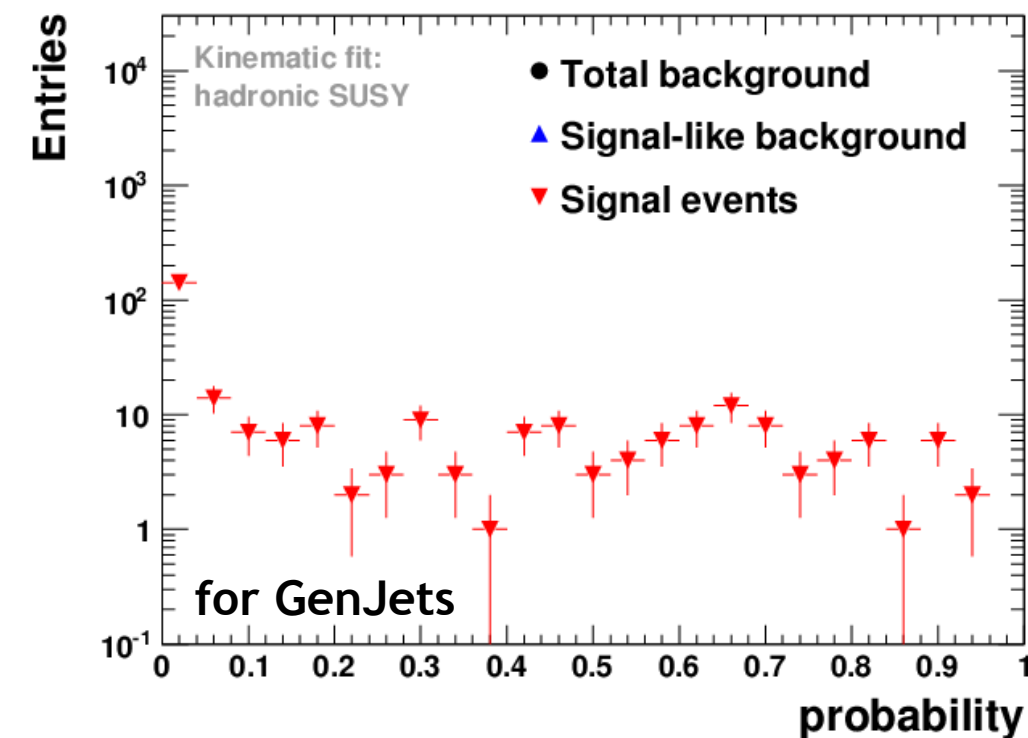
Fit probability of GA for GenJet fit reasonable flat (only events with exactly 7 GenJets and all partons within the acceptance are selected)

Increase towards low probability values due to new background (as described above)?

PT resolution of fitted neutralino not directly comparable, since for GenJets all hypothesis are ploted, while for partons only right combinations are shown

for partons

for GenJets
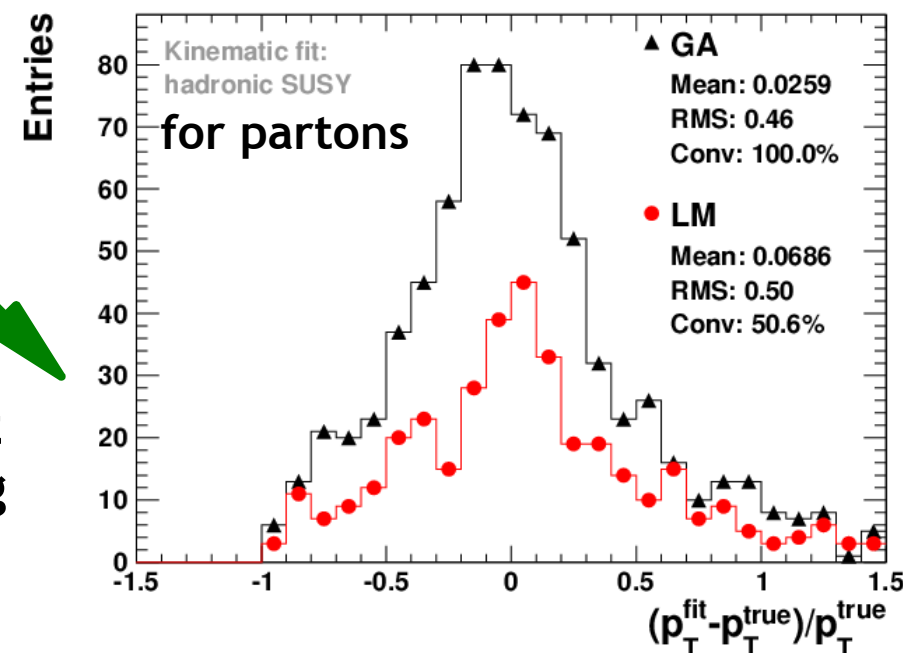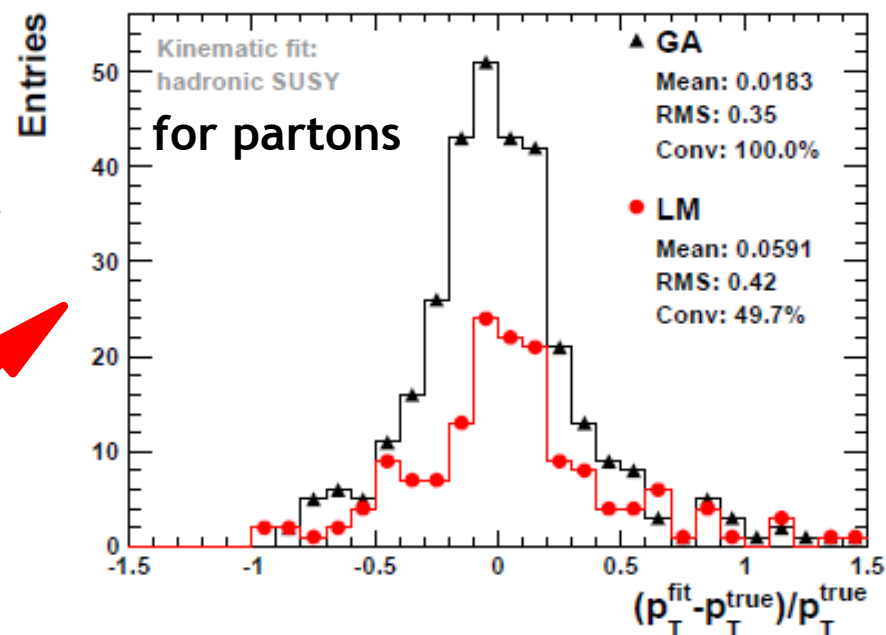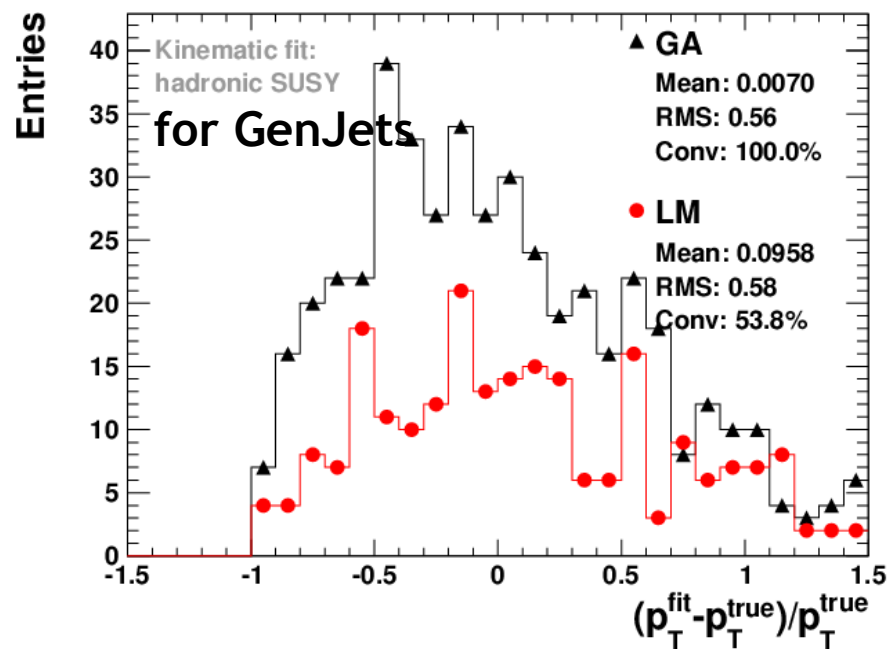
Comparable, but combinatorial bg only