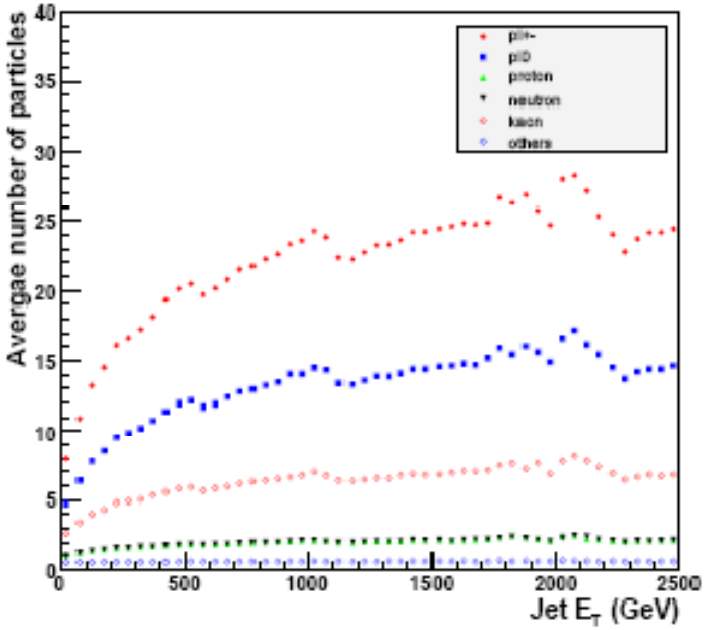
Some Thoughts on Systematic Uncertainties in the Determination of the Jet Energy Scale

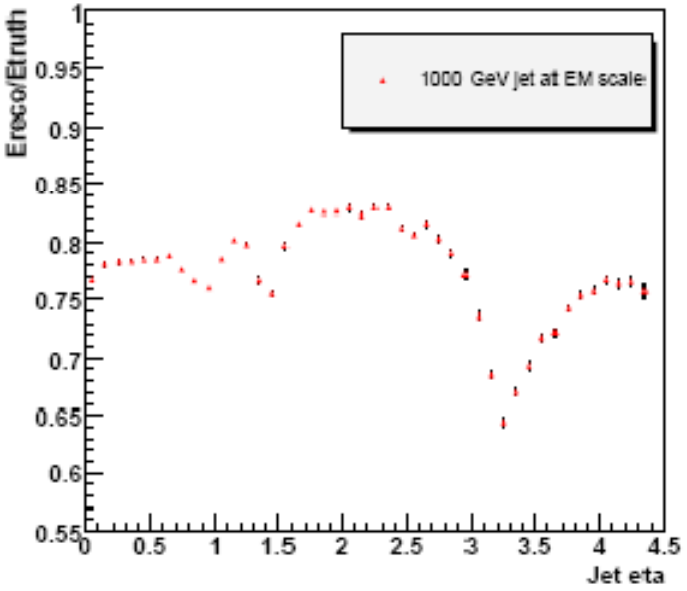


Jet Composition

And

Fragmentation Model

Calorimeter response Model (e.g. QGSP vs EMV)



Jet Location

Generator/Fragmentation

ATL-COM-PHYS-2009-042

(Sergei Chekanov)

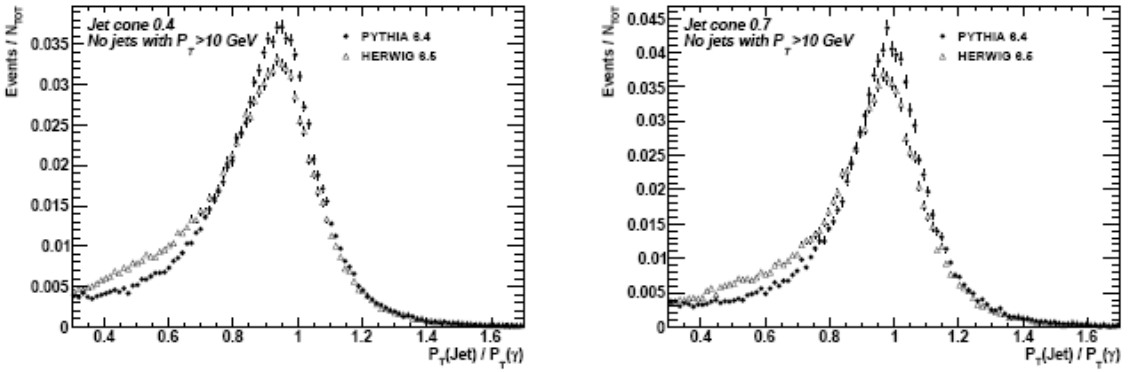


Figure 4: P_T balance plot for PYTHIA 6.4 and HERWIG 6.5 on the truth level. The jet was reconstructed using a cone algorithm with the cone size 0.4 (left) or 0.7 (right). Events with at least one second jet above 10 GeV are removed.

By comparing PYTHIA and HERWIG, it is clear that the difference between different simulations of hard sub-processes, multiparton interactions and hadronization stage for the jet hemisphere is at the level of $\sim 3\%$.

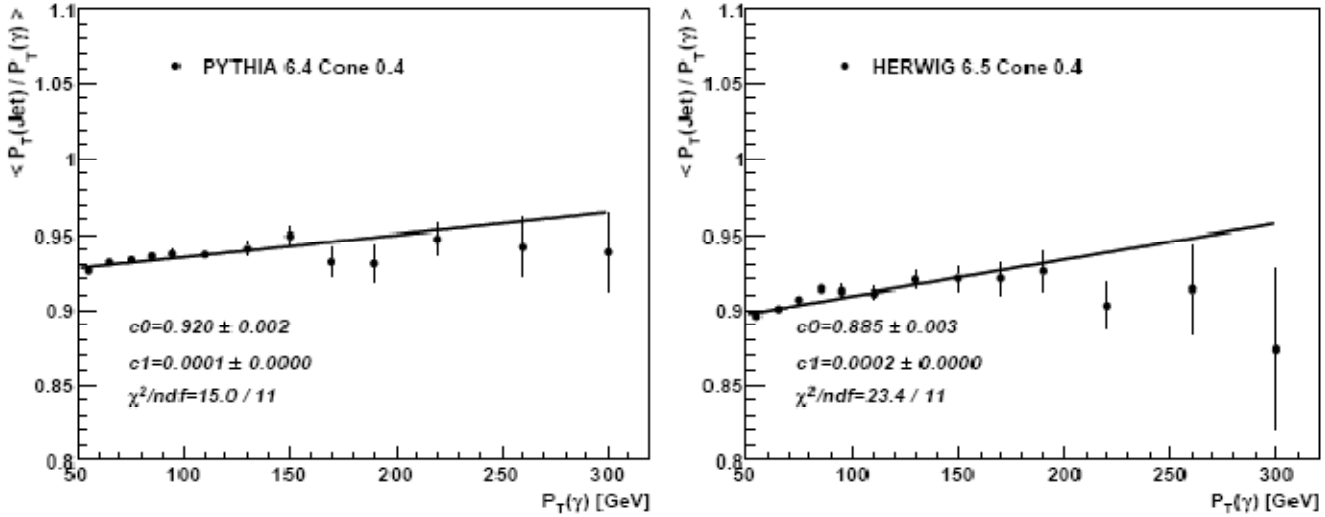


Figure 7: Same as Fig. 5, but with the isolation cut 0.9 for the leading jet (as for Fig.6), see the text. To understand the trend of this distribution, we have used a P1 polynomial for the χ^2fit.

Uncertainties on backgrounds to prompt γ

Other Contributors: Anything we use to correct the response

- GEANT4 model for energy deposition
- Charged particle fraction
- EM fraction by depth
- Numerical method (inversion)
- Jet Isolation cut
- Cut on additional jets (ISR/FSR model)
- Out-of-Cone energy (offset not a scale)
- Underlying event energy (offset not a scale, and process dependent)
- In-time pileup
- Bunch structure
- Luminosity dependence within runs