Discussion May 26, 2010: Nuclear Lunch Seminar

Charged-particle multiplicities in pp interactions at sqrt(s) = 900 GeV measured with the ATLAS detector at the LHC by The ATLAS Collaboration, Phys Lett B 688, 2010, Issue 1, 21-42

Questions Stimulated by the paper (Email frantz@ohio.edu with any questions about these questions, please)

1) What is pseudo-rapidity η & rapidity, and why is η = 0 significant? Anthony Paul

2) Why is transverse momentum more important than longitudinal momentum in these collisions? Harsha

3) What is a "Monte Carlo model/method" generally? Why are the models used for comparison in this paper Monte Carlo models? Dilu

4) What are the details of the MC models of p+p collisions, e.g. how does PYTHIA work?

   This is a huge question to answer but asked several times: the "MC models/PYTHIA" are large computer programs that actually incorporate at least 3 separate models which try to describe three different types of physics processes, I've split these three into 3 separate questions:

   4 a) What are some more details of the models of diffractive /pomeron physics? Chen

   4 b) What are some details of "model" of the large momentum transfer processes used, perturbative QCD, ie how is that theory incorporated in PYTHIA? Bing

   4 c) What are some details of models of other low-energy or "soft" hadron production physics, for example, also related to perturbative QCD ? Anton

5) What is a "rapidity gap"? Shloka

6) Is there data from the Tevatron at Fermilab at the same energy which could be used to "calibrate" these measurements? Nowo

7) How does LHC/Other facilities produce proton and anti-proton beams for experiments? Youngshin

8) How do we know the data isn't wrong and the (MC) models are right? What is the significance of the disagreement btw data and models? Daniel

9) How are events "reconstructed" given all the complex products of the collisions? Shamin

10) What's the difference between p+p and A+A collisions? Bijaya