

Abstract Submitted  
for the CAL11 Meeting of  
The American Physical Society

**Jets in ATLAS Data from Fresno's Tier 3 Computing System<sup>1</sup>**

ARYA AFSHARI, California State University, Fresno, ATLAS COLLABORATION — California State University, Fresno is the only CSU campus on the ATLAS experiment at the Large Hadron Collider (LHC) of the European Organization for Nuclear Research (CERN). Fresno's Tier 3 cluster is part of the ATLAS Grid Computing system which stores part of ATLAS data ( $\sim 10$  PB per year) and allows our students to analyze raw data and generate Monte Carlo events. The proton-proton collisions recorded by the ATLAS detector are analyzed in order to identify sprays of new particles (known as jets). The jets are characterized by their transverse momentum, angle which the cone axis makes with respect to the beam axis (rapidity), and the angle at which the cone encircles the beam axis ( $\phi$ ). When analyzing these jets in raw data, it is extremely difficult to distinguish jets created by possible new physics processes from jets created by known physics processes (QCD backgrounds). Monte Carlo simulations do not have such QCD backgrounds and are thus essential in calibrating the detector with known physics. We use ROOT to find the transverse momentum, rapidity, and  $\phi$  of the jets. The jet with the greatest transverse momentum is significant to us because it is more likely to contain new physics. Having found the jet with the highest transverse momentum from the simulations, we know where to look in the raw data for potential new physics. These ATLAS Monte Carlo simulations of jets are from the authors' summer 2011 work at CERN.

<sup>1</sup>College of Science and Mathematics, Instructional Related Activities, Faculty Sponsored Student Research

Arya Afshari  
California State University, Fresno

Date submitted: 29 Sep 2011

Electronic form version 1.4