Abstract Submitted for the DNP12 Meeting of The American Physical Society

Analysis of Jet Substructure to Identify Jets in Heavy Ion Collisions R.C. MALONE, Duke University and CERN (REU student from Gettysburg College) — Parton jets provide an excellent probe to study the properties of the quark gluon plasma. However, they are difficult to identify among the many particles created in a heavy ion collision. We seek to characterize the substructure of parton jets in order to distinguish these jets from showers of background particles. Jet characteristics and substructure are studied in the vacuum (p-p) case using a PYTHIA simulation. A thermal bath of background particles is then introduced to the simulation and the analysis is repeated. By studying differences between hard jets and jets composed mainly of background particles, hard jets are distinguished from soft background jets based on their substructure. The simulation is used to study the effectiveness of this method of jet identification. We then investigate if this method can be successfully applied to data from heavy-ion collisions measured by the ALICE experiment at the LHC.

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Date submitted: 31 Jul 2012

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