

Abstract Submitted  
for the HAW14 Meeting of  
The American Physical Society

**Analysis of  $Z^0$ +jet production with Simulations and Fastjet<sup>1</sup>**

CHADWICK RAINBOLT, UC Davis — We present an analysis of  $Z^0$ +jet production in simulations of hadron collisions. In high-energy p-p collisions, the quarks and gluons are the particles that initiate the reaction. A  $Z^0$ +jet event is one in which a  $Z^0$  boson and a quark are created. Since the two initial protons collide in the CM frame the  $Z^0$  and the quark should be in opposing directions, due to conservation of momentum. In the simulation we follow the leading quark until it bursts into a jet; the quark bursts into a jet because quarks cannot exist in free space. We can use this to find the jet in the simulations. We concurrently use the anti-kt Fastjet algorithm to cluster the final state hadrons that came from the fast quark so we can estimate the kinematics of the quark. In future analysis of heavy ion collisions, the same analysis can be applied and a loss of energy may be identified. This analysis may be applied to data, when there is more statistics.

<sup>1</sup>UC Davis Nuclear Physics Group

Chadwick Rainbolt  
UC Davis

Date submitted: 01 Jul 2014

Electronic form version 1.4