

Abstract Submitted  
for the DNP08 Meeting of  
The American Physical Society

**Determination of Impact Parameter for Fermi Energy Heavy Ion Collisions Using the HIPSE Event Generator**<sup>1</sup> MICHAEL MEHLMAN, Rice University, ZACH KOHLEY, SHERRY YENNELLO, Texas A&M Cyclotron Institute — In order to determine the impact parameter of a nuclear collision (a quantity that cannot be observed directly), one must first verify the method for doing so. This is only possible using a theoretical model that provides realistic observables associated with a known impact parameter, such as the HIPSE (Heavy-Ion Phase-Space Exploration) event generator. For four systems, HIPSE-generated observable distributions were mapped to the geometrical impact parameter distribution, providing probable event impact parameter ranges, which were then compared with the theoretical impact parameter. Numerous quantities were considered for correlation, several of which ultimately proved useful, such as charged particle, neutron, and total particle multiplicity, as well as total event transverse momentum. Four observables, charged particle and neutron multiplicities, intermediate to light fragment ratio, and total event transverse momentum, were then chosen to train a Neural Network to refine the impact parameter prediction. The output of the Neural Network showed better correlation than the distribution mapping method, and is expected to prove useful for analysis of data currently (July 2008) being taken on the NIMROD detector. Results are presented for correlations stemming from both the mapping and Neural Net analyses.

<sup>1</sup>Special thanks to: NSF, DOE

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Date submitted: 01 Aug 2008

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