

Abstract Submitted  
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**Angular Distribution of Gamma Rays in Neutron-Rich Hafnium Nuclei**<sup>1</sup> STEVEN SHEPPARD, University of Massachusetts Lowell — The HISPIN research group at UMass Lowell conducts Hheavy Ion Spectroscopic Ivestigations of Nuclei to learn about the physics of nuclear rotation. In this experiment, performed at the 88" Cyclotron at Lawrence Berkeley National Lab, a 750 MeV beam of  $^{136}\text{Xe}$  was incident upon a  $^{180}\text{Hf}$  target in order to excite  $^{180}\text{Hf}$  nuclei to high angular momenta. Gammasphere, an array of 110 Compton-suppressed germanium detectors, with CHICO (Compact Hheavy Ion Counter), a large solid-angle, position-sensitive, heavy-ion detector, was used to record, in multi-parameter event mode, the recoil angles, flight times and gamma emissions of the nuclei. This allows event-by-event Doppler correction for the gamma rays, to restore the intrinsic detector resolution in the spectra. The gamma-ray angular distribution was measured with respect to the direction of both the beam and the recoiling nucleus, using the CHICO data to identify the flight path. These angular distributions can identify the nature of the transition responsible for a characteristic gamma emission, and yield knowledge of the excited level structure of a nucleus and the governing physics.

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