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Search for New Gamma Cascades in Monochromatic Hf-178m2 Triggering

J. Carroll (YSU), M. Helba (SRS), H. Roberts (SRS), Z. Zhong (BNL), J. Burnett (YSU), T. Drummond (YSU), R. Propri (YSU)

Beamline(s): X15A

Introduction: When searching for evidence of a triggered decay by stimulating the 31-year Hf-178m2 isomer with synchrotron radiation, it is possible that the triggered gamma emissions follow a different cascade path than the spontaneous emissions. This experiment was designed to capture all coincident gamma rays from a single event using a 4π detector array.

Methods and Materials: The Hf-178m2 target was encapsulated in beryllium held in an aluminum frame. The target was placed in the beam path and enclosed by the YSU Miniball. The Miniball consists of one 10% HPGe detector for precise energy resolution and coincidence gating and six NaI detectors for high efficiency collection of coincident gamma rays. The X15A monochromator was used to step through incident energies of interest including the L1 and L3 X-ray edges of hafnium.

Results: Sufficient analysis of the Miniball data has not been completed yet. A cursory review of the spectra collected by the germanium detector reveals no clear indicators of triggering (peak enhancements corresponding only to certain incident beam energies).

References: *Gamma Spectroscopy of $^{178}Hf^{m2}$ Using Synchrotron X-rays*, to be published in 2002 Hyperfine Interactions Proceedings.