Characterizing BaF_2 Detectors for use in Gamma Ray Detection

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Understanding the symmetry energy in the nuclear equation of state is essential to understanding properties such as the structure of a neutron star or its gravitational collapse, leading to supernovae. It has been suggested that to better constrain the symmetry energy one can use the bremmstrahlung gamma rays emitted from the hot, dense nuclear matter in the early stages of heavy ion collisions. These gamma rays have the potential to provide a cleaner probe than the more traditional hadronic probes. To measure these bremmstrahlung photons, barium fluoride scintillation crystals were chosen for their ability to detect photons across a large energy range and for their inherent pulse shape discrimination properties. This summer, the detectors of the TAMU/ORNL barium fluoride array were tested in preparation for such an experiment. Signals from each detector were recorded individually for cosmic rays and radioactive source events. The full waveforms were digitized with flash ADCs. A selected set of detectors was assembled and tested with beam from the K500 cyclotron. With this in-beam data, waveform integration parameters may be optimized. Results from the testing of these detectors with flash digitizers will be presented.