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Recent Results from Gamma-Ray Energy Tracking Array GRETINA

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The gamma-ray energy tracking array GRETINA uses 28 Ge crystals, each with 36 segments, to cover $1/4$ of the 4π solid angle. The gamma ray tracking technique uses detailed pulse shape information from each of the segments. These pulses are analyzed to determine the energy, time, and three-dimensional positions of all gamma-ray interactions. This information is then utilized, together with the characteristics of Compton scattering and pair-production processes, to track the scattering sequences of the gamma rays. Tracking arrays will give higher efficiency, better peak-to-total ratio and much higher position resolution, and thus increases the detection sensitivity by factors of several hundred compared to current arrays used in nuclear physics research. Particularly, for fast beam experiments tracking will provide spectra quality comparable to that from a Compton suppressed array, such as Gammasphere, while having the position resolution needed for the accurate Doppler correction comparable to detectors designed for good position resolution such as SeGA. GRETINA construction at the 88-Inch Cyclotron at LBNL was completed in March 2011. Extensive engineering and commissioning runs were carried out using radioactive sources, and beams from the Cyclotron until March 2012. The data obtained have been used to debug and improve its performance. After the commissioning period, GRETINA was moved to NSCL MSU and installed at the target position of the S800 spectrograph. The experimental program with a total of twenty four experiments will start in July 2012 after successful commissioning runs. I will present preliminary results from these runs and discuss future research plans.