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Gamma-Ray detector Array with Position and Energy sensitivity (GRAPE) E. IDEGUCHI, S. SHIMOURA, M. NIIKURA, M. TAMAKI, H. IWASAKI, H. SAKAI, CNS, The University of Tokyo, T. FUKUCHI, Rikkyo University, H. BABA, M. KUROKAWA, S. MICHIMASA, RIKEN, S. OTA, Kyoto University — We have constructed a Ge detector array, GRAPE, for high- resolution in-beam gamma-ray spectroscopy using RI beams. In order to correct for the Doppler broadening effect from the moving gamma-ray emitters, the array was designed to have position sensitivities in the Ge crystal. The total array consists of 18 detectors and each of which contains twe Ge planar crystals with effective radius of 3 cm and thickness of 2 cm. One side of crystal has 3×3 segmented electrodes. The planar structure and the segmented electrodes enable us to extract the position information based on a pulse- shape analysis. The resolution of less than 1% for $v/c = 0.3$ can be achieved after Doppler shift correction. Total efficiency of 5% for 1 MeV gamma ray is expected. First-phase electronics using conventional analog techniques for pulse shape analysis has been completed. Overall performance of the system with the first-phase electronics was evaluated in the physics experiments using RI beams. As a second phase data acquisition, a system for pulse shape sampling using flash ADC was tested. R&D of pulse shape analysis based on an artificial neural network algorithm was initiated by using the digital pulse-shape data. We will present current status of GRAPE.

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