

Status of R&D activities for FAZIA detector upgrade in Korea

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FAZIA (Forward-angle A and Z Identification Array) is a multi-detector array designed to identify charges and masses of the reaction fragments from heavy ion collisions in the Fermi energy domain. One basic unit of FAZIA detector consists of three layers which include two Si sensors with different thicknesses and one CsI scintillator detector read out by a photodiode, forming the FAZIA telescope. The detector signals are analyzed using digital signal processing implemented on FPGAs, which are integrated into the front-end electronics board (FEB). The telescope structure enabled the charge identification of nuclei with Z up to 54 and the isotopic nuclei discrimination with Z up to 25 by using the $\Delta E - E$ information and Z up to 20 with the pulse shape analysis. A single FAZIA detector module consists of 16 telescopes.

The FAZIA upgrade project began a few years ago with the goal of extending beam-energy coverage and enhancing acceptance. The Korean FAZIA team takes major responsibility for developing new Si sensors with various thicknesses and improving the performance of FEBs. The Si sensors, designed through TCAD simulations, have been successfully fabricated and tested for their I-V characteristics and performance using an Am-241 source. Additionally, prototype FEBs have been developed using modern FPGA chips and other advanced components. New VHDL code has also been developed. The testing system for prototype detectors and FEBs is complete at present. This presentation will highlight recent efforts by the team in the upgrade project, with a particular focus on the R&D of new Si sensors and electronics.

Research field of your presentation

Experimental Low-energy nuclear physics

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