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Position Sensitive Detectors and Applications at CIAE

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This report will mainly introduce two new types of position-sensitive detectors and their applications in imaging. Integrated Micromegas detector is a new type of micro-pattern gas detector utilizing photoetching technology for its production. Capacitance testing across each channel has confirmed good uniformity, gain and energy resolution under varying Ar and CO₂ ratios. The detector is now capable of mass production with all processes conducted domestically. Additionally, we have developed a sealed version of the micro-pattern gas detector, which has demonstrated reliable operability at ambient temperature and pressure for a duration exceeding 21 days. In cooperation with Fudan University and Peking University, we completed the R&D, production, and testing tasks for the electromagnetic calorimeter of the sPHENIX experiment. This marks the first use of innovative technologies such as tungsten powder, scintillating fibers with SiPM readouts technology for calorimeter signals in high-energy collision experiment. By establishing the Beijing Development Center at the Atomic Energy Institute, we developed 320 scintillating fiber detectors for the sPHENIX experiment, achieving a yield rate of 97%. Currently, these detectors have been applied to X-ray, muon and neutron experiments.

Presenters: LI, Xiaomei (China Institute of Atomic Energy); LI, Xiaomei (China Institute of Atomic Energy (CN))

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