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Development of large-area THGEM Imaging Detectors

We report recent progress on development of high-resolution instrumentation and measurement techniques for investigation of various thermal-hydraulic processes, such as dynamic gas-liquid two-phase flow. Included in these activities, two projects are currently under development: a novel high-efficiency, one-dimensional fast-neutron imaging detector intended for fan-beam tomography applications, and a large-area, cold/thermal-neutron imaging detector prototype. Both instruments are based on neutron-to-charge particle converters coupled to THick Gaseous Electron Multipliers (THGEM) for position-sensitive charge readout. We review the operational principle and properties of the two detector concepts, as well as some recent results and the extensive R&D program carried out in the last few years for various potential applications.

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