GEM-Based Detectors for Thermal Neutrons with a VMM3 ASIC Readout

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Gas Electron Multiplier, or GEM, is a modern gas-filled coordinate detector which becomes very popular in High Energy Physics experiments. Used for charged particle detection, GEM can provide high spatial and time resolutions and high rate compatibility. It can be extremely radiation hard and can be made with large active area. A triple GEM, implementing three amplification stages, provides a charge amplification at the level of 10000. A standard triple GEM with an input window made of thin metallized mylar with B4C coating can be operated in both the nominal detection mode and in neutron registration mode.

Custom Application Specific Integrated Circuits (ASICs) VMM3 and VMM3a developed by Brookhaven National Laboratory (BNL) are capable of simultaneous precise measurements of both the charge and time characteristics of signals in gaseous detectors. Their flexibility makes them attractive as a readout electronics solution for a wide range of applications, including readout systems of nGEM-detector in Neutron Physics experiments.

Neutron detection capability of the modified triple GEM operated with the VMM3-based readout is presented in the talk.