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Development of GEM Detectors at Hampton University

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Two GEM telescopes, each consisting of three $10 \times 10 \text{ cm}^2$ triple-GEM chambers were built, tested and operated by the Hampton University group. The GEMs are read out with APV25 frontend chips and FPGA based digitizing electronics developed by INFN Rome.

The telescopes were used for the luminosity monitoring system at the OLYMPUS experiment at DESY in Hamburg, Germany, with positron and electron beams at 2 GeV. The GEM elements have been recycled to serve in another two applications: Three GEM elements are used to track beam particles in the MUSE experiment at Paul Scherrer Institute in Switzerland. A set of four elements has been configured as a prototype tracker for phase 1a of the DarkLight experiment at the Low-Energy Recirculator Facility (LERF) Jefferson Lab in Newport News, USA, in a first test run in summer 2016.

The Hampton group is responsible for beam particle tracking in the MUSE@PSI and for the DarkLight phase-I lepton tracker in preparation. Further efforts are ongoing to optimize the data acquisition speed for GEM operations in MUSE and DarkLight. An overview of the group's GEM detector related activities will be given.

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