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New results on hole-size dependence of GEM-foil performance

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An optical Quality Assurance (QA) system has been developed at the Detector Laboratory of the Helsinki Institute of Physics. The size and shape of the holes in a Gas Electron Multiplier (GEM) -foil can be measured with the system. The system is used e.g. for the QA of the GEM foils of the TPC detectors being developed for the beam diagnostics system of the SuperFRS at future FAIR facility and in the QA of the GEM-foils for the upgrade of the TPC readout chambers of the ALICE experiment at CERN.

The correlation between the GEM hole size variation and the corresponding gain variation has been studied with several different gas compositions and operating voltages. It has been found that a quantitative estimation of the variation in gain across the GEM foil can be made based on precise
measurement of the geometry of the holes. This study has been made in collaboration between Helsinki Institute of Physics and Wigner Research Centre in Budapest as part of the R&D effort of the ALICE TPC upgrade project. The current status of the study is presented.

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