



Contribution ID: 105

Type: not specified

Triple-GEM detector: in direction of a Xe/Kr sealed X-ray imaging detector

Wednesday, 3 July 2013 16:45 (1h 10m)

The main goal of this work is to study the performance of a triple GEM (Gas Electron Multiplier) detector, envisaging the development of high detection efficiency detectors for X-ray imaging applications. Preliminary studies were done using a triple GEM detector in a standard configuration filled with krypton and xenon at atmospheric pressure. First results shows a stable operation at high gains ($>10^4$) for both gases. The obtained gains are high enough to achieve good position resolutions when using different electronic readout systems for imaging purposes. Calculated and simulated studies of the detection efficiency and primary electron cloud size as a function of the x-ray energy in the range of 1-30 keV, will be presented for different noble gases and selected mixtures. Description of the sealed detector (low out-gassing materials) and of the purifying system will be given. Preliminary Imaging measurements with multichannel front end ASICs will be presented for Kr as a detection medium.

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Session Classification: Wednesday (poster session)