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High granularity scanner for MPGD based photon detectors

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Gaseous detectors can be made sensitive to photons, and become excellent choice for applications such as Cherenkov radiation imaging for particle identification. Micopattern Gaseous Detector (MPGD) technologies opened new ways to photon detection, where the possibility for reduced ion feedback, better timing and the suppression of non-photon signals are factors of improved performance. On the other hand the microstructure of an MPGD renders the photo-electron emission, transfer and subsequent detection to be a very complex process.

We have developed a high resolution UV photon scanner, where single photon-electron response measures local detection efficiency and gas gain with position resolution better than 100 microns. Studies on Thick GEM based photon detectors proved the existence of inefficient symmetry points, and shed light on hole-gain structure and microscale variance. In fact practically all MPGD detectors, even if not designed for photon detection in the first place, can be made sensitive, and thus be explored, by the scanning system. Measurement of the microsturcture of the charge transport can lead to a better understanding of the detection mechanisms, and help in optimization of various MPGD, especially for Cherenkov detectors.

The presentaion will focus on details of the critical parts of such a system; and recent results on TGEM microstructure with its dependence on the applied micropattern configurations.

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