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Development of a novel Micro Pattern Gaseous Detector for cosmic ray muon tomography.

Cosmic ray tomography is a technique under development since years. It consists in using particle detectors to reconstruct the scattering angle of cosmic rays traversing the volume under inspection, thus revealing the presence of materials with high atomic number, as radioactive elements or heavy metals. Although the validity of the muon tomography has already been demonstrated, its use on a large scale is still disfavored because of the high cost and complexity of the detectors.
We propose a novel detector (Micro Channel Device, MCD) specifically designed for this application, having the potential to be easily produced on industrial scale.The proposed detector belongs to the category of MPGDs with an amplification region less than 1 mm wide.
The use of this device has several advantages: it allows for compact scanning stations (reduced transverse dimensions) and reduced operating costs (limited applied voltages and small gas volumes) when compared to other gas detectors as drift chambers; it can be adapted to curved shape to better fit a scanning station and it is competitive from the point of view of the production costs. The potential for industrial mass production makes the MCD a good candidate for the homeland security market.
We will illustrate the basic concept of an MCD, its working principle and expected performance. The concept of a small-size cylindrical scanning station based on MCD and the study of the resolution power on different materials will also be presented.

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