

First observation of Cherenkov rings with a large area CsI-TGEM-based RICH prototype

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We have built a RICH detector prototype consisting of a liquid C6F14 radiator and six triple Thick Gaseous Electron Multipliers (TGEMs), each of them having an active area of 10x10 cm². One triple TGEM has been placed behind the liquid radiator in order to detect the beam particles, whereas the other five have been positioned around the central one at a distance to collect the Cherenkov photons. The upstream electrode of each of the TGEM stacks has been coated with a 0.4 micron thick CsI layer.

In this paper, we will present the results from a series of laboratory tests with this prototype carried out using UV light, 6 keV photons from ⁵⁵Fe and electrons from ⁹⁰Sr as well as recent results of tests with a beam of charged pions where for the first time Cherenkov Ring images have been successfully recorded with TGEM photodetectors. The achieved results prove the feasibility of building a large area Cherenkov detector consisting of a matrix of TGEMs.

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