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THGEM-based Photon Detectors for the upgrade of COMPASS RICH-1

An important upgrade of COMPASS RICH-1 has recently been approved: it mainly consists in replacing MWPC-based photon detectors with THGEM-based ones.
The new detectors have been developed in an extensive RD project, through three steps:
1) study of the response of single THGEM's with various geometries and different conditions, by systematic measurements and simulations of the electrostatic fields,
2) building of several small size detector prototypes, and operating them in laboratory and during test beam runs,
3) solving the challenging engineering problems related to the construction of large area THGEM-based photon detectors and their use on RICH counters.
The detector has a triple THGEM layer architecture with a CsI film acting as a reflective photocathode on the first layer.
It provides efficient detection of Cherenkov photons, stable operation at gain of 100,000 and time resolution better than 10 ns.
The new COMPASS RICH-1 upgrade project will be presented after describing the steps of the RD and the structure and characteristics of COMPASS THGEM-based photon detectors.
The performance of small and large size prototypes will be discussed.

quote your primary experiment

COMPASS

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