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TRICK: a Tracking Ring Imaging Cherenkov Detector

TRICK is a INFN CSNV Young Grant project that will investigate an innovative 5D technique for providing 3D information about the position, time, and ID of incoming particles. The core idea is based on the well-known technology of conventional Aerogel proximity focussing RICH combined with a GEM -based Time Projection Chamber (TPC) in a single box. Both parts, TPC and RICH, are read out simultaneously and instrumented with the same TIGER ASIC developed for the BESIII CGEM-IT detector. By combining the information from both systems, the TRICK technique will improve the performance of each instrument: The tracking will aid rings identification by measuring the expected center even in a magnetic field and reduce the error in the angle measurement caused by extrapolation of the external tracking; in addition, the precise timing information will allow better resolution of the time-projected third space coordinates.

The TRICK -Box prototype, equipped with triple- GEM and Hamamatsu H12700 MA-PMT, aims to achieve a spatial resolution of 100 microns, a time resolution better than 1 ns, and a 3-sigma separation for pi/K up to 4 GeV.

This contribution presents the project, focusing on the initial studies with the prototype, the preparation of the first cosmic stand, and the next steps.

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