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The new large-area hybrid-optics RICH detector for the CLAS12 spectrometer

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A large area Ring-Imaging Cherenkov detector has been designed to provide clean hadron identification capability in the momentum range from 3 GeV/c up to 8 GeV/c for the CLAS12 experiments at the upgraded 12 GeV continuous electron beam accelerator facility of Jefferson Lab, to study the 3D nucleon structure in the yet poorly explored valence region by deep-inelastic scattering, and to perform precision measurements in hadron spectroscopy.

The detector will exploit a novel hybrid configuration, in which the Cherenkov photons will either be detected directly for forward particles or after two mirror reflections for larger angle tracks.

The detector will include two layers of aerogel tiles as photon radiators, covering a total surface of about three squared meters, a system of planar and spherical mirrors and an array of 391 Hamamatsu H8500 and H12700 Multi-Anode Photomultiplier Tubes as photodetectors.

The readout of the 25000 electronic channels is provided by a compact system made by an ASIC front-end card based on the MAROC3 chip configured and controlled by an FPGA card.

The installation of the detector in the CLAS12 spectrometer is foreseen for the summer of 2017.

In the talk, the status of the detector will be presented and the results of the characterization of its main components and the expected performances will be discussed.

Registered

Yes

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