Contribution ID: **66** Type: **presentation**

The Large-area Hybrid-optics CLAS12 RICH: First Years of Data-Taking

Monday 12 September 2022 12:20 (25 minutes)

The CLAS12 deep-inelastic scattering experiment at the upgraded 12 GeV continuous electron beam accelerator facility of Jefferson Lab conjugates luminosity and wide acceptance to study the 3D nucleon structure in the yet poorly explored valence region, and to perform precision measurements in hadron spectroscopy.

A large area ring-imaging Cherenkov detector has been designed to achieve the required hadron identification in the momentum range from 3 GeV/c to 8 GeV/c, with the kaon rate about one order of magnitude lower than the rate of pions and protons. The adopted solution comprises aerogel radiator and composite mirrors in a novel hybrid optics design, where either direct or reflected light could be
imaged in a high-packed and high-segmented photon detector.

Among the innovative components are: aerogel of n=1.05 and cutting-edge transparency; modular spherical mirror in a light composite material; planar glass-skin mirrors, unprecedented in nuclear physics experiments; and large-area multi-anode photomultipliers readout by a modular electronics.

The first RICH module was assembled during the second half of 2017 and successfully installed at the beginning of January 2018, in time for the start of the experiment. A second RICH module is in the final stage of assembling with the goal to be ready, despite the delays caused by the pandemic crisis, for the operation with polarized targets in summer 2022.

In the presentation, the detector performance will be discussed with emphasis on the operation and stability during the data-taking, calibration and alignment procedures, reconstruction and pattern recognition algorithms, and particle identification.

Author: CONTALBRIGO, Marco (Universita e INFN, Ferrara (IT))

Presenter: CONTALBRIGO, Marco (Universita e INFN, Ferrara (IT))

Session Classification: Cherenkov light imaging in particle and nuclear physics experiments

Track Classification: Cherenkov light imaging in particle and nuclear physics experiments