

# 11th International Workshop on Ring Imaging Cherenkov Detectors (RICH2022)



Contribution ID: 27

Type: **presentation**

## **Aerogel RICH detector for the next generation heavy-ion experiment at LHC**

*Wednesday 14 September 2022 11:35 (25 minutes)*

The ALICE collaboration is proposing a new apparatus, ALICE 3, to investigate the Quark Gluon Plasma (QGP) properties, exploiting precise measurements of heavy-flavour probes as well as electromagnetic radiation. Electromagnetic probes can give access to the system temperature before hadronization, requiring a novel detector concept aimed at an unprecedented level of purity of the thermal di-lepton signal.  $e/p$  and  $K/p$  separation up to about 2 GeV/c and 10 GeV/c, respectively, is required. In this context, conceptual studies for the development of a RICH detector for ALICE 3 are ongoing. The proposed baseline layout is a proximity-focusing RICH, using aerogel ( $n = 1.03$  at  $\lambda_{ph} = 400$  nm) as Cherenkov radiator and a layer of Silicon Photomultipliers (SiPM) for the photon detection, with an area of about 40 m<sup>2</sup>. The proposed detector represents the largest one using this technology. A multi-layer (focusing) aerogel layout, with increasing refractive index, is also considered. If sufficient time resolution can be achieved in the SiPM photons detectors, they can be able to identify charged hadrons via TOF measurements. The detector specifications and performance, obtained by means of dedicated Monte Carlo simulation, will be presented. The design and R&D challenges will be also discussed.

**Presenter:** VOLPE, Giacomo (Universita e INFN, Bari (IT))

**Session Classification:** R&D for future experiments

**Track Classification:** R&D for future experiment