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Concept and development of the Focussing Aerogel Ring Imaging Cherenkov (FARICH) detector for HMPID-systems

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We present the Focusing Aerogel RICH-detector (FARICH) concept based on 2009-2014 studies of a FARICH prototype detector for the ALICE experiment at CERN. The aim of the project was to develop a prototype detector that would extend the momentum range of charged particle identification: up to 10 GeV/c for pion-kaon separation and up to 14 GeV/c for kaon-proton separation at the ALICE HMPID system [1, 2]. In the frameworks of this project, we proposed the FARICH prototype detector employing a multi-layer silica aerogel as a radiator. In June 2014, we tested a FARICH prototype detector based on Digital Photon Counters (DPC-DSiPM) by Phillips Company at the CERN PS T10 beam line with a particle momentum up to 6 GeV/c [3, 4]. The main performance characteristics of these prototype detectors and a comparison with a Monte Carlo simulation are presented.
In this talk, we also discuss one of the proposed versions of the FARICH concept using an MPGD GEM detector with a photo-conversion film for recording Cherenkov photons.
Proposed FARICH prototypes can be used in the development of HMPID-systems for projected heavy-ion experiments, for example, ALICE3 at CERN.

References
1. Development of FARICH-detector for ALICE experiment at CERN
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2. A Very High Momentum Particle Identification Detector (VHMPID)
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3. Beam test of FARICH prototype with Digital Photon Counter
A.Yu. Barnyakov (Novosibirsk, IYF) et al., 2013. 5 pp.
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What is your experiment?

Focusing Aerogel Ring Image Cherenkov detector concept

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