

Simulation study of the Ring Imaging Cherenkov detector for the next-generation heavy-ion experiment at LHC

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ALICE3, the next-generation heavy-ion experiment, has been proposed for the LHC RUN 5 and 6 to investigate the Quark Gluon Plasma properties, exploiting precise measurements of heavy-flavour probes as well as electromagnetic radiation. These measurements require excellent particle identification (PID) capabilities in a wide transverse momentum range.

The development of a Ring Imaging Cherenkov detector using aerogel radiator and SiPM-based photo-detector is proposed for the charged PID in the ALICE 3 experiment.

A high PID performance is expected thanks to large photon detection efficiency and granularity of the sensor, even in high multiplicity Pb-Pb collisions.

The particle separation capability of e/π , and $\pi/K/p$ can be achieved up to about 2 GeV/c and 10 GeV/c, respectively.

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.

Theory / experiment

Experiment

Group or collaboration name

the ALICE 3 RICH Collaboration

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