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ALICE 3

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The future ALICE programme for Run 5 and beyond relies on a novel detector concept, ALICE 3, to address the determination of QGP properties that will remain inaccessible with existing and planned detectors in Run 3 and 4. Amongst others, this requires next-level measurements of dileptons down to very low invariant mass as well as the clean reconstruction of heavy-flavour hadrons. They call for a substantial increase in luminosity in combination with unprecedented detector performance. A compact, light, and fast tracker, based on thin silicon sensors, operated in a magnetic field, shall provide good pT resolution over ~ 8 units of pseudorapidity. To achieve a pointing resolution of ~ 10 μm at 200 MeV/c, an ultralight vertex detector at minimal distance from the interaction point and, thus, within the beampipe is planned. Particle identification can be provided by a time-of-flight detector with 20 ps time resolution, for which R&D on monolithic silicon sensors is ongoing. An aerogel-based RICH detector is being studied to extend the momentum coverage. Further detectors are foreseen for more specialised measurements.

In this presentation, we will present the detector requirements resulting from the physics programme of ALICE 3. We will then discuss a detector concept and technologies suitable to meet these requirements. Additionally, we will highlight R&D activities, in progress and planned, to achieve the required performance.

Primary experiment

ALICE

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