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The silicon tracking system of the future ALICE 3 experiment at the LHC

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ALICE 3 is the next generation heavy-ion experiment proposed for the LHC Runs 5 and 6. Its tracking system will be based on a vertex detector, integrated in a retractable structure inside the beam pipe to achieve a pointing resolution of better than 10 microns for $p_{\mathrm{T}} > 200$ MeV/c, and a very-large-area tracker, surrounding the vertex detector and covering 8 units of pseudorapidity ($|\eta| < 4$). The tracking system will be based on Monolithic Active Pixel Sensor (MAPS) technology and will leverage the sensor developments carried out for the recently upgraded ALICE Inner Tracking System and for the future ALICE ITS3.

An intensive R&D program has already started to meet the challenging detector requirements: the innermost vertex detector layer, placed at 5 mm from the interaction point, must withstand an integrated radiation load of 9×10^{15} 1 MeV neq/cm^2 NIEL and 288 Mrad TID; the tracker will cover more than 50 m^2 of surface, extending to a radius of 0.8 m and a total longitudinal length of about 8 m.

This contribution will discuss the detector requirements and target sensor specifications, the ideas for mechanics and integration, and the main R&D challenges expected for the implementation of the ALICE 3 tracking system. In addition, the expected performance for novel heavy-flavour studies, ranging from D-Dbar angular and momentum correlations to the reconstruction of multicharm baryons, will be presented.

Auteur principal: LARIONOV, Pavel

Co-auteur: COLLABORATION, ALICE

Orateur: LARIONOV, Pavel

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