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Future ALICE upgrades for Run 4 and beyond

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ALICE pursues several upgrades to further extend the physics reach. For Run 4, ALICE is pioneering the usage of bent, wafer-scale pixel sensors to replace the three innermost layers of the inner tracking system. This makes it possible to construct truly cylindrical layers, which consist practically only of the silicon sensors. The resulting improvement in pointing resolution will allow better measurements of heavy-flavour hadrons and dielectrons. In addition, a Forward Calorimeter (FoCal) is proposed to provide unique constraints on the low- x gluon structure of protons and nuclei via forward measurements of direct photons. The FoCal combines a high-resolution electromagnetic Si-W calorimeter with a conventional hadronic calorimeter. For Run 5 and beyond, ALICE 3 is proposed, using a novel detector concept to gain unique access to heavy flavour probes of the QGP and the approach to thermalisation as well as real and virtual photons. At its core, it combines a high-resolution vertex detector with a large-acceptance silicon pixel tracker. For the identification of particles, a combination of a time-of-flight system, a Ring-Imaging Cherenkov detector, an electromagnetic calorimeter, a muon identifier, and a dedicated forward detector for ultra-soft photons, are being studied. In this presentation, we will discuss the upgrade plans, report on R&D results for ITS3 and FoCal, and present the requirements and concepts for ALICE 3.

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