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Perspectives of the ALICE Experiment and Detector Upgrade¹

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The primary goal of ALICE at the CERN-LHC is to study the structure of the QCD phase diagram at extremely high temperature and very large energy density. In particular, ALICE focuses on the properties of the hot and dense matter created in ultra-relativistic heavy ion collisions. The ALICE experiment features tracking to low transverse momentum (down to 150 MeV/c), as well as a variety of particle identification techniques and jet identification. After the LS2 (2018-19 Long Shutdown), ALICE will focus on rare probes, such as heavy-flavors, quarkonia, photons and jets with improved performance, thanks to the detector upgrade which will further strengthen the physics potential of the experiment. The long-term strategy of the ALICE upgrade is to fully exploit high luminosity provided by the LHC after the LS2, and to collect 10 nb^{-1} at the maximum collision rate of 50 kHz (Pb-Pb luminosity $L = 6 \times 10^{27} \text{ cm}^{-2} \text{ s}^{-2}$) in order to carry out the precision measurements on a large variety of probes such as heavy flavour, charmonia and dielectrons. In this talk, we present a review of the ALICE detector and highlights of the current physics program. Then we will discuss the limitations of existing measures and the prospects for physical measurements with the upgrade.

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