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ALICE detector upgrades

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The ALICE experiment is specifically designed for the study of strongly interacting matter as created in heavy ion collisions at LHC. With some of its particular features, like the very good measurement of low momentum particles and the particle identification capabilities it also provides unique measurements in p+p collisions. However, very recent developments in heavy ion physics suggest that some more enhanced measurement capabilities will be strongly desirable to obtain a deeper understanding of the new matter created.
ALICE is setting up a program of detector upgrades, which could to a large extent be installed in the long LHC shutdown foreseen for 2017/18, to address these new scientific challenges. Projects considered include an upgrade of the inner tracking system (ITS), the installation of a new forward calorimeter (FOCAL), the extension of the muon spectrometer (MFT, muon forward tracker), the installation of a detector with enhanced particle identification at high momentum (VHMPID), and additional detectors enhancing the capabilities for diffractive physics (AD = ALICE Diffractive). An increased rate capability of the largest detector in ALICE, the time projection chamber (TPC), is also under investigation, and it is foreseen to improve the data acquisition and high level trigger systems (DAQ & HLT) to achieve more bandwidth and to use more sophisticated and complex triggers. We will discuss the scientific frontiers and will present the corresponding upgrade projects under study for the ALICE experiment.

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