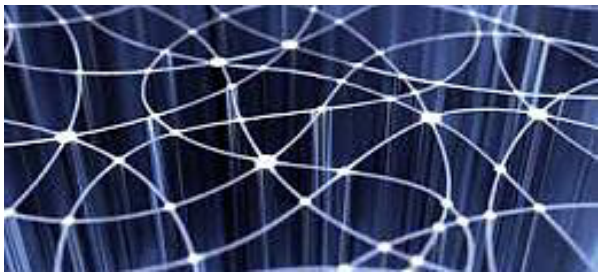

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Data Processing for ALICE at the LHC

The ALICE collaboration studies the Quark-Gluon Plasma, a deconfined state of strongly interacting matter at extreme temperatures and densities, which is created in high-energy collisions of heavy nuclei at the Large Hadron Collider (LHC) at CERN.

The ALICE apparatus was designed to inspect Pb-Pb collisions at an interaction rate of 8000 Hz, to read out up to 1000 events per second, and to record data at a rate of more than 1 GB/s. ALICE also analyzes p-p and p-Pb collisions at interaction rates up to 200 kHz, with similar limits on read-out and data rates as for Pb-Pb collisions. ALICE employs a multi-level hardware trigger system to select interactions for read-out and a High-Level Trigger to perform online reconstruction, data compression and further event selection.

In parallel to the luminosity upgrade of the LHC during the second long shutdown in 2018/19, a major upgrade to ALICE is planned, including replacements for the inner silicon tracker and the read-out chambers of the time-projection chamber. These detectors will feature continuous read-out, pushing the data rate above 1 TB/s. A new computing system will reduce the data rate to tape while keeping the
full event sample of up to 50 kHz Pb-Pb collisions, using online reconstruction, storage of partially reconstructed data and compression.

I will present the main physics goals and data taking strategy for the previous and upcoming runs until 2017. I will then present the upgrade of the ALICE experiment, pointing out how the changing physics goals influence the technology selection for the upgrade. I will focus on the design of the new computing system to process a data stream of more than 1 TB/s.

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