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The ALICE detector is designed to investigate the properties of the hot and dense plasma of quarks and gluons, formed at the extreme energy densities reached in Pb-Pb collisions at LHC.
Among the probes useful to investigate this medium, heavy quarks play a special role because they are produced in the very initial stage of the collisions and they carry information about the
properties of the traversed medium. In particular, an accurate measurement of heavy flavour provides information on fundamental properties of the medium as transport coefficients, the thermalization and hadronization mechanisms.
Interesting results have been obtained in the first three years of data-taking at the LHC, but there are still open questions, which would require measurements beyond the present capabilities of the ALICE apparatus. Among them, the most interesting are the measurement of the nuclear modification factor (R_AA) and anisotropy of the azimuthal distributions of charm
and beauty mesons down to transverse momentum below 1 GeV/c. Another completely unexplored field is the measurement of the production of heavy flavour baryons, like the Lambda_c and Lambda_b, that can bring insight on the heavy quark hadronization mechanism in the presence of a partonic medium.
At present such measurements are limited by the resolution of the inner tracking system, which, for instance, is not sufficient to measure in Pb-Pb collisions the production of Lambda_c baryons, that have a mean proper decay length of only 60 μm. Another limitation of the present ALICE central barrel detectors to the measurement of heavy flavours at low momentum, is the
maximum achievable readout rate, which prevents the full exploitation of the luminosity expected to be delivered by LHC after the Long Shutdown 2.
An upgrade of the inner tracking system based on today's frontier technologies has been recently approved. The new detector will improve by a factor 2-3 the current performance in
pointing and momentum resolution, providing in addition a high tracking efficiency down to very low transverse momentum. Moreover, a faster readout, for all the central barrel detectors,
will allow for a data collection rate, in Pb-Pb collisions, a factor 100 larger than at present, and this will contribute to enhance the ALICE physics performance very significantly.
In this contribution, we will present an overview of the inner tracker upgrade and the expected physics performance for heavy flavour measurements.

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