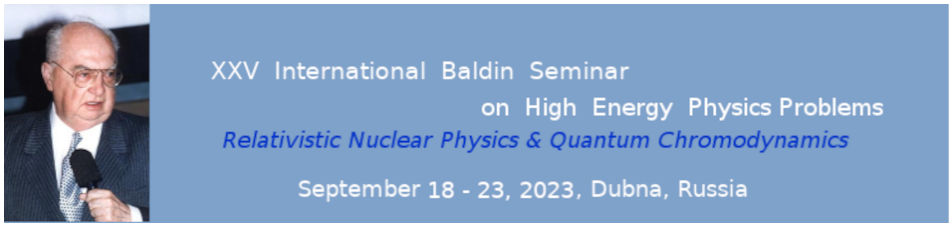

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Some highlights on studies of strangeness and charm in heavy ion collisions by ALICE at LHC

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Some highlights on studies of strangeness and charm in heavy ion collisions by ALICE at LHC

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The formation of a strongly interacting medium of deconfined quarks and gluons, known as the quark-gluon plasma (QGP), that occurs in the ultrarelativistic nuclear collisions at the LHC, can
be characterized by several observables. They include, in particular, the enhanced abundances (in heavy-ion collisions relative to that in pp) of rare, strange, and charm hadrons, the presence of
azimuthal flows of identified particles, a strong nuclear suppression of high-pT charged hadrons, peculiar behavior of baryon-to-meson yield ratios, etc. However, recently, some of these QGP signs were found in small systems like pp and p—Pb collisions. These systems were usually thought to have cold nuclear matter effects, not the QGP ones. Therefore, it is interesting to compare the multiparticle production in heavy-ion and small collision systems by using such probes as strange and charm hadrons. Both strange and heavy-flavor quarks are considered to be produced from the QCD vacuum at some early stage of nuclear collision and they interact strongly with the constituents of the QGP. Thus, the study of strangeness and charm production in the case of small and large collision systems could bring valuable information on the hadronization mechanisms. Results obtained in pp, p—Pb, and Pb—Pb collisions as a function of charged-particle multiplicity allow a detailed characterization of the system created in these collision systems. We will show in this report and discuss in some phenomenological models several recent experimental results by the ALICE collaboration got in RUN 1 and RUN 2 in pp, p-Pb and Pb-Pb
collisions at the LHC. This includes the studies of QGP medium induced effects on strange and charm particles yields and on shape of jets, on the azimuthal flows of identified particles, and some
other effects.
In the last part of the talk, we will present challenges by the current new physics programme of measurements in the LHC Run 3 that were successfully met by the recently upgraded ALICE
nstallation. New experimental perspectives of beauty and multi-charm hadrons studies are planned in Run 4 with the new version of the Inner Tracking System (ITS 3) to be installed in 2026-2028.
Finally, new, full Si-pixel sensors ALICE 3 installation that is being designed for RUN 5 (after 2034) will be also presented briefly.

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