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Hidden strangeness shines in NA61/SHINE

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One of the main objectives of the NA61/SHINE experiment at the CERN SPS is to study properties of strongly interacting matter (SIM). This includes a two-dimensional scan in the beam momentum and size of the colliding system, to investigate the onset of deconfinement discovered by NA49, and to search for the critical point of SIM. This contribution presents first ever results on ϕ meson production in proton-proton collisions, the smallest system in the scan, at beam momenta of 40 and 80 GeV/c, and most detailed ever experimental data at 158 GeV/c.

Strangeness production enhancement in large systems compared to small ones is traditionally considered as a signal of quark-gluon plasma formation. To discuss the nature of the enhancement it is important to compare this effect in both the open and hidden strangeness sector which is done in this contribution. The comparison of $p + p$ to Pb + Pb results shows also a non-trivial system size dependence of the longitudinal evolution of hidden strangeness production, contrasting with that of other mesons.

The results are furthermore compared to world data on ϕ meson production demonstrating superior accuracy, and to several models. The latter include a statistical and three microscopic models. None is found to be able to describe simultaneously the shapes of transverse momentum spectra, shapes of rapidity distributions and total yields.

Content type

Experiment

Collaboration

NA61/SHINE

Centralised submission by Collaboration

Presenter name already specified

Primary author: MARCINEK, Antoni (Polish Academy of Sciences (PL))

Presenter: MARCINEK, Antoni (Polish Academy of Sciences (PL))

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