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Strange and Multi-strange Particle Production in pPb and PbPb with CMS

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Identified particle spectra provide an important tool for understanding the particle production mechanism and the dynamical evolution of the medium created in relativistic heavy ion collisions. Studies involving strange and multi-strange hadrons, such as K^0_S, Λ, Ξ^-, and Ω^-, carry additional information since there is no net strangeness content in the initial colliding system. Strangeness enhancement in AA collisions with respect to pp and pA collisions has long been considered as one of the signatures for quark-gluon plasma (QGP) formation. Recent observation of collective effects in high-multiplicity pp and pA collisions raise the question of whether QGP can also be formed in the smaller systems. Systematic studies of the strange particle abundance, particle ratios, and nuclear modification factors can shed light on this issue. The CMS experiment has excellent strange-particle reconstruction capabilities over a broad kinematic range, and dedicated high-multiplicity triggers in pp and pPb collisions. The spectra of K^0_S, Λ, Ξ^-, and Ω^- hadrons have been measured in various multiplicity and rapidity regions as a function of p_T in pp, pPb, and PbPb collisions for several collision energies. The spectral shapes and particle ratios are compared in the different collision systems for events that have the same multiplicity and interpreted in the context of hydrodynamics models. Nuclear modification factors are measured out to high-p_T in minimum bias pPb collisions in several rapidity regions with the goal of investigating possible modifications in hard-scattering processes using identified hadrons. Forward-backward rapidity yield asymmetries are also studied as a function of pt to search for initial state effects, such as shadowing in the nuclear parton distributions.

List of tracks

Strangeness production at low baryon densities

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