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Multiplicity dependence of the production of identified charged hadrons in pp and pPb collisions from CMS

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New results on transverse momentum spectra of identified charged hadrons in proton-proton collisions at sqrt(s) = 13 TeV are presented using CMS detector at the LHC. Charged pions, kaons, and protons in the transverse-momentum range pT = 0.1-1.7 GeV/c and for laboratory rapidities |y| < 1 are identified via their energy loss in the CMS silicon tracker. The pT spectra and integrated yields are compared to lower center-of-mass energy pp, and to similar energy pPb and PbPb results, as well as to Monte Carlo simulations.
For all collision systems studied, the average pT increases with particle mass and with the charged-particle multiplicity of the event as expected from theoretical predictions, among others from those based on gluon saturation. The results shows only a slight dependence of the average pT on the center-of-mass energy, indicating that particle production at LHC energies is strongly correlated with the charged-particle multiplicity rather than with the center-of-mass energy of the collision. The observed dependencies show that at TeV energies the characteristics of particle production in hadronic collisions are constrained mostly by the amount of initial parton energy available in a given collision.

Experimental Collaboration

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