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Bose-Einstein correlations of identical charged kaons in p-Pb and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV by ALICE at the LHC

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Due to quantum statistical effects and final-state interactions, momentum correlations between two or more particles emitted with small relative velocities (or, equivalently, small relative momenta in their center-of-mass system) provide a sensitive tool for probing the spatiotemporal characteristics of particle-production processes at femtometer scales (10^{-15} m). Kaons are particularly valuable for studying Bose-Einstein correlations because they are less affected by resonance decays than more abundantly produced pions and, therefore, provide a more direct probe of the properties of the primary particle-emitting source created in high-energy collisions. Combined with femtoscopic measurements of pions and protons, kaon correlations also offer important information about the collective dynamics and evolution of strongly interacting matter. We report on the results of the femtoscopic analysis of Bose-Einstein correlations of charged kaons in p-Pb and Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with the ALICE detector. Both measurements show that the extracted source radii increase with charged-particle multiplicity and decrease with increasing pair transverse momentum. This behavior is characteristic of space-momentum correlations associated with collective expansion and can be described within hydrodynamic models. The time of maximum kaon emission is determined through a three-dimensional femtoscopic analysis for both collision systems. The value obtained in p-Pb collisions is comparable to that observed in highly peripheral Pb-Pb collisions, suggesting that the evolution of kaon emission is similar in p-Pb and peripheral Pb-Pb collisions. The EPOS-3 hadronic interaction model reproduces the measured source sizes in p-Pb collisions reasonably well, except for an underestimation of the source size in the most central collisions. For the Pb-Pb data, the integrated hydrokinetic model provides a good description of the transverse-momentum dependence of the source radii, except for the outward component in the longitudinally comoving system (LCMS).

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