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Femtoscopy in small colliding systems at CMS

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Femtoscopic correlations are measured over a broad multiplicity range using data from the LHC Run II collected by the CMS experiment for small colliding systems. Studies are performed for correlations of charged hadrons produced in proton-proton (pp) collisions at $\sqrt{s} = 13$ TeV and for correlations with all pair combinations of K_S^0 , Λ and $\bar{\Lambda}$ in proton-lead (pPb) collisions at $\sqrt{s_{NN}} = 8.16$ TeV. Results from pp collisions are compared to data from lower energies and from the ATLAS experiment, as well as with theoretical expectations from the color glass condensate and hydrodynamical models. In addition, identified particles are employed to perform the first femtoscopic correlation measurements of $K_S^0 K_S^0$ and of $\Lambda \bar{\Lambda}$ and $K_S^0 \Lambda \oplus K_S^0 \bar{\Lambda}$ correlations in pPb colliding systems. In these cases, the shape of the correlation function varies considerably for the different particle pairs, unveiling the effect of the strong final state interaction in each case. Intriguingly, the invariant radii and the correlation intensity results for $K_S^0 K_S^0$ in pPb collisions share similarities with those from charged hadrons in pp collisions. On the other hand, the scattering parameters obtained for baryon-baryon and baryon-antibaryon strong interactions in pPb collisions behave as found in previous results for larger colliding systems.

Authors: CMS; PADULA, Sandra (UNESP - Universidade Estadual Paulista (BR))

Presenter: PADULA, Sandra (UNESP - Universidade Estadual Paulista (BR))

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