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Results of femtoscopic correlations at CMS

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Femtoscopic correlations of identified and unidentified hadrons are measured with data re\-corded by the CMS experiment at the LHC over a broad multiplicity range and pair transverse momentum. The first femtoscopy measurements carried in CMS for all pair combinations of K^0_S, Λ and $\overline{\Lambda}$ are reported. These identified particles are employed to perform $\mathrm{K}^0_\mathrm{S}\mathrm{K}^0_\mathrm{S}$, $\Lambda\overline{\Lambda}$ and $\mathrm{K}^0_\mathrm{S}\Lambda \oplus \mathrm{K}^0_\mathrm{S}\overline{\Lambda}$ femtoscopic correlations in pPb collisions at $\sqrt{s_{\mathrm{NN}}} =$ 8.16 TeV, and of $\Lambda\Lambda \oplus \overline{\Lambda\Lambda}$ in PbPb collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV, for the first time. The shape of the correlation function is observed to largely vary for different particle pair species, revealing the effect of the strong final state interaction in each case. Charged particle correlations measured in pp at $\sqrt{s} = 0.9$, 2.76, 7 and 13 TeV, pPb at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV and peripheral PbPb collisions at $\sqrt{s_{\mathrm{NN}}} = 2.76$ TeV with the CMS detector are shown in addition. The invariant radii results for $\mathrm{K}^0_\mathrm{S}\mathrm{K}^0_\mathrm{S}$ in pPb and PbPb collisions show similar behavior with multiplicity and pair transverse momentum as observed for charged hadrons in all colliding systems and energies. The strong interaction scattering parameters, scattering length and effective range, are extracted from $\Lambda\Lambda \oplus \overline{\Lambda\Lambda}$ and $\Lambda\overline{\Lambda}$ correlations using the Lednick\'y-Lyuboshits model for both pPb and PbPb collisions, and compared with other experimental and theoretical results.

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