

From particle emission at accelerator facilities to axion properties in neutron stars: results and implications of the latest femtosopic studies involving pions by ALICE

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The composition of the innermost region of neutron stars is unknown, and the possible appearance of QCD axions has recently been proposed to help understand this puzzle. The properties of axions at high baryon densities can be related to the in-medium properties of pions, which are accessible in pp collisions at the LHC. Here, the emission of multiple hadrons helps to mimic high densities due to their short production distances (~ 1 fm). This talk presents recent measurements of the particle-emitting source size using femtoscopy of $\pi\pi$ and $p\pi$ in pp collisions at $\sqrt{s} = 13$ TeV by ALICE. The resulting scaling of the source size as a function of transverse mass is consistent for $\pi\pi$, $p\pi$ and previous results of baryon pairs by ALICE, demonstrating a common emission source for all hadrons. Using three-body femtoscopy, the first measurement of $pp\pi$ correlations unveiling effects beyond pairwise interactions are shown.

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