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The Study of Two (Anti-)proton Interaction via Correlation Measurement

The two-particle correlation at small relative momentum is influenced by the nuclear force between two particles, which has been intensively studied for nucleons and nuclei but not much for antinucleons or antinuclei. In this talk, we present the antiproton-antiproton and proton-proton correlation function in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV based on data taken by the STAR experiment at RHIC. We show the attractive nuclear force between two antiprotons, and present the measurement of the two key parameters that characterize the corresponding strong interaction, namely, the scattering length and the effective range. Our measurement serves as a verification of CPT symmetry. The present information on the strong force in the antiproton-antiproton system, the simplest system of antinucleons(nuclei), is a fundamental ingredient towards understanding the structure of more sophisticated anti-nuclei.

Summary

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