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The Study of Two Anti-Proton Interaction via Correlation Measurement at STAR ZHENGQIAO ZHANG, BNL, STAR COLLABORATION — Two-particle correlations at small relative momenta are influenced by the nuclear force between the two particles, which has been intensively studied for nucleons and nuclei but not much for anti-nucleons or anti-nuclei. The study of the force between (anti)nucleons is a necessary step to understand the structure of (anti)nuclei and how (anti)nuclei interact with each other. In this presentation, by studying the two anti-proton correlation function in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV collected by the STAR experiment at RHIC, we show the attracting nuclear force between two anti-protons. We also present the measurement of the two key parameters that characterize the corresponding strong interaction, namely, the scattering length and the effective range. As a direct knowledge of the interaction between two anti-protons, the simplest system of anti-nucleons (nuclei), our result provides a fundamental ingredient for understanding the structure of more sophisticated anti-nuclei and their properties.

Hui Wang
BNL

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