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Measuring the potential of antihyperons in nuclei with antiproton beams at PANDA

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PANDA is a key experiment of the FAIR facility in Darmstadt. It will study fundamental questions of hadron physics and QCD by exploring interactions between an antiproton beam and a fixed proton or nuclear target. Because of the relative large production cross section of hyperon-antihyperon pairs in
antiproton-nucleus collisions, PANDA will be an ideal instrument to study hyperons and antihyperons in a nuclear medium. The interaction between a baryon and an anti-baryon may shed light on the short-range structure of
the residual baryon-baryon force. However, because of the deep imaginary potential the behavior of antihyperons in nuclei is terra incognita. The exclusive production of hyperon-antihyperon pairs (as well as meson-antimeson
pairs) close to their respective production threshold represents the only realistic opportunity to study quantitatively antihyperons in nuclei. In the case of (Lambda + Lambda_bar) and (Sigma minus + Lambda_bar) production in
antiproton-neon collisions around 1 GeV incident
energy, calculations using the GießenBUU transport model indicatea strong sensitivity of transverse momentum correlations on the depth of the Lambda_bar potential well in nuclei. Because of the relative large production cross
section of (Lambda + Lambda_bar) pairs in antiproton-nucleus collisions the luminosity required at PANDA experiment at FAIR will be rather moderate. Therefore, this experiment is ideally suited for the start-up phase of PANDA@FAIR. In this talk we present the predictions of the transport model calculations for different beam energies and different neon isotopes. The expected sensitivity of the PANDA setup obtained by a realistic Monte Carlo inserted in the experiment full simulation framework will be discussed.

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