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Strange baryons and antibaryons in nuclei: unique opportunities for PANDA@FAIR (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 is a unique factory for hyperon-antihyperon pair production. This feature makes PANDA an ideal instrument to study hyperons and antihyperons in nuclear medium. The exclusive production of hyperon-antihyperon pairs close to their respective production threshold offers a unique opportunity to study the nuclear potential antihyperons in nuclei quantitatively. In the case of Lambda-\bar{Lambda} and Sigma -\bar{Lambda} production in antiproton-neon collisions around 1 GeV incident energy, calculations using the Gießen BUU transport model indicate a strong sensitivity of transverse momentum correlations on the depth of the \bar{Lambda} potential in nuclei. The expected sensitivity of the PANDA experimen and further options of this novel method will be discussed.

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