

Strangeness Studies with HADES within the FAIR Phase-0 Program

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Hyperons serve as powerful probes for investigating various aspects of quantum chromodynamics (QCD). As part of the FAIR Phase-0 program, HADES (High-Acceptance Di-Electron Spectrometer) at GSI has collected high-statistics data using a proton beam with a kinetic energy of 4.5 GeV impinging on a proton target. The beam energy enables the production of hyperons close to threshold, facilitating studies of hyperon-hyperon interactions and searches for intermediate resonances. Currently, the Λ - Λ reaction is being analyzed to extract crucial information on Λ - Λ interactions in p-p collisions which is expected to be essential to understand the interiors of neutron stars. The N- Λ interaction is also being investigated in A-A collisions. Furthermore, the first-time measurements of the Dalitz decay of the Σ^0 will provide insights into transition form factors and thereby the electromagnetic structure of the Σ^0 . The study of Ξ^- production as well as $\Lambda(1405)$ and $\Sigma^{*+/-}(1385)$ in proton-proton collisions is valuable to shed light on the production mechanisms and nature of the states. This talk will highlight the ongoing hyperon physics analyses at HADES and present selected results. Prospects of measuring hypernuclei with PANDA at FAIR in the future will also be discussed.

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