

The FAIR Phase-0 Hyperon Program at HADES

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Hyperons are a unique probe to study the non-perturbative aspects of the strong interaction. At HADES they are produced in proton or pion induced reactions at a few GeV. The detector has recently been extended with a forward detector featuring straw tube trackers developed for the PANDA experiment and a time of flight detector, extending the acceptance for hyperon channels at forward angles. The main objectives of the HADES hyperon program are electromagnetic decays of hyperons and double strangeness production.

The upgrade of the HADES detector plus its capability to tag electron-positron pairs makes up an ideal combination to study electromagnetic decays of hyperons. First measurements at HADES on both virtual and real photon decays, $Y^* \rightarrow Y e^+ e^-$ and $Y^* \rightarrow Y \gamma$, respectively, will significantly impact our understanding of meson effects on the electromagnetic structure of strange resonances. In addition the Dalitz decay will provide valuable information about electromagnetic transition form factors of hyperon resonances.

Very little is known about the production of hyperons with masses larger than the Σ^0 hyperon or hyperons with double strangeness at HADES energies. These measurements can provide important references for future heavy-ion experiments planned at FAIR which explore the high net-baryon density region of the QCD phase diagram. Especially the measurement of double Λ hyperon production can make $\Lambda - \Lambda$ correlation studies possible which will constrain the hyperon-hyperon interaction playing a key role in $\Lambda - \Lambda$ double hyper nuclei, neutron star core studies and the Ξ^- production mechanism.

These possibilities and selected results on hyperon production from proton induced reactions together with the prospects of a pion beam experiment will be presented.

Collaboration

HADES

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