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ϕ meson production from K^+K^- decay channel in $p(4.5 \text{ GeV})+p$ with HADES at GSI

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The High Acceptance Di-Electron Spectrometer (HADES) at GSI, Darmstadt, Germany, is an experimental setup designed to investigate the hadronic matter in regions of large net baryon densities and moderate temperatures. It achieves this through fixed-target heavy-ion collisions with incident energies in the range of a few GeV/nucleon. This program is associated with proton and pion-induced reactions that provide important references. One of the recent endeavors by the HADES collaboration, in February 2022, involves the measurement of proton-proton reactions with an incident beam energy of 4.5 GeV. ϕ meson production is one of the intriguing channels that this experiment can measure, either through its decay into an e^+e^- pair or a K^+K^- pair. It remains an open question how this meson, primarily composed of $s\bar{s}$ pairs according to the quark model, is produced in a proton-proton collision. This work primarily focuses on examining the ϕ meson via its K^+K^- decay channel in the $p(4.5 \text{ GeV})p \rightarrow ppK^+K^-$ reaction.

This talk will provide an overview of the current analysis status of the ϕ meson channels. This analysis encompasses data collected from various detectors, including the tracking system, Mini Drift Chamber (MDC), Inner time-of-flight (iTOF), and FORWARD detector. It involves several crucial steps: tracking, and identifying kaons and protons through correlations between momentum and energy loss and velocity, subtracting background, and applying efficiency and acceptance corrections. This talk will also include preliminary results of the ϕ meson's angular distribution and cross-section. A very primitive hint of ϕ meson polarisation will also be discussed.

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Sitzung Einordnung: Session