

Eta meson reconstruction in pp reactions at 2.2 AGeV with HADES

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The HADES spectrometer installed at GSI Darmstadt is devoted to study production of di-electron pairs from proton, pion and nucleus induced reactions at 1-2 AGeV. The main goal is to search for in-medium modifications of spectral functions of the light vector meson ρ/ω at moderate temperatures and nuclear matter densities of $\rho_0 - 3^*\rho_0$.

The detector became operational in 2002 and since then took data from $^{12}\text{C}+^{12}\text{C}$ collisions at 2AGeV (2002), 1AGeV (2004) and proton-proton (2004) reactions at 2.2 GeV. In the pp collisions we have focused on exclusive and inclusive η meson reconstruction. In this energy regime η Dalitz decays significantly contribute to the dielectron invariant mass range of $140 < M_{e^+e^-} < 550 \text{ MeV}/c^2$. In pp reactions exclusive η meson reconstruction in hadronic ($\eta \rightarrow \pi^+\pi^-\pi^0$) and electromagnetic channels ($\eta \rightarrow e^+e^-\gamma$) was possible in the HADES by means of missing mass techniques. Reconstructed η -yields allow for studies of the detector acceptance and dielectron reconstruction efficiency important for the interpretation of C+C data.

We present analysis techniques and discuss first results on η production with the main focus on comparisons of reconstructed distributions to results obtained by other experiments and theoretical predictions. We discuss preliminary results on search for $\eta \rightarrow e^+e^-$ rare decays and perspectives for future high-statistics run with pp at 3.5 GeV scheduled on may 2006.

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