

## Dielectron measurements with the HADES at GSI

The High Acceptance DiElectron Spectrometer (HADES) is a versatile detector with particular focus on dielectron measurements in pion, proton, deuteron and (heavy-) ion-induced reactions using proton or nuclei targets and SIS-18 beams with energies of up to 4.5 GeV/nucleon. Its excellent particle identification capabilities also allow for the investigation of hadronic observables.

The excess of dileptons above the contributions from initial state processes and late meson decays serve as messengers of the dense medium created in heavy-ion collisions and reveal the thermal properties and the lifetime of the medium but also give insight into meson properties at high densities.

In this contribution dielectron measurements with the HADES in various heavy-ion collision systems,  $Ar + KCl$ ,  $Au + Au$ ,  $Ag + Ag$ , are presented. The recently upgraded detector combines a high electron detection efficiency, impressive pion suppression and high-level conversion recognition allowing to study dielectron production with unprecedented precision, also as a function of centrality and pair-momentum with a signal up to the  $\phi$  meson mass region. The obtained dilepton spectra show strong excess radiation and suggest a substantial modification of the mesons.

Information on the  $\rho$ -meson in cold nuclear matter has also been obtained in  $p + Nb$  reactions at 3.5 GeV. The dilepton production rates in  $p + p$  reactions at the same kinetic beam energy serve as reference for the study of vector meson production in  $p+Nb$  reactions. This program is continuing and a first glimpse on new results from the recent  $p+p$  beamtime at  $E_{beam} = 4.5 GeV$  will also be discussed.

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