

Meson and di-electron production with HADES

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HADES is a multi-purpose spectrometer installed at GSI, Darmstadt with the focus on the di-electron production in A+A, N+N and N+A collisions. Here, the main goal is to understand the properties of vector mesons in dense matter, a question which had been addressed already more than a decade ago by the pioneering DLS experiment. In order to understand the resulting “DLS-puzzle”, dedicated measurements using C+C collisions at 1 and 2 AGeV were performed [1]. The pair excess above a cocktail of free hadronic decays has been extracted and compared to the one measured by DLS. This excess will be confronted with predictions of various model calculations.

On the other hand, all transport calculations suffer from incomplete knowledge of some elementary processes. In particular the Dalitz decays of baryonic resonances (mainly (1232)), including the NN bremsstrahlung (as an elastic term part of full OBE calculations [2]), are unmeasured. In order to shed more light on these processes, p+p and d+p collisions have been investigated. Preliminary results from these experiments will be presented and discussed.

The understanding of the di-lepton continuum is crucial for the question of possible in-medium effects of vector mesons (ρ/ω). The first spectroscopy of the mentioned vector mesons have been started with Ar+KCl collisions at 1.75 GeV and p+p at 3.5 GeV. The latter data set allow to be directly compared to the p+A experiment planned for September 2008.

The high statistics data sample (150000 pairs) collected for Ar+KCl has already been analyzed. First results will be presented and compared to model predictions.

As an outlook, the future plans (heavy-ion collisions up to Au+Au at 8AGeV) in the context of the HADES upgrade will be roughly outlined.

[1] G. Agakichiev et al. (HADES Collaboration), Phys. Rev. Lett. 98 (2007)052302

[2] L. P. Kaptari and B. Kämpfer, Nucl. Phys. A **764** (2006) 338 [arXiv:nucl-th/0504072].

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