Dilepton analysis in the HADES spectrometer for C+C at 2 AGeV data

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The HADES (*High Acceptance DiElectron Spectrometer*) [1] recently commissioned at the synchrotron SIS at GSI-Darmstadt (Germany) has been designed for lepton pair (e^-e^+) spectroscopy in pion, proton and heavy ion induced reactions in the 1-2 AGeV energy range.

One of the goals of the HADES experiment is to study in-medium modifications of hadrons properties like effective masses, decay widths, electromagnetic form factors etc. which might be linked to QCD chiral symmetry restoration [2]. To probe such effects the vector mesons (ρ, ω, ϕ) are the best suited. The very-short lived ρ mesons ($\tau_{free} = 1.3\ fm/c$) mainly decay inside a collision zone of comparable extension, and even the longer-lived ω mesons ($\tau_{free} = 23\ fm/c$) and ϕ mesons ($\tau_{free} = 44\ fm/c$) still do so to a substantial fraction. In addition, all of them can decay directly into e^-e^+ pairs which do not interact strongly and curry out almost undistorbed information from a collision zone.

The identification of the vector mesons in the HADES spectrometer is based on an invariant mass reconstruction of their decay into e^+e^- pairs. The combined information from all sub-detectors [3,4,5,6] is used to reconstruct the dilepton signal. In this reconstruction, particulary important is the reduction of a huge combinatorial background arising from wrong combinations of positrons and electrons to un-like sign pairs. A purity of the dilepton signal is determined by using the GEANT simulations [7,8] with the full HADES setup.

Methods of the dilepton signal and combinatorial background reconstruction in the HADES spectrometer will be presented.

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