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Photon-photon correlations in Ag+Ag √ collisions at SNN = 2.55 GeV

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The study of femtoscopic correlations of photon pairs emitted from heavy-ion collisions can serve as an unique probe of the source's spacetime evolution and properties. In contrast to commonly used charged particles, photons are not subject to strong, nor electromagnetic interactions, having relatively long mean free path. These properties imply no to minimal distortion of the carried information, from the point of their creation up to the detection in the experiment. Consequently, it is plausible to investigate source features, which are not only based on the information available after thermal freeze-out, but also include previous stages of expansion, without meaningful distortions caused by surrounding particles. Unfortunately, photon detection is not a trivial problem, requiring a dedicated approach. Moreover, the photon yield is mainly dominated by π^0 meson decays. Therefore one has to distinguish between femtoscopic signal from direct photons and decay photons (originating from f.eg. π^0 or η decays) emitted at later stages of collision.

As a part of FAIR/GSI scientific complex, the HADES experiment specializes in detecting light vector mesons form of dielectron ($e^{\pm}$) channels created in heavy system collisions at energies of several (1-2) A GeV. With use of detectors included in the spectrometer (among others electromagnetic calorimeters, capable of detecting neutral particles), combined with specially created software, a dedicated framework and reconstruction algorithm, the photon sample was obtained.

We present the first preliminary results from experimental data of Ag+Ag collisions at $\sqrt{s_{NN}} = 2.55$ GeV, measured with HADES at the GSI-SIS18.

Collaboration

HADES

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