First Results from the HADES Collaboration on Dielectron Production in C+C Collisions at 1 GeV and 2 GeV per Nucleon and the Solution to the DLS Puzzle

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HADES is a second generation experiment at GSI/Darmstadt to measure dielectrons in elementary and heavy ion collisions. It features a toroidal magnetic field with 6 equal size gaps which extend from 18 to 85 degrees in polar angle and cover approximately 70% of the full azimuthal angle. These sectors are equipped with large area Mini(-cell) Drift Chambers for tracking and RICH, TOF and Pre-Shower detectors for particle identification. We shall report on the results on C+C collisions at beam kinetic energies of 1 and 2 A GeV [1]. Fully corrected and background subtracted electron-positron invariant mass distributions are compared to earlier measurements at the BEVALAC (DLS) [2] and to expectations obtained from different theoretical approaches. These include contributions of long and short-lived dielectron hadron decays from a simple thermal source and more advanced transport models. We confirm an excess of dielectron yield relativ to model PREdictions for invariant masses between 200 and 600 MeV/c^2 which decreases with increasing beam energy. More specifically the excess rather scales like the number of produced pions than like a particle with a mass in the range from 200 - 600 MeV/c^2, i.e. η meson. Particularly with regard to preliminary HADES data obtained in elementary reactions, and recent calculations on virtual Bremsstrahlung in elementary collisions in a OBEM approach [3], it became likely that the excess is due to so far underestimated isospin effects.

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