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Improvements in the treatment of peripheral heavy ion collisions

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Recently, STAR made measurements of pair production at very low transverse momenta and a significant excess with respect to hadronic cocktail in peripheral Hadronic Heavy Ion Collisions (HHICs) was observed. The excess pairs have transverse momenta $p_T < 150$ MeV/c and are most prominent in peripheral gold-gold and uranium-uranium collisions. The ALICE Collaboration observes a similar excess in peripheral lead-lead collisions for dileptons from the J/Ψ decay. The description of these data sets is still a subject of intense debate. In peripheral collisions we expect a dominance of hadronic processes so, usually, the dilepton production is studied with models based on strong interactions. Nevertheless, the excess can not be described by these models, motivating the proposition of additional sources of dileptons. An alternative, considering pair production at very low transverse momenta, is the dilepton production by photon–photon interactions in peripheral heavy ion collisions. At ultrarelativistic energies, the heavy nuclei are sources of strong electromagnetic fields, and the dilepton production in nucleus-nucleus collision can be studied with Equivalent Photon Approximation (EPA). In EPA, the nucleus-nucleus cross section can be factorized in terms of photon flux, associated to each nuclei, and the elementary photont-photon cross section. In this contribution we investigate the impact for different treatments of nuclear form factor in the rapidity and invariant mass distributions for the dimuon production in peripheral heavy ion collisions at LHC energies considering distinct centralities. We present our predictions for the realistic and pointlike models and demonstrate that the pointlike approximation for the calculation of the photon spectra, present in the StarLight Monte Carlo, disregards a significant part of the spectra responsible for the production of dileptons. In addition, we propose a modfication in the point like model in order to make its predictions more realistic. We argue that this modification can be used in future analysis to improve the StarLight Monte Carlo predictions.

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