

# Exclusive $D\bar{D}$ meson pair production in heavy ion collisions

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We have calculated for the first time in the literature total and differential cross sections for exclusive production of pseudoscalar  $D\bar{D}$  meson pairs in the  $AA \rightarrow AAD\bar{D}$  reaction assuming that the reaction is driven by the  $\gamma\gamma \rightarrow D\bar{D}$  subprocess. The calculation of the elementary  $\gamma\gamma \rightarrow D\bar{D}$  cross section is done within the heavy-quark approximation and in the Brodsky- Lepage formalism with distribution amplitudes describing recent CLEO data on leptonic  $D^+$  decay. Realistic (Fourier transform of charge density) charge form factors of nuclei are used to generate photon flux factors. Absorption effects are discussed and quantified. The cross section for exclusive  $D\bar{D}$  production is much smaller than the cross section for the exclusive or semi-exclusive production of  $c\bar{c}$  calculated recently. In our calculations absorption effects were included in the impact parameter Equivalent Photon Approximation. The meson pairs are produced preferentially when the nuclei almost touch each other. The cross section strongly depends on the approximation made in the calculation. The dominant contribution to the cross section comes from the region of very small  $D\bar{D}$  invariant masses. The cross sections of a few nb are predicted for RHIC and of a few hundreds of nb for LHC with details depending on the approximation made in calculating elementary  $\gamma\gamma \rightarrow D\bar{D}$  cross sections.

- [1] "Exclusive  $D\bar{D}$  meson pair production in peripheral ultrarelativistic heavy ion collisions"  
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