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Simulation of direct photons production in d+d collisions at $\sqrt{s_{NN}} = 13.5$ GeV and $\sqrt{s_{NN}} = 27$ GeV

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Direct photons produced in quark-gluon and quark-antiquark interactions are planned to be studied in detail in the upcoming SPD experiment at the NICA collider. Direct photons serve as important probes for understanding the dynamics of interactions in high-energy nuclear collisions.

An important aspect for understanding the production of direct photons are parton distribution functions (PDFs), which determine the probability of detecting quarks and gluons with given characteristics inside nucleons. PDFs can differ significantly for free and internuclear nucleons. The differences between these functions can be investigated through the invariant spectra and nuclear modification factors of direct photons in deuteron-deuteron collisions.

In this paper, we present calculations of the invariant spectra and nuclear modification factors of direct photons as a function of transverse momentum in the rapidity region $|y| < 3$ at energies $\sqrt{s_{NN}} = 13.5$ GeV and $\sqrt{s_{NN}} = 27$ GeV.

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