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Performance for inclusive photon and neutral meson spectra and anisotropic flow measurements with the MPD experiment at NICA

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The MPD experiment will provide particle identification and broad coverage in transverse momentum and rapidity for neutral mesons decaying into photons, using different methodsbased on its electromagnetic calorimeter, tracking, and time-of-flight systems. The spectra and anisotropic flow of neutral mesons may help constrain the properties of the hot and dense nuclear matter created in heavy-ion collisions at NICA collider energies. Moreover, subtracting their contribution from inclusive photon spectra and anisotropic flow is necessary for direct-photon measurements.

We present the performance of inclusive photon, neutral pion, and eta meson spectra and anisotropic flow measurements with the MPD experiment at NICA in both collider (Bi+Bi @ 9.2 GeV) and fixed-target (Xe+W @ 2.87 GeV) regimes. The study was performed using the latest high-statistics simulations with the UrQMD event generator, an updated detector response, and improved reconstruction and analysis procedures, including the rejection of charged particles using the time-of-flight detector and machine-learning-based identification of converted photons.

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