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Prospects for MPD operation at NICA in the fixed-target mode.

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The Multi-Purpose Detector (MPD) at NICA is primarily designed for collider experiments at $\sqrt{s_{NN}} = 4\text{--}11$ GeV. A recently proposed program of fixed-target experiments extends its research potential, allowing for the investigation of dense baryonic matter in ion collisions at lower center-of-mass energies $\sqrt{s_{NN}} = 2.4\text{--}3.5$ GeV. Running in the fixed-target mode requires a careful revision of the MPD efficiency for event triggering, as well as its performance in particle reconstruction and identification, momentum resolution and geometric acceptance.

In this report, we present a review of the physics performance of the MPD operating in the fixed-target mode, including the results of physics feasibility studies for measuring a wide range of physics observables in Xe+W collisions at $\sqrt{s_{NN}} = 2.87$ GeV. The reconstruction of identified charged and neutral light hadrons, strange mesons and baryons, short-lived resonances, and light nuclei is discussed. The obtained results demonstrate that the MPD in the fixed-target configuration preserves sufficient trigger efficiency and geometrical acceptance, offering a powerful means to advance our understanding of the QCD phase diagram at high net-baryon density.

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