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Higher-harmonic proton flow and differential v_1 , v_2 measurements in the fixed-target mode of the MPD Experiment at NICA

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Anisotropic flow serves as a sensitive probe of the equation of state (EOS) and transport properties of the strongly interacting matter. It is an important observable at intermediate beam energies, which current theoretical models associate with the high baryon density region of the QCD phase diagram. Despite extensive study, this region still requires additional experimental constraints. This work presents a feasibility study of differential anisotropic flow measurements for identified hadrons in the fixed-target mode of the MPD experiment at NICA, which explores the properties of strongly interacting matter at beam energies of 2.3–3.5 GeV. For the first time, results on the higher harmonic anisotropic flow of protons will be shown, specifically their transverse momentum (p_T) and rapidity (y) dependencies. In addition, the large statistics of the analysis enable double-differential v_1 and v_2 measurements as functions of p_T and y , which will also be presented.

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