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Initial State Anisotropies in Ultra-Central collisions of Deformed Nuclei

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We use the boost-invariant IP-Glasma+MUSIC+UrQMD framework to isolate and study the effects of initial state geometry on observables. The study of spherically symmetric nuclei via heavy ion collisions cannot fully distinguish between the effects of collision centrality and initial state geometry on the hydrodynamic QGP or the hadron resonance gas. By using deformed collision systems such as ^{238}U, one can create geometrically non-trivial initial states that help differentiate initial state and centrality effects. By focusing on ultra-central collisions, we show that emulation of ZDC binning can help select specific geometric sub-types of events solely based on final state observables. Selecting these events provides key insights into how these distinct anisotropies impact QGP flow, anisotropic flow coefficients, and transverse momentum distributions. Finally, we show that the QCD- and saturation-based IP-Glasma, coupled to relativistic hydrodynamics and hadronic cascade simulations, reproduces STAR data for U+U at $\sqrt{s_{NN}} = 193$ GeV.

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