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Assessing the deformed nuclear structure at various energy scales

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Many atomic nuclei have a deformed intrinsic shape that affects the initial-state geometry of the related collider experiments, and hence the flow coefficients observed in the final states. We use collisions of deformed nuclei to study the connection between nuclear structure at low energy and the effective theory of high energy QCD. Along with ^{16}O , the clustered and deformed structure of ^{20}Ne is studied across different collision energies via JIMWLK evolution equations to search for QCD-induced modifications to the nuclear geometry and their observable signatures. Our range of $\sqrt{s_{\text{NN}}}$ varies from top LHC energy at 7 TeV, down 70 GeV, corresponding to the center-of-mass energy available in fixed-target experiments performed in the SMOG system of the LHCb detector. In addition, we discuss ratios of observables in isobar collisions involving Ru^{96} and Zr^{96} , which differs from unity because of the structural difference of these isotopes, and examine their energy evolution from RHIC to LHC.

Category

Theory

Collaboration (if applicable)

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