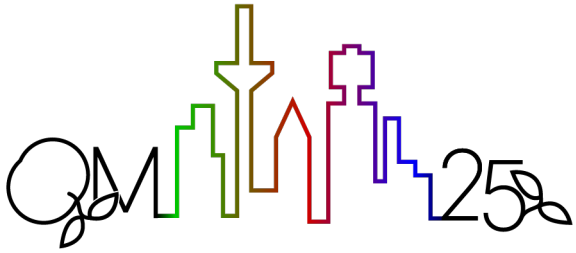

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Discriminating cluster configurations in ^{20}Ne in central Ne+Ne Collisions

The initial condition in relativistic heavy-ion collisions is sensitive to the nuclear structure of the colliding nuclei. Experimental observations in U+U and isobar collisions have revealed nuclear structure effects, such as deformation or neutron skin. For smaller colliding systems such as ^{20}Ne+^{20}Ne collisions, where the number of nucleons is limited, cluster models are typically used to describe the nuclear structure. We study the 5α and α+^{16}O cluster structure inside ^{20}Ne within the microscopic Brink cluster model. Our study presents a full analytical calculation of eccentricities ε_n and ε_n-related observables in most central Ne+Ne collisions. We demonstrate that the normalized symmetric cumulant $\mathrm{NSC}(3,2)$ and the Pearson correlation coefficient $\rho(\varepsilon_3^2, \delta d_\perp/d_\perp)$ can enable us to study which potential cluster configuration is more significant in ^{20}Ne. Our findings offer a novel strategy for identifying cluster structures inside ^{20}Ne through the future Ne+Ne collision experiment at the LHC.

Category

Theory

Collaboration (if applicable)

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