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Hard-soft tomography with event engineering in heavy-ion collisions

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The azimuthal anisotropy of parton energy loss in non-central heavy-ion collisions can lead to jet anisotropy which in turn can provide insight into the path-length dependence of jet quenching. Jet anisotropy flow in this study is investigated within the Linear Boltzmann Transport model, in which the dynamical evolution of the QGP is simulated within the CLVisc hydrodynamic model with fully fluctuating event-by-event initial conditions. We quantify the colliding energy, centrality, jet transverse momentum dependence of jet anisotropy flow coefficients $v_2^{\rm jet}$ and $v_3^{\rm jet}$, with emphasis on their event-by-event correlations with the flow coefficients of the soft bulk hadrons. We find that the correlation between jet and bulk anisotropy is approximately linear and that the effect of the bulk v_n fluctuation on the event-averaged jet $v_n^{\rm jet}$ is negligible. Other effects such as medium excitation with different jet cone sizes and viscosity of the QGP on jet anisotropy are investigated as well.

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