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Value of event-by-event fluctuations and v4 puzzle for QGP tomography

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We present a novel framework ebe-DREENA, based on a state-of-the-art dynamical energy loss model, which can include any temperature profile from bulk medium simulations. The framework is fully optimized to exploit different state-of-the-art medium evolutions - both event-by-event hydrodynamics and kinetic transport theory. It does not use fitting parameters within the energy loss model, allowing it to fully exploit differences in temperature profiles, as the only input in the framework. The framework applies to both light and heavy flavor observables, and both large (A+A) and small (e.g. p+A) systems. We calculate high-pt harmonics up to 6th order and exploit how the differences in the temperature profiles affect them, which will be especially useful with the upcoming high-luminosity measurements at RHIC and LHC. These comparisons of predictions and data are done within the same formalism and parameter set. We, therefore, propose ebe-DREENA as a unique tomography tool, which allows systematic and comprehensive mapping of QGP properties.

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