

Abstract Submitted
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Exploring theoretical uncertainties in the hydrodynamic description of relativistic heavy-ion collisions¹ CHENG CHIU, Cranbrook Upper High Schools, CHUN SHEN, Wayne State University — We explore theoretical uncertainties in the hydrodynamic description of relativistic heavy-ion collisions by examining the full non-linear causality conditions and quantifying the second-order transport coefficients' role. The causality conditions impose physical constraints on the maximum allowed values of inverse Reynold's numbers during the hydrodynamic evolution. For large Au+Au collisions, we find the variations of final observables are small with and without imposing the causality conditions, suggesting a robust extraction of the transport coefficients through model-to-data comparisons. However, sizable sensitivity is present in small p+Au collisions, which poses challenges to studying the small systems' collectivity.

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