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Viscous Effects on the Mapping of the Initial to Final State in Heavy Ion Collisions JACQUELYN NORONHA-HOSTLER, Columbia University, FERNANDO GARDIM, Alfenas Fed. U., Pocos de Caldas , MATTHEW LUZUM, Santiago de Compostela U., FREDERIQUE GRASSI, University of Sao Paulo — We investigate the correlation between various aspects of the initial geometry of heavy ion collisions at the Relativistic Heavy Ion Collider energies and the final anisotropic flow, using v-USPhydro, a 2+1 event-by-event viscous relativistic hydrodynamical model. We test the extent of which shear and bulk viscosity affect the prediction of the final flow harmonics, v_n, from the initial eccentricities, ε_n. We investigate in detail the flow harmonics v_1 through v_5 where we find that v_1, v_4, and v_5 are dependent on more complicated aspects of the initial geometry that are especially important for the description of peripheral collisions, including a non-linear dependence on eccentricities as well as a dependence on shorter-scale features of the initial density. Furthermore, we compare our results to previous results from NeXSPheRIO, a 3+1 relativistic ideal hydrodynamical model that has a non-zero initial flow contribution, and find that the combined contribution from 3+1 dynamics and non-zero, fluctuating initial flow decreases the predictive ability of the initial eccentricities, in particular for very peripheral collisions, but also disproportionately in central collisions.

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