Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Constraining the initial state of heavy ion collisions through many-body observables[1] MATTHEW HEFFERNAN, CHARLES GALE, SANGYONG JEON, McGill University, JEAN-FRANCOIS PAQUET, Duke University — Initial state geometry is a key quantitative component of descriptions of collective behavior in heavy ion collisions. Phenomenological models of the initial state are typically used in hybrid models tuned to observables such as charged hadron multiplicity and coefficients of the spatial Fourier decomposition, v_n. While this approach has demonstrated success, these models often fail to accurately predict many-body observables such as event plane correlations and nonlinear response coefficients. In this talk, we use state of the art simulations of heavy ion collisions to demonstrate that Color Glass Condensate-inspired models such as IP-Glasma are better able to simultaneously describe and predict many-body observables. We demonstrate the advantage of interpretable microscopic models of the initial stage of heavy ion collisions over parametric models and motivate their use in Bayesian inference. Through the use of an interpretable model of microscopic initial state physics, we can gain further insight into the properties of collective behavior in strongly-interacting matter and reduce systematic uncertainties and unphysical cross-correlations in order to precisely quantify the dynamics observed in heavy ion collisions.

[1]M.H., S.J., and C.G. are supported in part by the Natural Sciences and Engineering Research Council of Canada (NSERC).

Matthew Heffernan
McGill University

Date submitted: 08 Jan 2021 Electronic form version 1.4