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Constraining theoretical initial conditions models of heavy-ion collisions with Au+Au collision data at $\sqrt{s_{NN}}$ =27 GeV from the STAR detector at RHIC[1] SKANDAPRASAD RAO, Rutgers University, New Brunswick — Jet suppression in heavy-ion collisions provided evidence in the 2000s of the formation of a quark-gluon plasma, which evolves as a strongly coupled liquid. The flow harmonics produced after the QGP freeze-out are known to exhibit a nonlinear hydrodynamic response to the initial geometry, characterized by eccentricity cumulants. Previous work has identified that the relationship can be well described with a linear+cubic estimator, leading to an exceptional prediction of the elliptic flow fluctuations using the initial ellipticity and estimator coefficients corresponding to the beam energy. By determining these coefficients for different energies, we can check many initial conditions models against data without computationally expensive hydro calculations. We present a full analysis of the flow harmonics v_1, v_2, and v_3 from pions produced in 27 GeV Au+Au collisions using data from the Beam Energy Scan II at the STAR experiment at BNL's Relativistic Heavy Ion Collider. We also apply hydro code to simulated collisions to find the estimator coefficients best approximating the hydrodynamic response. We use the estimators to test several initial conditions models against the STAR results at this new energy.

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