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Initial state geometry and fluctuations in deformed and asymmetric nuclear collisions in the IP-Glasma framework

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The IP-Glasma model of initial conditions based on the *ab initio* color glass condensate (CGC) framework successfully explains the bulk features of global data for various systems like p+p, p+A and A+A over a wide range of energies [1-3]. We employ this framework to study deformed U+U collisions, asymmetric Cu+Au collisions and the effect of deformation in Au+Au collisions at RHIC. A combined study of these heavy ion systems with varying initial geometries can provide a unique opportunity to determine the origin of different sources of fluctuations that affect global observables like multiplicity and flow. We study the sensitivity of multiplicity, eccentricity and their event-by-event distributions to the details of initial state geometry. Results are compared to a two component MC-Glauber model implementation that includes Negative-Binomial multiplicity fluctuations. We argue that measurements of global observables for these systems at RHIC can constrain the mechanism of multi-particle production [4].

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[4]B .Schenke, P. Tribedy, R. Venugopalan *in preparation*

Primary author: TRIBEDY, Prithwish (VECC)

Co-authors: Dr SCHENKE, Bjoern (Brookhaven National Lab); VENUGOPALAN, Raju (Brookhaven National Laboratory)

Presenter: TRIBEDY, Prithwish (VECC)

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