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Gluonic Hot Spot Initial Conditions in Heavy Ion Collisions[1]
ROSS SNYDER, MEGAN BYRES, University of Colorado, Boulder, CO, USA, SANGHOON LIM, Pusan National University, Busan, South Korea, JAMES NAGLE, University of Colorado, Boulder, CO, USA — Experiments at the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC) have measured collective flow coefficients that reflect the geometry of the quark-gluon plasma created in Au-Au and Pb-Pb collisions. The initial conditions for these collisions are calculated in many different frameworks. In particular, the Monte Carlo Glauber (MCG) method of calculating these initial conditions was a major advancement in the field about a decade ago, and it establishes that nucleon position fluctuations are of importance when describing the flow of the quark-gluon plasma. A new model, called MAGMA, was recently proposed that calculates the flow coefficients by accounting for both the smooth nucleus structure and gluon hotspots within the nucleus. The flow coefficients that MAGMA predicted at each centrality percentage were a good fit to experimental data. Also, it may have explained how ultra-central collisions (0-1% centrality) produce $v_2\{2\}$ and $v_3\{2\}$ flow coefficients that are almost identical. We explore whether the MAGMA calculations are justified by modeling the hydrodynamics of ultra-central events. We also compare MAGMA with other MCG calculations that are often used to describe the experimental data.

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