Contribution ID: **105** Type: **Oral Presentation**

Ultracentral Collisions of Small and Deformed Systems at RHIC

Tuesday, 5 November 2019 12:00 (20 minutes)

We study a range of collision systems involving deformed ions and compare the elliptic and triangular flow harmonics produced in a hydrodynamics scenario versus a color glass condensate (CGC) scenario. For the hydrodynamics scenario, we generate initial conditions using TRENTO and work within a linear response approximation to obtain the final flow harmonics. For the CGC scenario, we use the explicit calculation of two-gluon correlations taken in the high-p_T "(semi)dilute-(semi)dilute" regime to express the flow harmonics in terms of the density profile of the collision. We consider ultracentral collisions of deformed ions as a testbed for these comparisons because the difference between tip-on-tip and side-on-side collisions modifies the multiplicity dependence in both scenarios, even at zero impact parameter. We find significant qualitative differences in the multiplicity dependence obtained in the initial conditions+hydrodynamics scenario and the CGC scenario, allowing these collisions of deformed ions to be used as a powerful discriminator between models. We also find that sub-nucleonic fluctuations have a systematic effect on the elliptic and triangular flow harmonics which are most discriminating in $0-1\%$ ultracentral symmetric collisions of small deformed ions and in $0-10\%$ $\mathrm{d}^{197}\mathrm{Au}$ collisions. The collision systems we consider are $^{238}\mathrm{U}^{238}\mathrm{U}$, $\mathrm{d}^{197}\mathrm{Au}$, $^{9}\mathrm{Be}^{197}\mathrm{Au}$, $^{9}\mathrm{Be}^{9}\mathrm{Be}$, $^{3}\mathrm{He}^{3}\mathrm{He}$, and $^{3}\mathrm{He}^{197}\mathrm{Au}$.

Primary authors: WERTEPNY, Douglas (Ben Gurion University of the Negev); NORONHA-HOSTLER, Jacquelyn (Rutgers University); PALADINO, Noah (Rutgers State Univ. of New Jersey (US)); SIEVERT, Matthew (Los Alamos National Laboratory); RAO, Skandaprasad (Rutgers University)

Presenter: WERTEPNY, Douglas (Ben Gurion University of the Negev)

Session Classification: Parallel Session - Small systems II

Track Classification: Small systems