Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Octupole deformation of ^{208}Pb does not resolve the ultracentral v_2 to v_3 puzzle[1] PATRICK CARZON, University of Illinois Urbana-Champaign, SKANDA RAO, Rutgers University, MATTHEW SIEVERT, University of Illinois Urbana-Champaign, MATTHEW LUZUM, University of So Paulo, JACQUELYN NORONHA-HOSTLER, University of Illinois Urbana-Champaign — Recent measurements establish the sensitivity of ultracentral heavy-ion collisions to deformation parameters of non-spherical nuclei. In ^{129}Xe collisions, a quadrupole deformation of nuclear profile led to an enhancement of elliptic flow in the most central collisions. In ^{208}Pb collisions a discrepancy exists in similar centralities, where either elliptic flow is over-predicted or triangular flow is under-predicted by hydrodynamic models; this is known as the v_2-to-v_3 puzzle in ultracentral collisions. Motivated by low-energy nuclear structure calculations, we consider the possibility that ^{208}Pb nuclei could have an octupole deformation, which has the effect of increasing triangular flow in central PbPb collisions. Using data from ALICE and ATLAS, we revisit the v_2-to-v_3 puzzle in ultracentral collisions, including new constraints from recent measurements of triangular cumulant ratio $v_3\{4\}/v_3\{2\}$ and comparing two different hydrodynamic models. We find that data is consistent with an octupole deformation β_3 of ^{208}Pb less than 0.0375 and that addition of an octupole deformation does not significantly improve the agreement with data.

[1]US-DOE Nuclear Science Grant No. DE-SC0019175

Patrick Carzon
University of Illinois Urbana-Champaign

Date submitted: 25 Jun 2020 Electronic form version 1.4