

# Study of uranium nuclei deformation via flow-mean transverse momentum correlation at STAR

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1 Collective phenomena in heavy-ion collisions are very sensitive to initial ge-  
2 ometry including nuclei deformation effects. Recent hydrodynamic model cal-  
3 culations [1, 2] suggest that such deformation effects can be probed by studying  
4 event-by-event mean  $p_T$  ( $\langle p_T \rangle$ ) fluctuation and the correlation between mean  $p_T$   
5 and harmonic flow. In particular, due to prolate shape of the uranium nuclei,  
6 significant difference between Au+Au and U+U collisions is expected for these  
7 observables. This poster presents new measurements as a function of centrality  
8 from Au+Au at  $\sqrt{s_{NN}} = 200$  GeV and U+U at  $\sqrt{s_{NN}} = 193$  GeV collisions  
9 with the STAR detector. Results on the high-order cumulants of  $\langle p_T \rangle$  fluctu-  
10 ations and Pearson correlation coefficient between  $\langle p_T \rangle$  and harmonic flow  $v_n$   
11 from these two systems will be presented. The results will be compared with  
12 model calculations to constrain initial geometry as well as medium properties  
13 and final state effects in these collisions.

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[1] G. Giacalone, Phys. Rev. C102, 024901(2020).

[2] G. Giacalone, F.G. Gardim, J.N Hostler, J.Y. Ollitrault, arXiv:2004.09799 [nucl-th].