Exploring the quadrupole deformation in uranium nuclei at STAR

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| Collective phenomena in heavy-ion collisions are very sensitive to initial ge- |
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| ometry including nuclei deformation effects. Recent hydrodynamic model cal- |
| culations $[1, 2]$ suggest that such deformation effects can be probed by study- |
| ing event-by-event mean $p_T(\langle p_T \rangle)$ fluctuation and the correlation between the |
| mean p_T and harmonic flow (v_n) . In particular, due to prolate shape of the |
| uranium nuclei, significant difference between Au+Au and U+U collisions is |
| expected for these observables. Results on the high-order cumulants of $\langle p_T \rangle$ |
| fluctuations and Pearson correlation coefficient between $\langle p_T \rangle$ and v_n as a func- |
| tion of centrality from Au+Au at $\sqrt{s_{NN}} = 200$ GeV and U+U at $\sqrt{s_{NN}} =$ |
| 193 GeV collisions with the STAR detector will be presented. Precise data- |
| model comparison could be helpful to constrain the quadrupole deforamtion |
| parameter β_2 of uranium nuclei. |
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[2] Bjorn Schenke, Chun Shen and Derek Teaney, https://arxiv.org/pdf/2004.00690.pdf.

^[1] Giuliano Giacalone, https://arxiv.org/abs/2004.14463.