Contribution ID: **13** Type: **not specified**

How does Bayesian analysis infer the nucleon distributions in isobar collisions?

Relativistic collision of isobaric systems is found to be valuable in differentiating the nucleon distributions for nuclei with the same mass number. In recent contrast experiment of $^{96}_{44}$Ru $+^{96}_{44}$ Ru versus $^{96}_{40}$Zr $+^{96}_{40}$ Zr collisions at $\sqrt{s_{\rm NN}} = 200$ GeV, the ratios of multiplicity distribution, elliptic flow, triangular flow, and radial flow are precisely measured and found to be significantly different from unity, indicating the difference in the shapes of the isobar pair. In this work, we investigate the feasibility of nuclear structure reconstruction from heavy-ion collision observables.

We perform Bayesian Inference with employing the Monte-Carlo Glauber model as an estimator of the mapping from nuclear structure to the final state observables and to provide the mock data for reconstruction. By varying combination of observables included in the mock data, we find it plausible to infer Woods–Saxon parameters from the observables. We also observe that single-system multiplicity distribution for the isobar system, rather than their ratio, is crucial to simultaneously determine the nuclear structure for the isobar system.

Primary authors: 程, 艺琳 (上海应用物理研究所); SHI, Shuzhe (McGill University); MA, Yu-Gang (Shanghai Institute of Applied Physics, CAS); Prof. STOCKER, Horst (Frankfurt Institute for Advanced Studies); 周, 凯 (F)

Presenter: 程, 艺琳 (上海应用物理研究所)