Coulomb Dissociation Measurement in Isobaric Collisions at $\sqrt{s_{NN}} = 200$ GeV with the STAR Experiment

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Abstract

The STAR experiment collected large-statistics datasets from isobar collisions of $^{96}_{44}$Ru $+^{96}_{44}$ Ru and $^{96}_{40}$Zr $+^{96}_{40}$ Zr ions in 2018, offering a valuable opportunity to study Coulomb dissociation via Ultra-Peripheral Collisions (UPCs). Despite having identical mass numbers, these isobars exhibit distinct proton and neutron distributions, leading to variations in their charge and neutron density profiles. These differences are expected to manifest in distinct Coulomb dissociation processes, particularly in the neutron emission spectra which can be measured by the STAR Zero-Degree Calorimeters.

In this talk, we present new measurements on neutron emission from $^{96}_{44}$Ru+$^{96}_{44}$Ru and $^{96}_{40}$Zr+$^{96}_{40}$Zr collisions at $\sqrt{s_{NN}} = 200$ GeV. By analyzing these results, we aim to gain deeper insights into the nuclear structure properties of isobaric nuclei, including their implications for neutron skin. These findings contribute to a better understanding of the electromagnetic fields generated in heavy-ion collisions.