

Search for the Strange Dibaryons with Baryon Correlations in Isobar Collisions at STAR

Boyang Fu, Ke Mi, Kehao Zhang (for the STAR Collaboration)

Central China Normal University

1 Dibaryons, exotic states composed of six quarks, have long been a sub-
2 ject of interest in understanding the strong interaction beyond conven-
3 tional hadrons. Among these, strange dibaryons, which contain strange
4 quarks, offer an important role of studying the hyperon-nucleon (YN)
5 and hyperon-hyperon (YY) interactions. Of particular interest are
6 the spin-0 H ($S = -2$) and the spin-2 $N\Omega$ ($S = -3$) dibaryon state,
7 which are considered promising candidates for the strange dibaryon
8 bound state. In heavy-ion collisions, two-particle femtoscopy is a pow-
9 erful and unique method for extracting information about the spatio-
10 temporal properties of the source, characterising the final state inter-
11 actions (FSI), and searching for the possible bound states.

12 In this talk, we will present the measurements of baryon-baryon corre-
13 lation functions, including $p\Xi^-$, $\Lambda\Lambda$ and $p\Omega^-$ pairs, in Isobar colli-
14 sions (Ru+Ru, Zr+Zr) at $\sqrt{s_{NN}} = 200$ GeV. The correlation functions
15 are analyzed within the Lednický-Lyuboshitz formalism. The extracted
16 scattering length and effective range will be presented. Those measured
17 parameters will be compared with recent Lattice QCD and effective
18 theory model calculations. Most importantly, the physics implications
19 for the formation of strange dibaryon ($S = -2$ and $S = -3$) bound
20 state will be discussed.