# Feasibility study for the measurement of higher-order baryon-strangeness correlations in heavy-ion collisions

Takumi Furuya
University of Tsukuba

The event-by-event correlation between net baryon and net strangeness is expected to be sensitive to the system temperature and the degrees of freedom. Measurements of the second-order BS correlation have been reported from the BES-II program by the STAR collaboration [1], where the experimental results are consistent with both the lattice QCD and HRG calculations. Measuring the higher-order correlations may allow a cleaner distinction between these theoretical calculations. It was also suggested that the higher-order correlations could be sensitive to the QCD critical point [2]. The experimental measurements of the higher-order correlations, however, suffer from the combinatorial backgrounds from hyperon reconstruction and its lower detector efficiency compared to other primary particles, both of which need to be carefully addressed in the data analysis.

In this talk, the novel purity correction approach for higher-order hyperon number cumulants will be demonstrated by toy model calculations including the detector efficiency and combinatorial backgrounds. More detailed studies incorporating $p_T$ distribution and $p_T$-dependent detector efficiency on top of UrQMD calculations will also be presented. The changes in relative uncertainties under different $p_T$ acceptance will be investigated in order to discuss the feasibility of measuring higher-order BS correlations.

[1] H. Feng (STAR Collaboration), EPJ Web Conf. 364, 15006 (2026)
[2] Chin.Phys.C 45 (2021) 4, 044112