From hyperons to hypernuclei online

Y. Fisyak, H. Ke, I. Kisel, P. Kisel, G. Kozlov, S. Margetis, A. Tang, I. Vassiliev, M. Zyzak
(for the STAR Collaboration)

The fast algorithms for data reconstruction and analysis of the FLES (First Level Event Selection) package of the CBM (FAIR/GSI) experiment were successfully adapted to work on the High Level Trigger (HLT) of the STAR (BNL) experiment online. For this purpose, a so-called express data stream was created on the HLT, which enabled full processing and analysis of the experimental data in real time.

With this express data processing, including online calibration, reconstruction of tracks and short-lived particles, as well as search and analysis of hyperons and hypernuclei, approximately 30% of all the data collected within the Beam Energy Scan (BES-II) program in 2019-2021 has been processed on the free resources of the HLT computer farm.

A block diagram of the express data processing and analysis will be presented, particular features of the online calibration and application of the reconstruction algorithms, work under pile-up conditions at low collision energies in the fixed-target mode, and results of the real-time search for hyperons and hypernuclei up to ${}^{5}_{\Lambda}\mathrm{He}$ with $11.6 \cdot \boldsymbol{\sigma}$ at HLT will be presented and discussed. The high quality of the physics results of the express data analysis led to their status as preliminary in the STAR experiment.