

Application of the missing mass method in the fixed-target program of the STAR experiment

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As part of the FAIR Phase-0 program, the fast FLES (First-Level Event Selection) package algorithms developed for the CBM experiment (FAIR/GSI, Germany) has been adapted for online and offline processing in the STAR experiment (BNL, USA). Using the same algorithms creates a bridge between online and offline modes. This allows combining online and offline resources for data processing.

Thus, an express data production chain was created based on the STAR HLT farm, which extends the real-time functionality of HLT all the way down to physics analysis. The same express data production chain can be used on the RCF farm, which is used for fast offline production with the same tasks as the extended HLT. The express analysis chain does not interfere with the standard analysis chain.

An important advantage of express analysis is that it allows you to start calibration, production, and analysis of the data as soon as it is available. Therefore, the use of express analysis can be useful for BES-II data production and help accelerate scientific discovery by helping to get results within a year after data collection is complete.

Here we describe and discuss in detail the missing mass method that has been implemented as part of the KF Particle Finder package for searching and analyzing short-lived particles. Features of the application of the method within the framework of express real-time data processing are given, as well as the results of real-time reconstruction of short-lived particle decays in the BES-II environment.