

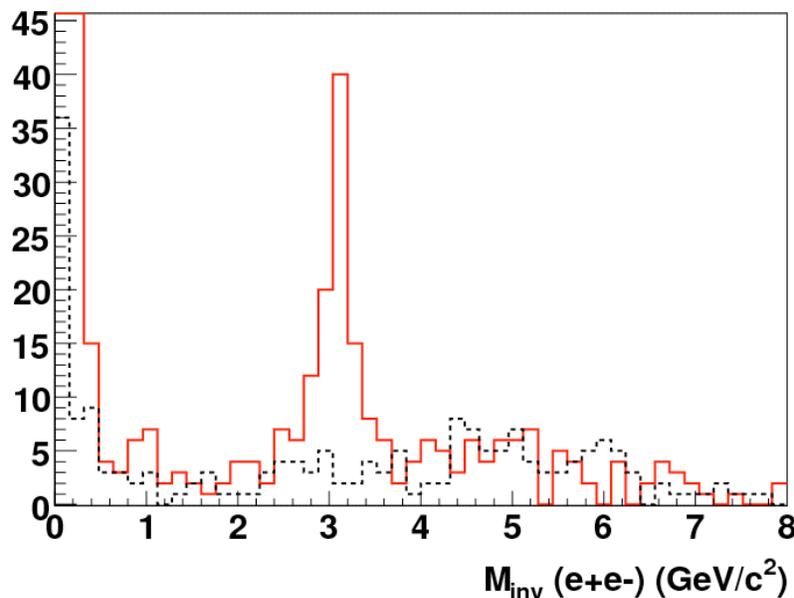
A High-Level Online Tracking Trigger (HLT)

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We propose to implement a high-level online tracking trigger at STAR, which can be also used at future experiments at eRHIC. As RHIC is delivering x40 higher luminosity during RHIC II era, STAR can in principle take ~4 billion events per year, which is beyond STAR's projected processing capability. Thus it becomes critical to have a highly effective trigger system to reduce the rate of events to tape, and fully take advantage of the high luminosity during RHIC II. Having a HLT will also allow STAR's other subsystems, currently being upgraded for RHIC II, to operate at their full potentials.

STAR can address a lot of interesting physical topics which are otherwise difficult without HLT. Examples include, i) identified particle spectra which can allow us to understand how QGP hadronize, ii) heavy flavor flow to answer the question of the mechanism of fast thermalization, iii) heavy flavor production at large p_t to probe the energy loss of the medium, iv) exotic phenomena like the production of (anti)heavy-nuclei, etc.

Below we show that our preliminary version of HLT can successfully reconstruct J/ψ from real data (d+Au collisions at 200 GeV). With this trigger, the rejection rate is 99% from Level zero triggered events.



In the near future we expect significant R&D so that we can increase the speed of HLT by parallel computing. A FTE at postdoc level is needed. We hope this project can be supported, and in the future can be naturally integrated as part of eRHIC, for which the luminosity is high and a HLT will be much beneficial.