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Energy Dependence of the Width of the Pion Rapidity Density Distribution from STAR CHRISTOPHER FLORES, University of California Davis, STAR COLLABORATION — By analyzing events with longitudinally displaced vertices the STAR Collaboration will measure the width of the rapidity-density distribution of negatively charged pions. The ratio of the measured width to the width predicted by Landau hydrodynamics is interpreted analogously to the speed of sound and has previously been seen to exhibit a minimum as a function of center-of-mass energy [1]. Because the speed of sound is sensitive to the bulk properties of the medium through which it propagates, finding non-monotonic behavior in this ratio as a function of center-of-mass energy is suggestive of a change in the equation of state of the medium. The data used in this analysis cover center-of-mass energies of $\sqrt{s_{NN}} = 3.0, 3.5, 4.5, 11.5$ and 19.6 GeV. The lowest three energies were obtained from fixed-target interactions between heavy beam-halo nuclei and the aluminum vacuum pipe, while the remaining energies were obtained from Au+Au collider events. Here, we discuss the performance of the STAR detector for measuring these types of events, the methodology utilized in the analysis, and the measured dependence of the width of the pion rapidity-density distribution as a function of center-of-mass energy.

[1] H. Peterson, M. Bleicher, Proc. of Science arXiv:nucl-th/0611001

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