

Collision energy and system size dependences of ρ meson production from STAR experiment

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Abstract

1 Searching for the QCD phase transition and possible chiral phase transition is one of the main
2 purposes of the RHIC-BES program. Vector meson ρ can be produced at different stages of heavy-
3 ion collisions, and are expected to carry information on the hot and dense medium. Modification
4 of the ρ meson in the hot and dense medium has been proposed as a possible signature of the QCD
5 phase transition from nuclear matter to a de-confined plasma of quarks and gluons, which is also
6 expected to be accompanied by the restoration of the approximate chiral symmetry. By studying
7 the collision energy and system size dependences of the ρ meson production, we may gain insights
8 into those physics. We report the invariant mass spectra of the ρ meson through the π - π channel
9 in p+p, p+Au, d+Au, and Au+Au collisions at 200 GeV from the STAR experiment. We compare
10 the mass spectra in different collision systems to extract possible modifications of the ρ meson mass
11 and width, and discuss implications of our results.