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Probing QCD matter via K^{*0} and ϕ resonance production at RHIC

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Relativistic heavy-ion collisions offer a unique opportunity to study the properties of nuclear matter at very high temperature and/or high density. It is believed that resonances (like K^{*0}, ϕ) are excellent probes for the medium created in heavy-ion collisions. Particularly, K^{*0} (lifetime $\sim$ 4 fm/c) and ϕ (lifetime $\sim$ 42 fm/c) can be used to study the bulk properties of QCD matter produced in heavy-ion collisions. Because of a short lifetime, K^{*0} decays inside fireball and its decay daughters interact with the medium. Therefore, properties of K^{*0} can be modified by in-medium interactions. On the other hand, because of a long lifetime, the ϕ meson will mostly decay outside of the fireball and therefore its daughters will not have much time to rescatter in the hadronic phase. Hence, a comparison of the properties (e.g. yields, spectra, and elliptic flow) of K^{*0} and ϕ is interesting. In addition, ϕ-meson is considered to be a clean probe of pre-hadronic collectivity, since hadronic interaction cross section of ϕ meson is expected to be very small.
In this talk, we will present invariant yields of K^{*0} and ϕ as a function of beam energy ($\sqrt{s_{NN}}$=7.7-200 GeV) measured by the STAR experiment. Resonance to non-resonance particle ratios (ϕ/K and K^{*0}/K) will be shown as a function of centrality for various beam energies. Elliptic flow (v_2) of K^{*0} and ϕ and directed flow (v_1) of ϕ meson will be presented for different beam energies.

Collaboration name

STAR Collaboration

Track

Hadron Resonances

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