## Strangeness in Quark Matter 2019



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## Probing QCD matter via $K^{*0}$ and $\phi$ 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  $K^{*0}$ ,  $\phi$ ) are excellent probes for the medium created in heavy-ion collisions. Particularly,  $K^{*0}$  (lifetime ~ 4 fm/c) and  $\phi$  (lifetime ~ 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  $\phi$  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  $\phi$  is interesting. In addition,  $\phi$ -meson is considered to be a clean probe of pre-hadronic collectivity, since hadronic interaction cross section of  $\phi$  meson is expected to be very small.

In this talk, we will present invariant yields of  $K^{*0}$  and  $\phi$  as a function of beam energy ( $\sqrt{s_{NN}}$ =7.7-200 GeV) measured by the STAR experiment. Resonance to non-resonance particle ratios ( $\phi/K$  and  $K^{*0}/K$ ) will be shown as a function of centrality for various beam energies. Elliptic flow ( $v_2$ ) of  $K^{*0}$  and  $\phi$  and directed flow ( $v_1$ ) of  $\phi$  meson will be presented for different beam energies.

## **Collaboration name**

STAR Collaboration

## Track

Hadron Resonances

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