Thermal dielectron measurements in Au+Au collisions at $\sqrt{s_{NN}} = 7.7$, 14.6, and 19.6 GeV with the STAR experiment

Yiding Han (Rice University)
for the STAR Collaboration

Dielectrons emitted during the evolution of the hot and dense QCD medium created in relativistic heavy-ion collisions offer an effective way to probe the medium properties, as they do not interact via the strong force. The rate of the dielectron emission is proportional to the medium's electromagnetic spectral function. In the dielectron mass range from 400 MeV/c^2 to 800 MeV/c^2, the spectral function probes the in-medium ρ meson propagator which is sensitive to the medium's properties including the total baryon density and the temperature. Meanwhile, the low energy range of the spectral function provides information about the medium's electrical conductivity. Therefore, by measuring thermal dielectron production, we can study the microscopic interactions between the electromagnetic current and the medium.

The STAR experiment has recorded large datasets of Au+Au collisions during the Beam Energy Scan Phase-II (BES-II) program, spanning center-of-mass energies ($\sqrt{s_{NN}}$) from 3.0 to 19.6 GeV with detector upgrades that benefit the dielectron measurement via extended transverse momentum and rapidity coverages as well as enhanced particle identification capability. In this talk, we will report on the measurements of thermal dielectrons produced in Au+Au collisions at $\sqrt{s_{\rm NN}} = 7.7$, 14.6, and 19.6 GeV using the STAR experiment.