

Measurement of heavy-flavor electron production in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV at STAR

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Abstract

1 Studying heavy-flavor quarks can enhance our understanding of parton inter-
2 actions with the Quark-Gluon Plasma (QGP). Due to their significant mass,
3 heavy quarks (charm and bottom) are primarily produced during the early
4 stages of high-energy heavy-ion collisions, where hard scatterings dominate,
5 allowing them to experience the entire evolution of the QGP. One approach
6 to investigate heavy-quark transport properties in QGP is through the mea-
7 surement of heavy-flavor electrons (HFE), which are electrons emitted from
8 the semi-leptonic decays of heavy-flavor hadrons.

9 In this contribution, we present measurements of HFE yield and central-
10 to-peripheral nuclear modification factor as functions of transverse momen-
11 tum (p_T) in Au+Au collisions at $\sqrt{s_{NN}} = 54.4$ GeV by the STAR ex-
12 periment - making this the first such result at this energy. Strong HFE
13 suppression has been observed in central Au+Au collisions at $\sqrt{s_{NN}} = 200$
14 GeV. This measurement at energies below the RHIC top energy provides
15 new insights into the heavy-quark transport coefficient dependence on QGP
16 temperature and collision system baryon chemical potential, and comple-
17 ments existing results at $\sqrt{s_{NN}} = 200$ GeV and the recent HFE elliptic
18 flow measurements at $\sqrt{s_{NN}} = 54.4$ GeV. The obtained results will also be
19 compared with available model predictions.