

# 10th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions



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## Heavy Quark Radiative Energy Loss in a Non-perturbative Approach

*Tuesday, 2 June 2020 13:15 (20 minutes)*

The energy loss of heavy quarks propagating through the quark-gluon plasma (QGP) is expected to transit from an elastic regime at low and intermediate momenta to a radiative regime at high momenta. For the latter, a significant amount of energy dissipates by radiating rather soft gluons that can strongly interact with the surrounding medium through non-perturbative many-body effects. In order to investigate these effects, we extend a T-matrix approach [1-3], which describes the equation of state of QGP and yields a small shear viscosity and heavy-quark diffusion coefficient, to include the radiative energy loss of heavy quarks. We analyze several different cases by turning on/off specific non-perturbative many-body effects, to illustrate how the underlying partonic spectral functions and drag coefficients affect the radiation properties, such as the emitted power spectra and the pertinent transport coefficient,  $\hat{q}$ . In addition, by scrutinizing the power spectrum, we can test the accuracy of the commonly employed soft and collinear approximations for the kinematics of the radiated gluons. Furthermore, we implement the transport coefficients including both the elastic and radiative contributions into a realistic transport simulations. The comparison of the results to other approaches and experiments will be discussed.

- [1] S. Y. F. Liu and R. Rapp, (2016), arXiv:1612.09138 [nucl-th].
- [2] S. Y. F. Liu and R. Rapp, Phys. Rev. C 97, 034918 (2018).
- [3] S. Y. F. Liu, M. He, and R. Rapp, (2018), Phys.Rev. C99, 055201 (2019).
- [4] S. Y. F. Liu, and R. Rapp, (2020), in preparation.

### Collaboration (if applicable)

### Track

Heavy Flavor and Quarkonia

### Contribution type

Contributed Talk

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