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Electromagnetic emissivity of hot and dense matter

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The QCD matter produced initially in ultra-relativistic nucleus-nucleus collisions is expected to represent a high temperature plasma, which should be evidenced in its electromagnetic radiation. We analyze the production of real and virtual photons from the strongly-coupled QGP in the initial stages of the collisions as well as the ('corona') radiation from the interacting mesons and baryons after hadronization using the parton-hadron-string dynamics (PHSD) transport approach. The description of the bulk evolution in the microscopic PHSD approach is independently controlled by abundances, spectra and flow of final particles, which is found to be in agreement with experimental observation. In this contribution, we will provide a brief description of the relevant physics assumptions within the PHSD approach and give details on the implementation of the photon radiation in partonic and hadronic interactions and decays. Our calculations successfully describe the production of photons and dileptons in proton-proton as well as nucleus-nucleus collisions from SIS to RHIC and LHC energies.

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