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Universal Parametrization of Thermal Photon Production in Hadronic Matter[1] MATTHEW HEFFERNAN, PAUL HOHLER, Cyclotron Institute, Texas A&M University, RALF RAPP, Cyclotron Institute and Department of Physics and Astronomy, Texas A&M University — As the production of photons and dileptons from high-energy collisions is able to provide information on the high temperature and high density phases of nuclear matter, an improved and universal parametrization of the rather involved microscopic calculations is key to honing the theory behind this production. We focus on photon emission rates from hadronic many-body calculations of the in-medium rho spectral function, which includes the effects of baryons and antibaryons. Across a range of temperatures from 0.1 to 0.18 GeV and baryon chemical potentials from 0 to 0.4 GeV, a parametrization of thermal photon rates for energies from 0.2 to 5 GeV is numerically determined through the use of nested fitting methods. This provides a fully functional description of thermal photon production largely within an unprecedented 20% of the calculated values from the spectral function, a significant reduction in error from available parametrizations. The contribution of photons and dileptons from pion-pion bremsstrahlung is evaluated for the importance of its contribution. The functional form, coupled with the comparison to the bremsstrahlung production of thermal photons, will provide a baseline for guiding future studies.

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