

## Photon kinetics in plasmas

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We present a kinetic theory of radiative processes in many-component plasmas with relativistic electrons and nonrelativistic heavy particles. Using the non-equilibrium Green's function technique in many-particle QED, we show that the transverse field correlation functions can be naturally decomposed into sharply peaked (non-Lorentzian) parts that describe resonant (propagating) photons and off-shell parts corresponding to virtual photons in the medium. Analogous decompositions are obtained for the longitudinal field correlation functions and the correlation functions of relativistic electrons. We derive a kinetic equation for the resonant photons with a finite spectral width and show that the off-shell parts of the particle and field correlation functions are essential to calculate the local radiating power in plasmas and recover the results of vacuum QED. The influence of plasma effects on radiative processes is discussed.