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### **Kinetic photon transport in low-temperature plasma simulations<sup>1</sup>**

ANDREW FIERRO, Sandia National Laboratories , University of New Mexico

Light emission from plasmas is one of the defining characteristics from plasma discharges. This light is often used to elucidate fundamental plasma properties such as gas constituents and plasma temperature. Furthermore, self-produced light emission from the plasma source is often energetic enough to influence the plasma discharge itself through interaction with background gas atoms and molecules or with the surfaces that contain the plasma. As an example, it is well-known that photoionization plays an important role in the propagation of positive streamers. To address this and other photon-driven phenomena, a method has been developed to incorporate photons in a particle-in-cell, direct simulation Monte Carlo code that accounts for several line broadening mechanisms. This method allows for the incorporation of energy-dependent photo-processes, such as photo-ionization and photo-emission, into particle-based plasma simulations. This talk will discuss the numerical method for this discrete tracking of photons and several examples of the influence of photons on transient discharge formation.

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