

Abstract Submitted
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Interaction between liquid droplets and atmospheric pressure discharge¹ M.M. IQBAL, M.M. TURNER, Dublin City University, Ireland — We present a multi-dimensional model for two-phase flow. The two phases are liquid and plasma, described by a two-dimensional time-dependent fluid model and a stochastic liquid droplet model. We describe the evolution of major parameters, such as temperature and radial and axial velocities of liquid droplets. The behaviour of liquid droplets in atmospheric pressure discharge are discussed in detail by considering collision mechanisms, such as grazing, coalescence, and distortion of liquid droplets during transport in helium gas. The temporal distributions of droplet counts are compared before and after collisions, which provides insight into the effect of droplet collisions on the characteristics of atmospheric pressure discharges. The evolution of spatial profiles of charge carriers are examined as liquid droplets evaporate. The effect of material evaporated from liquid droplets on the plasma characteristics is appreciable.

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