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Liquid Droplets in Atmospheric Pressure Plasmas MUHAMMAD IQBAL, MILES TURNER, NCPST, DCU — Atmospheric pressure plasmas have many applications, ranging from industrial processes to medical treatments. The behaviour of such droplets, once immersed in the plasma, may be important. For example, in chemical vapour deposition, which is the immediate motivation for the present work, it may be desirable for droplets to evaporate into the plasma, and most undesirable for partially evaporated droplets to reach the substrate. In this paper, we will discuss the behaviour of liquid droplets in the atmospheric pressure plasmas environment, with a focus on particles with radii in the micron range. We will consider charging of the droplets by interaction with electrons and ions, transport of droplets through the plasma, and evaporation of the droplets during their passage. We note that although charging and transport of small bodies has been studied extensively in connection with dusty plasmas, and the regime of concern to us has some distinctive features, which we will discuss. The focus of this discussion will be on models to describe droplet charging, which necessarily differ from those usually used for dusty plasma, on describing the rate of evaporation, which is in the regime of the nonequilibrium Langmuir-Knudsen law, and on the implications for describing droplet transport.

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