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Branching Patterns in Multi-Atmospheric Pressure Corona Discharges With Positive and Negative Bubbles NATALIA YU. BABAEVA, University of Michigan, MARK J. KUSHNER, Iowa State University — The branching of streamers occurs in most high pressure gases and liquids. One mechanism for streamer branching may be inhomogeneities in the path of the streamer – a solid particle, aerosol or a region of different density, one extreme being a bubble in a liquid. To lend insights into how positive (an included volume of higher density) or negative (volume of lower density) bubbles might produce branching in high pressure gases, we computationally investigated the role of randomly distributed bubbles on the propagation of a streamer in atmospheric (and greater) pressure humid air. The plasma hydrodynamics model, *nonPDPSIM*, uses an unstructured mesh to simultaneously resolve reactor scales and bubbles. Radiation transport, and photoionization in bubbles are included by implementing a Green's function propagator. Positive streamers encountering a single slightly negative bubble in its path tends to converge into the bubble that has a higher rate of ionization. Streamers encountering slightly positive bubbles tend to branch around the regions of lower ionization. Photoionization producing electrons in remote highly negative bubbles which have a proportionally larger E/N can lead to remote sources of plasma that launch their own streamers. If the bubbles are within a few photon absorption lengths of the streamer (or other bubbles), these streamers may link together.

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