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Comparison of initial seed electron generation mechanisms in kinetic simulations of positive streamers CHRISTOPHER MOORE, ANDREW FIERRO, ROY JORGENSON, LAURA BIEDERMANN, PAUL CLEM, HAROLD HJALMARSON, MATTHEW HOPKINS, RAYMOND MARTINEZ, Sandia Natl Labs — Positive streamer simulations typically resort to initiation by artificially seeding a small region with an initial plasma. However, in order to simulate observed variations in breakdown voltages and times in pulsed voltage experiments [1], a more physical model for the generation of the initial plasma/electrons is necessary. This work will investigate several models of generating the initial seed plasma in an air-filled gap with a dielectric present: a "typical" artificial initial plasma, ionization of the background air due to cosmic rays, field emission from the dielectric, and simulation of radiation incident on surfaces prior to applying the voltage resulting in diffuse e^- and O_2^- densities. 2D axisymmetric PIC-DSMC simulations using a detailed e^--air collision model including field-dependent detachment and photon transport [2] will be compared to experiments of an air gap with a dielectric cylinder and a 10 GV/s applied potential [1]. [1] L.B. Biedermann *et al., Dielectric-Directed Surface Flashover under Atmospheric Conditions*, PPC-O-2-6, 2015. [2] C.H. Moore, *et al.*, *Development of PIC-DSMC Air Breakdown Model in the Presence of a Dielectric*, 43rd IEEE ICOPS, June 19-23, 2016. Sandia National Laboratories is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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