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Plasma-chemical simulation of negative corona near the inception voltage[1] FRANCISCO PONTIGA, FRANCISCO J. DURAN-OLIVENCIA, ANTONIO CASTELLANOS, University of Seville — The spatiotemporal development of Trichel pulses in oxygen between a spherical electrode and a grounded plane has been simulated using a fluid approximation that incorporates the plasma chemistry of the electrical discharge. Elementary plasma processes, such as ionization, electron attachment, electron detachment, recombination between ions and chemical reactions between neutral species, are all included in a chemical model consisting of 55 reactions between 8 different species (electrons, O_2^+, O_2^-, O_3^-, O^-, O_2, O, O_3). Secondary emission at the cathode by the impact of positive ions and photons is also considered. The spatial distribution of species is computed in three dimensions (2D-axysimmetrical) by solving Poisson's equation for the electric field and the continuity equations for the species, with the inclusion of the chemical gain/loss rate due to the particle interaction. The results of the simulation reveal the interplay between the different negative ions during the development of every Trichel pulse, and the rate of production of atomic oxygen and ozone by the corona discharge.

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Francisco Pontiga
University of Seville

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