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Electron-induced breakdown in gases in RF fields ZORAN PETROVIC[1], MARIJA PUAC, Institute of Physics, University of Belgrade, ANTONIJE DJORDJEVIC, School of Electrical Engineering, University of Belgrade, DRAGANA MARIC, GORDANA MALOVIC, Institute of Physics, University of Belgrade — Electron avalanches are the necessary first step in transition from an insulating gas to electrical discharge and formation of plasmas. In DC and low frequency fields, a feedback mechanism is needed to support a self-sustained discharge. In RF fields electrons provide the feedback and thus one only needs the contribution of electrons to produce a growing sequence of avalanches that increase the space charge and lead to plasma. Achievement of non-equilibrium atmospheric-pressure plasmas, as needed for applications in medicine and agriculture, requires a good knowledge of the RF breakdown in order to produce the non-equilibrium plasma. As the breakdown occurs at zero space charge, one may use swarm techniques such as the Monte Carlo simulation. Using the standard swarm techniques, we have established an explanation of the breakdown curves, scaling, and the basic phenomenology of the RF breakdown through the role of elastic and inelastic collisions in formation of the electron energy distribution function. We have found that ionization and attachment form moving spatially dependent fronts, which reshape the ensemble of electrons and affect the basic physical processes and their spatial profiles. Supported by MESTDRS OI171037 and III41041 and SASA 133 and 155 projects.

[1]Also at Serbian Academy of Sciences and Arts

Zoran Petrovic
Institute of Physics

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