



Contribution ID: 566

Type: Oral

NUMERICAL EVALUATIONS OF ENERGY-DEPENDENT SECONDARY ELECTRON EMISSION BY INCIDENT ELECTRONS AND CHARGED IONS*

Tuesday 25 June 2019 10:45 (15 minutes)

Multipactor is known to jeopardize the performance of vacuum electronic devices and high-power microwave systems. Though most treatments have focused on the secondary emission from incident primary electrons, the overall process is quite complicated. It involves not just the role of primary electrons, but also the effects of incident ions that might produce secondary electrons and/or cause heating of the surface layer due to the inelastic collisions as they enter the target electrode. Here we assess the secondary electron yield (SEY) as a function of the incident energy and angle of primary electrons. In addition, the potential for secondary electron emission by incident ions is also probed. Monte Carlo simulations are used along with the Furman-Pivi [1] formulation for electron-initiated SEY. Helium is used as a simple example ion. Finally, temperature increases produced at and near the electrode surface due to ion impact is also modeled based on Molecular Dynamic simulations. The values form the basis for temperature driven out-gassing from the surface, a process that will also be treated with discussion of results.

[1]. M. A. Furman and M. T. F. Pivi, "Probabilistic model for the simulation of secondary electron emission," Phys. Rev. Accel. Beams, vol. 5, no. 12, p. 124404, 2002.

- This work was supported by an AFOSR Grant # FA9550-18-1-0062 on "Multipactor and Breakdown Susceptibility and Mitigation in Space-Based RF Systems", and the Office of Naval Research (N00014-18-1-2382).

Authors: Hieu K. A. Nguyen, Xiaoli Qiu, Joy Acharjee, John Mankowski, James C. Dickens, Andreas A. Neuber and Ravi P. Joshi

Authors: Mr NGUYEN, Hieu (Texas Tech University); Ms QIU, Xiaoli (Texas Tech University); Mr ACHARJEE, Joy (Texas Tech University); Prof. MANKOWSKI, John (Texas Tech University); Prof. DICKENS, James C. (Texas Tech University); Prof. NEUBER, Andreas (Texas Tech University); Prof. JOSHI, Ravindra (Texas Tech University)

Presenter: Mr NGUYEN, Hieu (Texas Tech University)

Session Classification: 2.6 Non-Fusion Microwave Systems and 2.7 Microwave Plasma Interaction I

Track Classification: 2.6 Non-Fusion Microwave Systems