Abstract Submitted
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Experimental Measurements and DFT-Based Modeling of Secondary Electron Yield of Materials of Interest to High Power Vacuum Electron Devices[1] T. MALIK, I. GONZALES, M. GILMORE, S. PORTILLO, R. GUTIERREZ, R. JOHNSON, E. SCHAMILOGLU, University of New Mexico — Vacuum electron devices can experience degraded performance, including complete failure, due to multipactor breakdown (MPB). This is tied to the production and acceleration of secondary electrons due to electron impact and coupling to the RF fields. In order to better understand MPB with materials of interest, controlled measurements and density-functional theory (DFT)-based modeling of SEY are being conducted. SEY from electron bombardment in the low energy regime (10 eV to 1 keV) as a function of incident angle for Cu, Monel, Kovar, Invar, Al, and Fe (Cu Plated) has been measured. In addition, various surface cleaning protocols will be tested. The ability of DFT to reproduce the frequency dependent dielectric function of copper has been tested. The DFT data can be used to demonstrate that SEY can be predicted from first principles using Monte Carlo simulations. As a first step, two DFT codes Abinit and Vasp, both based on pseudopotentials and plane wave basis sets, have been used to calculate the frequency dependent dielectric function and energy loss function of copper. The best protocol for the calculation of these functions was obtained by comparing the computed and experimental values determined for copper in the optical limit.

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Mark Gilmore
University of New Mexico

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