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MODELING AND SIMULATION OF MULTIPACTOR DISCHARGE ON DIELECTRIC WINDOW UNDER HPM IN VACUUM

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Multipactor discharges on dielectric window seriously limits the generation and transmission of high power microwaves (HPM), which blocks the development of microwave technology. In order to understand its physical mechanism deeply, a simulation model based PIC Monte Carlo is built in this paper. The influences of microwave electromagnetic field and dielectric surface electrostatic field are considered in this model. During simulation, the realistic secondary electron yield curves as input are used, and the distributions in the emission velocities and emission angles of the secondary electrons are also taken into account. The movement trajectories of electron under complex field are obtained by simulation. The influences of different emergence angles and microwave electromagnetic parameters to electron movement are also considered. It is found that the emergence angles of electron have significant effect on the movement of electron, and impact energy will be increased and return time will be reduced as the increase of electric field amplitude, and the impact energy and return time will oscillate with cycles for the change of the phase of electric field. The change of multipactoring electrons number and electrostatic field are also studied by simulation. The result shows that electrons number and electrostatic field both oscillate with twice microwave frequencies periodically for the change of time. The reason of this phenomena is explained.

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