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Numerical studies of multipactor in dielectric-loaded accelerator structures[1] OLEKSANDR SINITSYN, GREGORY NUSINOVICH, THOMAS ANTONSEN, IREAP, University of Maryland — Multipactor (MP) is known as the avalanche growth of the number of secondary electrons emitted from a solid surface exposed to an rf electric field under vacuum conditions. MP may occur in various microwave and rf systems such as microwave tubes, rf windows and launchers, accelerating structures, and rf satellite payloads. In this work we present results of MP analysis in dielectric-loaded accelerator (DLA) structures. The starting point of our work was experimental and theoretical studies of DLA structures jointly done by Argonne National Laboratory and Naval Research Laboratory (J. G. Power et al., Phys. Rev. Lett. 92, 164801 (2004); J. G. Power et al., AIP Conf. Proc. 877, 362 (2006)). In the theoretical model developed during those studies the space-charge field due to the total number of particles is taken into account as a parameter. We perform our studies using a self-consistent approach with the help of time-dependent two-dimensional code developed at the University of Maryland (O. V. Sinitsyn et al., Phys. Plasmas 16, 073102 (2009)). Results include analysis of MP evolution at an early stage, detailed studies of individual electron trajectories, analysis of MP onset time under various conditions and comparison of some results with the experimental data.

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