

Multipactor Suppression in X-band Waveguide Utilizing Surface Coatings

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Multipactor (MP) is a phenomenon where electron multiplication via secondary electron emission (SEE) can occur in waveguides under vacuum conditions. The effects of multipactor can lead to component damage or destruction. This study will explore techniques to suppress MP via modification of the secondary electron yield (SEY) using surface coatings and surface treatments.

This study applies a previously developed X-band high power microwave system and TE₁₀ impedance transformer to test and compare MP formation in a pure copper sample versus samples with surface coatings and treatments. Surface coatings are of particular interest to this research as they can shift the first crossover point to higher primary electron energies, thus potentially improving the longevity of space-based communication systems and accelerators. The maximum threshold power achievable by such systems may consequently be further increased. Experimental findings are reported and compared against simulations and available literature.

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