

The Simulation Calculations And Dielectric Characteristics Investigation of a Hybrid Dielectric-Iris-Loaded Traveling Accelerating Structure

C.-F. Wu, USTC/NSRL, Hefei, Anhui

Abstract

Mafia code has been used to calculate the RF properties versus the geometric parameters and dielectric permittivity of the X-band ($f=9.37$ GHz) hybrid dielectric-iris-loaded travelling accelerating structure. The simulation results show that when the range of the permittivity is about 59 and the geometric parameters are optimized, the new structure may have lower ratio (about 1) of peak surface electric field at the iris to axial accelerating electric field, while r , Q , r/Q of the new structure being comparable to iris-loaded accelerating structure. The experimental investigation of the permittivity of the dielectric (ceramic) has been made by using the cavity perturbation technique. The results show that the permittivity of the ceramic is about 5.8 at the X-band and its stability is good. The above results will be applied to the design of the new accelerating structure, which may be a potential candidate of high gradient Linear accelerator.

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