Abstracts

Single-Particle Motion in a Large-Orbit Gyrotron

The perturbation on the zeroth-order motion of individual particles in an axis-encircling, large-orbit gyrotron due to a constant-amplitude TE/sup 0//sub ln/ electromagnetic (em) wave is studied analytically and numerically. Single-particle phenomena such as phase bunching and trapping are studied as a function of the frequency difference between the cyclotron motion and the em wave. Analytic solutions are developed for both trapped and untrapped particles and are compared with exact numerical results. The analytic solutions yield the percentage of trapped particles and an expression for the minimum em field necessary for trapping. It is shown that energy loss depends on first-order terms for trapped particles and on second-order terms for untrapped particles. A specific set of parameters is used to display the results.

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