Abstract

Here we embark on a journey to find the analytical expression for the inter-cell coupling slot of a coupled cell accelerating cavity. First weakly coupled oscillators are discussed. Effects of coupling are discussed. Coupling constant k_c is discussed in detail. Secondly, the theory of weakly coupled oscillators is generalized and its applications regarding practical problems are discussed. It is found that the disk loaded wave guide has the same dispersion relation as weakly coupled oscillators. Therefore, we can apply the theory of weakly coupled oscillators to the disk loaded wave guide and make useful applications of the theory regarding different design parameters of the wave guide especially the coupling slot. The theory analytically is applicable to a disk loaded waveguide having simple geometry. By applying the theory of weakly coupled resonators, we have derived an expression connecting the coupling slot radius 'a' with the other design parameters. The only required parameter is the frequency of operation ω of the accelerator; rest can be extracted from the derived expression.