

Superconducting RF Development: Search for the Optimal Shape of Cells for a TESLA-like SC Accelerating Section

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Abstract

It has been proposed that significant improvement can be made on the current superconducting accelerating cavities scheduled to be used for the linear accelerator project TESLA by exploring a different type of cavity geometry. By allowing the profile line of the cell to be constructed using only a series of arcs of conjugated circles, the equations lend themselves to a straightforward transition to a more complicated model. Using the SuperLANS set of code which numerically determines the cavity mode frequencies and their electromagnetic fields, we can analyze different geometries and compare them with the current TESLA cavities. Discussed here is the optimization of a model which uses four arcs to describe a TESLA-like SC cavity. The results of this optimization have led us to believe that the analysis of a more complicated model using eight or perhaps ten arcs to depict the profile line of a cell is a worthwhile task.