

Design of L-Band 10MW High Efficiency Multibeam Klystron

This paper describes the design and simulation of the complete electron gun, electromagnet and RF structure of 10 MW High efficiency (75%) multibeam (06 beams) klystron for high energy physics applications. At an acceleration potential of 115 kV, a space charge beam current of total 132A is achieved with an average cathode loading of less than 3.36 A/cm². The maximum surface electric fields at beam optics and at the high voltage ceramic seal are less than 7 kV/mm and 1.13 kV/mm, respectively. With an average beam radius of 7 mm, the electron beam is successfully transported to the interaction structure with a ripple rate of 3.36%. The 3-D beam dynamic simulation results (Eff.=70%), in CST agrees with the results of 1D AJDISK (Eff.=75%), 2-D KLYC (Eff.=72%), 2.5D EMSYS (Eff.=72%), simulations.

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