

Study and comparison of different Slow Wave Structures (SWS) for a W-band Traveling Wave Tube (TWT).

This poster presents possible solutions for a W-band Travelling Wave Tube (TWT) in space satellite applications. Various devices are commonly used in this context and we have analysed folded waveguide configurations as potential Slow Wave Structures (SWS) operating between 95 and 100 GHz. In order to increase the TWT performance, two possible solutions with identical cathode areas were considered: one with a circular beam and the other with a rectangular one. The simulations were carried out using CST Studio Suite.

The circular beam structure showed a gain of 7.3 dB and a bandwidth of -3 dB at 4.5 GHz, with a periodic structure of 18 periods. The device achieved these values with a cathodic voltage of 18.6 kV and a current density of 1.9 A/mm^2 . The sheet beam, with the same number of periods as the previous one, showed double the gain and a bandwidth of 5.5 GHz, supplied with a voltage of 17.8 kV and a current density of 1.7 A/mm^2 . These preliminary simulation results provide a solid basis for promising improvements.

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