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2P04 - Development and testing of the 190 GHz dual mode OAM gyrotron with axial output

Tuesday 25 June 2019 13:00 (1h 30m)

We presented the design of a 190 GHz dual mode OAM gyrotron with axial output configuration for a prototype experiment of Orbital Angular Momentum (OAM) communication. A mode pair of second harmonic modes ($TE_{8,3}/TE_{11,2}$) is excited at 28/35 kV, 5A electron beam input in the presence of a uniform magnetic field of 3.56 T. It incorporates a perturbed cavity with two sinusoidal perturbations to excite higher order axial modes with the suppression of spurious fundamental modes. Cavity simulation has been performed by in-house developed code "UNIST Gyrotron Design Tool (UGDT)". It suggests the generation of the ~30 kW power in both the modes at their respective operating voltages. Switching between these modes is to be carried out by tuning the applied cathode voltage from 33.5 kV to 36 kV. Moreover, these mode-pair is directly radiated into free space from a raised cosine taper which is placed after collector to reduce its divergence. It incorporates a quartz RF window with a thickness of 4.87 mm to achieve more than 90% transmission for both the modes. The experimental testing of the gyrotron is currently in progress and we expect to present its detailed performance analysis in conference.

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