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2P18 - E-band Overmoded Relativistic Backward Wave Oscillator

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An E-band relativistic backward wave oscillator (RBWO) is proposed to generate megawatts of power. An overmoded rectangular slow wave structure (SWS) is chosen and combined with a relativistic hollow electron beam to increase the interaction impedance and avoid RF breakdown. To overcome the frequency limits of conventional fundamental mode version, a higher order mode is selected as the operating mode by using a mode selection technique. To demonstrate its capability, the RBWO based on the axisymmetric SWS has been designed and simulated using the particle-in-cell codes CST and MAGIC. The Gaussian output mode is obtained from the operating TM03 mode through a corrugated waveguide mode converter.

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