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Dual Band Relativistic Backward Wave Oscillator with Gaussian Radiation[1] AHMED ELFRGANI, EHSAN VADIEE, SARITA PRASAD, MIKHAIL FUKS, EDL SCHAMILOGLU, Department of Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM 87131, USA — Generating dual-band signals using a relativistic backward wave oscillator (RBWO) with a two-section slow wave structure is attractive to many applications such as plasma diagnostics and sounding systems. Using different sections in the RBWO provides a change of the synchronism conditions and as a result two microwave frequencies at C-band and X-band have been produced at the output. The synchronism condition can be provided by variation of the corrugated waveguide period. In this abstract, a two-spiral corrugated and a sinusoidal structures have been used as two sections to produce the frequency bands. The slow wave structures have been designed analytically and the simulation results verified the analytics. The RBWO is generating a microwave signal that propagates backwards, so the two-spiral corrugated structure acts as a reflector. This reflector gives the ability to extract the signals azimuthally. Two dominant frequencies at 7GHz and 10GHz have been found with a microwave power of megawatts and with a Gaussian beam. The simulations show that the two beam-wave interaction regions work independently. The fully electromagnetic, fully relativistic particle-in-cell (PIC) code MAGIC was used to simulate the device with a voltage pulse 460kV and with a 2T axial magnetic field.

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