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Title:Time-dependent multi-mode nonlinear theory of dual-frequency operation coaxial gyrotron with two electron beams

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Abstract:The nonlinear coupling between modes and electron beams of the coaxial gyrotron with two electron beams (CGTB) has been investigated by means of the self-consistent time-dependent multi-mode nonlinear theory. The effects of the currents of two electron beams on the output power of two operating modes are discussed. It has been found that CGTB can operate at two different frequencies simultaneously with the given parameters and the peaks of the output power of two operating modes appear alternately with a certain period in dual-frequency operation. Compared with the coaxial gyrotron with one beam (CGOB) with the same parameters, the corresponding average output power of two operating modes in CGTB is enhanced due to the nonlinear coupling between operating modes and electron beams. © 2012 Elsevier B.V.

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