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Author Sueng-Chien Wu
Author's Email Address No Public.
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Abstract
The gyrotron traveling wave amplifier (gyro-TWT) is a high-power, broadband, millimeter-wave amplifier. The mode exhibits the lowest ohmic dissipation in previous gyro-TWT experiment. Moreover, it’s field peaks at a radial position of half the waveguide radius, so the quality of electron beam isn’t degraded. Therefore, the TE01 mode gyro-TWT may be a high-power millimeter-wave amplifier. However, the output power, gain, and efficiency of gyro-TWT will be degraded where the spontaneous and reflective oscillations occur. Start-oscillation current will be down by absolute instability of TE02 and TE01 modes and electron velocity ratio and interaction section, it can be suppressed by the distributed wall losses. However, the spontaneous oscillation(TM01 mode) is not effectively suppressed by the distributed wall losses. The Ka band gyro-TWT(NRL) will be amplified, where the input power is 10KW. The output power is decreased because of competition from the TE02、TE01 and TM01 oscillations in the Ka band gyro-TWT(UCLA) with sever and the W band gyro-TWT(UCD) with distributed wall losses.
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