



Theoretical Studies of Plasma-loaded Backward Wave Oscillator

By Dilip Kumar Sarker

LAP Lambert Academic Publishing Jun 2012, 2012. Taschenbuch. Condition: Neu. Neuware - The linear theory of electromagnetic radiation from a plasma-loaded sinusoidally corrugated backward wave oscillator driven by intense relativistic electron beam has been developed and analyzed numerically as well as analytically. A beam-plasma waveguide model has been proposed and studied analytically with an aim to give a guideline to achieve an optimally designed backward wave oscillator in the X-band frequency range. First, the dispersion relation for TM₀₁ mode in absence of electron beam has been analyzed numerically for different structure-size parameters and plasma density. Then, developing the analytical dispersion relation, the effects of variation of structure parameters and plasma density on the spatial and temporal growth rates for TM₀₁ mode are investigated. Here, the analytical investigation, have been carried out by absolute instability analysis. It is observed that the variation of structure-size parameters and filled-plasma density modify the dispersion curves of the backward wave oscillator significantly and affect the beam-wave interaction frequency, the temporal and spatial growth rates and thus the signal strengths considerably. 88 pp. Englisch.



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