WAVE AMPLIFICATION IN STIMULATED SMITH-PURCELL PROCESS

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Abstract

The Smith|-|Purcell FEL |-| when mildly relativistic electron beam passes in the vacuum over the grating and coupled with the slow electromagnetic mode is the promising source of coherent radiation in microwave region and there is currently substantial interest in the development of the comprehensive theory of Smith|-|Purcell FEL. In this paper the operability of the Smith|-|Purcell FEL for the lamellar|-|type grating is considered. The consideration is based on the self|-|consistent set of Maxwell|-|Vlasov equations. The amplification of the evanescent, as well as radiation modes is investigated. The small signal gain for various regimes is calculated and the dependence of the gain on the electron beam angular and energy spreads is analyzed.

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