

SPACED-BASED FREE ELECTRON LASER

by

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ABSTRACT

Free electron laser is a new source of coherent radiation, produced by the passage of a relativistic electron beam through a periodic magnetic field called undulator or wiggler field. A normalized set of nonlinear equations which describes the interaction of the relativistic electron beam with the electromagnetic field for a free-electron laser operating in the Compton regime are presented and the efficiency of energy extraction from the relativistic electron beam to the radiation is determined. The optimum values of this efficiency for a short-period, untapered and tapered, wiggler are presented. This free-electron laser can be used as radiation source for ionospheric heating and for power transmission in space.