

Design of a free electron maser without wiggler

Abstract

We are developing prototype free electron maser (FEM) that is compact, powerful and efficient for potential industrial applications. The design, set-up and results of a novel X-band rectangular waveguide prebunched free electron maser (PFEM) are presented in this paper. Our initial device operates at 10 GHz, without wiggler and employs two rectangular waveguide cavities (one for velocity modulation and the other for energy extraction). The electron beam used in this experiment is produced by thermionic electron gun which operates at 3 kV and up to 50 μ A. The nominal beam diameter is 1mm passing across the X-band cavity resonators. The resonant cavity consists of a thin gap section of height 1.5mm which reduces the beam energy required for beam wave interaction. The results, progress so far and the scope of work for the next couple of months are reported.