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Title

Design of the miniaturized free electron laser module as an efficient source of the THz waves

Source

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Abstract

Since the tremendous potential of the THz wave for the bio-technological applications has been found, there has been a lot of interest paid to development of the THz-wave sources. The miniaturized free electron laser (FEL) module based on the microcolumn can be a very convenient THz wave emitter because of its compactness. In this work, we tried to design the miniaturized FEL module to achieve the optimized electron beam (e-beam) trajectory in the module by using 3D simulation tool. We found that the accelerator bias, the length and radius of the limiting aperture were important parameters to obtain the strong and parallel e-beam. We have also proposed the ring-type grids to get more symmetrical behavior of the e-beam in the wiggler.