

3S7 Design of a Short-Period-Wiggler Free Electron Laser Experiment,* J. H. BOOSKE, T. M. ANTONSEN, JR., D. BENGSTON, H. BLUEM, W. W. DESTLER, V. L. GRANATSTEIN, P. E. LATHAM, I. D. MAYERGOYZ, D. RADACK, T. ROSENBURY, and C. D. STRIFFLER, University of Maryland, College Park, MD 20742--A 150 GHz free electron laser (FEL) is being designed using a sheet electron beam and modest electron energy. The wiggler magnet¹ has been fabricated with a 1 cm period and has been tested up to fields of ~ 3 kG. The FEL will be driven by a state-of-the-art 500 kV modulator producing 1-2 μ s pulses.² Peak output power will be as large as one megawatt. We will present our designs of the electron gun, the wiggler electromagnet, and the rf structure. Sheet beam stability and confinement, and linear FEL growth rates have been calculated as a function of beam, wiggler, and rf structure parameters with encouraging results. Potential applications of this type of FEL include space-borne radar and heating of magnetic fusion plasmas.

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¹W. W. Destler, V. L. Granatstein, I. D. Mayergoyz, and Z. Segalov, J. Appl. Phys. 60, 521 (1986).

²J. Calame, F. J. Williams, W. Lawson, and V. L. Granatstein, Bull. Am. Phys. Soc. 31, 1601 (1986).