

Abstract Submitted  
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**A Joule-class, 0.5 kHz repetition rate picosecond diode-pumped laser**<sup>1</sup> CORY BAUMGARTEN, MICHAEL PEDICONE, Department of Physics, Colorado State University, HERMAN BRAVO, Electrical and Computer Engineering Department, Colorado State University, HANCHEN WANG, Department of Physics, Colorado State University, LIANG YIN, CARMEN MENONI, Electrical and Computer Engineering Department, Colorado State University, JORGE ROCCA, Department of Physics, Colorado State University, BRENDAN REAGAN, Electrical and Computer Engineering Department, Colorado State University — Joule level, high repetition rate laser systems enable a number of applications in which simultaneously high pulse energy and average power are required. These applications include the generation of high average power soft x-ray lasers, optical parametric chirp pulse amplifier sources of very short duration pulses, generation of bright, coherent and incoherent pulses of extreme ultraviolet, soft x-ray, and hard x-ray radiation. We report on the development of an entirely diode-pumped chirped pulse amplification laser system that produces pulses with up to 1.5 J pulse energy at repetition rates up to 500 Hz (750 W average power) which can be compressed resulting in the production of Joule-level, 5 ps duration pulses. The main amplifier is based on cryogenically-cooled Yb:YAG active mirrors. The laser produces pulses with good beam quality, and its stable operation is demonstrated. The system is quite compact, occupying an optical table area of only 4.5 m<sup>2</sup>, making it an ideal source for tabletop experiments.

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