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Terawatt picosecond CO_2 laser DANIIL STOLYAROV, IGOR POGORELSKY, IGOR PAVLISHIN, MARCUS BABZIEN, KARL KUSCHE, Brookhaven National Lab, V. PLATONENKO, Moscow University, VITALY YAKIMENKO, Brookhaven National Lab — We present the design of a powerful CO_2 laser that generates short 3 ps pulses with energy exceeding 10 J/pulse. The output of a conventional 1 atm TEA oscillator undergoes pulse shortening via a semiconductor switching method in combination with nonlinear Kerr cell. Pressure broadening of CO_2rotational line in the 10 atm regenerative amplifier and the 9 atm final amplifier allows amplification of the short pulse up to several terawatts in peak power without pulse distortion. Present applications of the terawatt CO_2laser include various methods of laser acceleration of relativistic electron beams, generation of high-intensity X-rays via Thomson scattering, ion acceleration, etc.

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