Diode-Pumped Laser with 3.5 W of Pulsed Output at 532 nm

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A Nd:YAG laser crystal was pumped with three 10-W fiber-coupled lasers. Over 11.5 W of continuous-wave 1064 nm, and 3.5 W of pulsed 532-nm was obtained with output beam quality (M^2) of less than 1.5.

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High average power, good beam quality diode-pumped lasers are of interest for a number of applications. A Q-switched and frequency-doubled diode-pumped Nd:YAG laser with over 11.5 W of continuous-wave 1064 nm, and 3.5 W of 532-nm at 50 kHz pulse repetition frequency, will be described. A single 0.7 mm long Nd:YAG rod was pumped with the combined output of three fiber-coupled diode laser arrays, Each pump laser was capable of 1 O-W cw output. The fiber output of each pump laser was first collimated and then focused to a diameter of approximately 0.8 mm onto one end of a cooled Nd:YAG rod with a single lens. Approximately 27 W of 809 nm light was incident on the crystal, The resonator mirrors for the 11-cm long folded cavity were selected such that thermal lensing in the laser crystal was mostly compensated. The Nd :YAG rod and an acousto-optical Q-switcher were located in one arm of the cavity while a 5 mm long KTP Type II frequency-doubler was in the other arm. Particular attention was paid to minimizing intracavity losses. To avoid gray tracking damage in the crystal, the KTP crystal was placed away from the cavity beam waist. The 532 nm output

beam quality (M2) was less than 1.5. Output beam characteristics for a Nd:YVO4 crystal pumped in the same cavity will also be described.