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Passively Q-switched LED-pumped Ce: Nd:YAG laser

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Abstract

The experimental study of passively Q-switched, LED-pumped Ce:Nd:YAG laser is reported. The active medium is a 3 mm diameter laser rod with 60 mm length; it is optically pumped with four segments of blue LEDs at 460 nm, with each segment consisting of 32 single LEDs. The 14 cm length optical resonator with 2 dielectric mirrors and the reflectivity of 99 and 93 percent at 1064 nm produced more than 200 micro-joules laser spikes at the free-running mode of operation. By using a passive optical switch with 96% initial transmission and 0.6 J electrical pumping energy, the single Q-switch (QS) laser pulse with 240 ns pulse-width and 17 micro-joules optical energy was produced. By increasing the pumping energy to 1.2 J, two nearly similar QS laser pulses were generated. Moreover, we have proposed a method for decreasing the pulse-width and increasing the energy of single QS laser pulse that is based on controlling the pumping rate by shaping the current of LEDs.

Keywords: passive Q-switch, LED pumping, Ce: Nd: YAG laser

For full article, refer to the Persian section