Amplification of 10 $\mu$m Light with a 2 $\mu$m Optical Pumped CO$_2$ Laser

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CO$_2$ is one of the most efficient amplification media known. Usually CO$_2$ is excited by an electrical discharge, and laser action can be achieved at 10.6 $\mu$m as well as 9 $\mu$m. The minimal possible pulse duration of the amplified beam depends on the maximal CO$_2$ gas pressure in the laser tube and is limited under discharge excitation to 1.5–2.0 ps using chirped pulse amplification [1]. A different excitation method consists in pumping CO$_2$ molecules with an infrared laser [2]. This allows increasing the CO$_2$ pressure in the laser cell to more than 40 bars, leading to the amplification of much shorter laser pulses. We want to discuss the possibility of using 2 $\mu$m light from a YAG pumped high power OPO system to amplify 10 $\mu$m. We will also present results from our 2 $\mu$m OPO system.

References