Gain switched 2090nm laser with few nanosecond pulse duration and high energy per pulse

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The 2 µm spectral range offers the basis for a variety of applications. In some applications there is importance of high atmospheric transmittance, short pulse duration and high energy per pulse. Commonly, Ho:YAG laser meets these requirements. But for this laser ,what is appers in littuter is only short pulses durations with relativly low energies per pulse for the cavity dumping method or high energies per pulse with longer pulse durations for the Q-switch method. Here we present for the first time a Ho:YAG laser based on gain-switching method that achived both high energy pulses and short pulse duration. The main advantage of using the gain-switch, rather than Q-switching is that a short cavity can be implimented, which is neccecery for obtaining a short pulse duration. In our case the Ho:YAG laser was pumped by a Tm:YLF laser passively Q- switched using Cr:ZeS. The Tm:YLF emision wavelength was tuned to the Ho:YAG absorption peak. The Ho:YAG cavity was 25 mm long allowing pulse duration of few nsec. For a repetition rate of 500Hz a pulse duration of 3.45ns and maximal energy of 832µJ was achived with pump pulse enrgy of 3.23mJ. This result corresponding to a slope efficiency of 42.4% and optical to optical conversion of 25.7%.

The laser emitted at 2090 nm, inside the realevant atmospheric window. The maximal pulse energy and shortest pulse duration were limited by the damage threshold of our laser components.

Biography

Salman Noach completed his PhD at 2003 from the Hebrew University Jerusalem Israel ,Currenty he is faculty member at the Electro optics department in Jerusalem college of thechnology and he is the head of the solid state laser (SSL) labatury there . The Lab mainly deals with the development of end pump SSL in the SWIR spectral regim. He has published more than 30 papers in reputed journals.

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