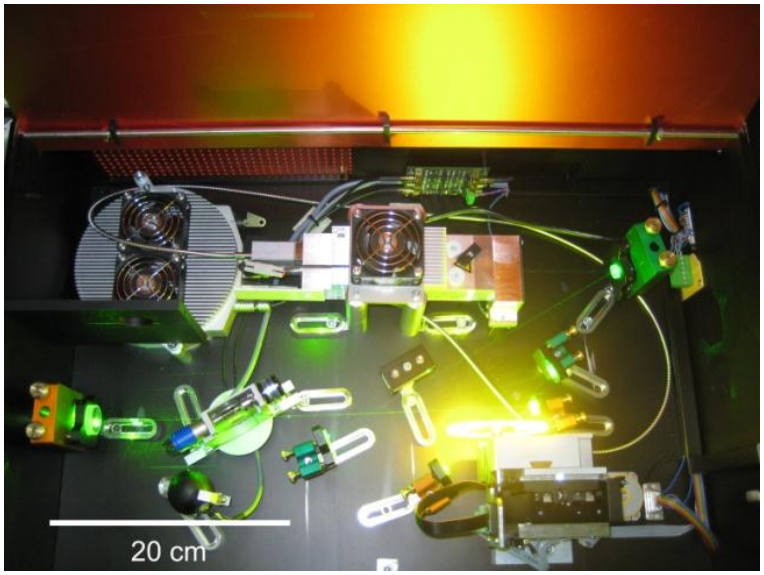

Fig. 7. Photography of the laser within the laser housing including the pump-laser during laser operation.

Because of the solid-state laser medium, the new laser provides no contamination risks and can be used in medical and biological labs as well as in clean rooms. Besides the integrated construction, the solid condition of the active medium is the most important advantage in comparison to commercial cw dye lasers. It should also be noticed that a change of the active medium is easily possible and can be done in less than one minute. For that purpose no cleaning process is required at all.

The used organic dye is a member of the class of perylene molecules. It is known that members of this chemical class have inherent extraordinary photo stability and a fluorescence quantum yield close to unity. In addition, by modification of the molecular structure, the absorption and fluorescence and therefore the tuning range for laser emission can be moved from 400 to 800 nm. By the use of different perylene dyes, it can be expected that tunable laser emission over the whole visible spectral range can be obtained. Moreover, the tuning range should be extendable to the near infrared. These exceptions are underlined by the detailed investigation of the photochemical decomposition of the solved dye molecules. It is shown that power decrease is finally caused by photo bleaching and reabsorption of photo products. The polymer host does not influence the long-time power stability.

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