intracavity loses to its absolute minimum value since the efficiency of intracavity second harmonic generation decreases rapidly with the increasing intracavity losses.

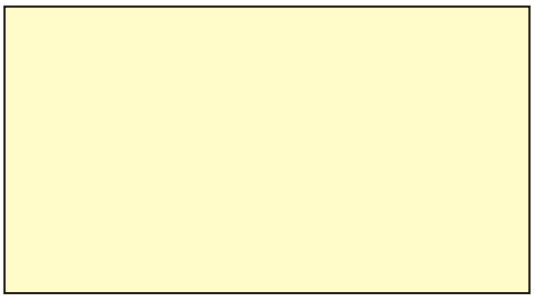

Fig. L.9.1

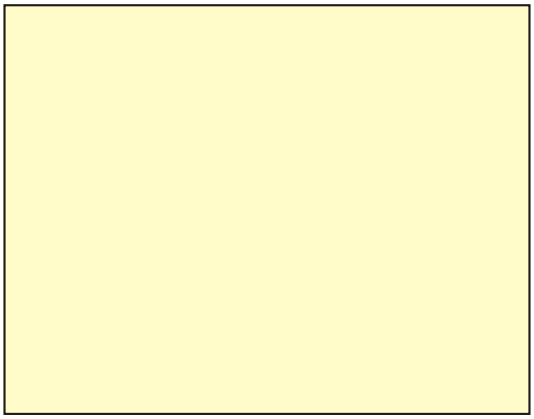

Fig. L.9.2

The KTP crystal was 10 mm long and was cut for type II phase matching. It was kept within a water-cooled jacket to maintain its temperature within ± 0.2 °C so that the polarization is preserved in order to avoid back conversion and to obtain stable operation. The pump head consists of a 60 mm long Nd:YAG rod (4 mm diameter) with 0.6 at.% Nd^{3+} doping concentration enclosed with in a gold coated flow tube. The rod was pumped transversely by six number of laser diodes with total emitted power of 180 watts. The detail of the pumping geometry is described earlier. The laser was Q-switched with the help of an acousto-optic modulator with 17 kHz of repetition rate. The total cavity length is only 15.8 cm. The output green power increases linearly with the incident diode power and show no sign of roll over (Fig. L.9..2). At the maximum incident pump power of 174 W, 30.1 W of average green power was obtained corresponding to 17.3 % optical to optical conversion efficiency. The pulse width was measured to be 165 ns. Further effort to reduce the pulse width by changing the cavity configuration is going on.

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L.10 200mW SLM green laser at 532nm using ICSHG technique

We have developed a compact SLM green laser with more than 200mW of output power at 532nm by diode end-pumping a semi-monolithic and a-cut Nd:YVO_4 crystal with 2-at-% doping concentration and 1.0mm thickness. The Nd:YVO_4 crystal was provided with adequate heat sinking and was end pumped using a fiber coupled laser diode with 100µm core diameter and the focus spot-size at the gain medium was 117µm. The cavity was plane-plane geometry stabilized by the pump induced thermal lens in the gain medium. A type-II phase matched and one side coated KTP crystal with 3x3x7mm length was used to produce 532nm by intracavity SHG of 1064nm. A home-built high stability temperature (Stability < 20mK) controller was used to adjust the temperature of the KTP crystal and hence the wave plating effect of 1064nm, when it makes a round trip inside the KTP crystal. A 2mm thick Brewster plate was kept with its transmission axis at 45^0 to the fast axis of the KTP crystal, but parallel to the c-axis of the Nd:YVO_4 crystal.

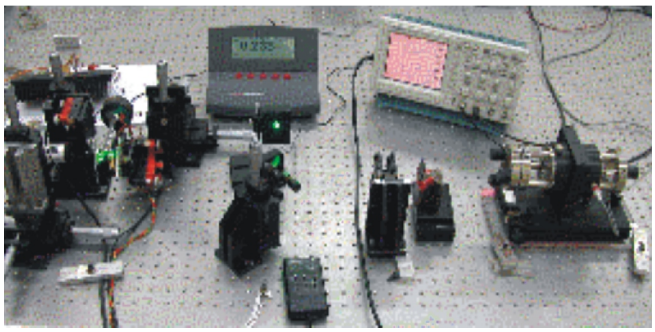

Fig.L.10.1 *Experimental Setup of fiber coupled laser diode end pumped SLM green at 532nm operating at 235mW green power.*

The combination of temperature controlled wave plating of KTP crystal along with loss discrimination offered by the Brewster plate and the short absorption depth of Nd:YVO_4 crystal provided SLM operation. The system operated in SLM with 207mW of output power at a pump power (Laser Diode) of 1.1W, when the KTP temperature was adjusted to be 35.50^0C. We confirmed SLM by analyzing the leaked 1064nm laser beam with the help of a scanning plane-plane Fabri-Perot Interferometer.

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