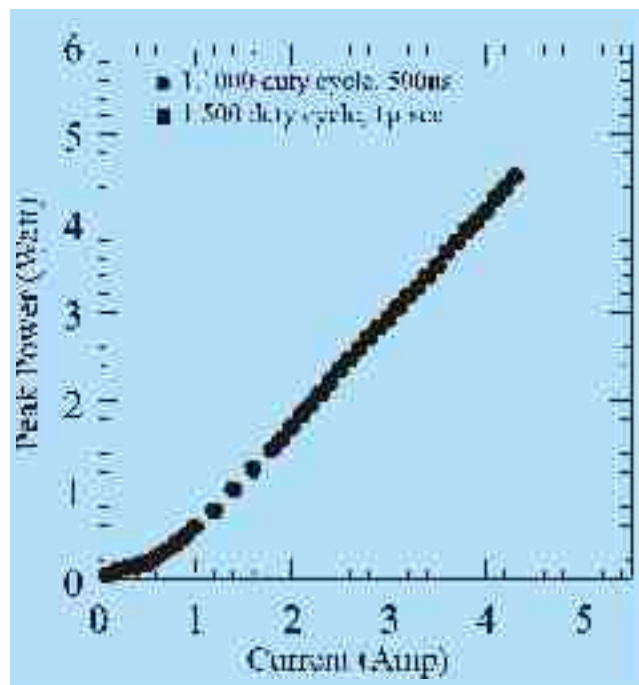


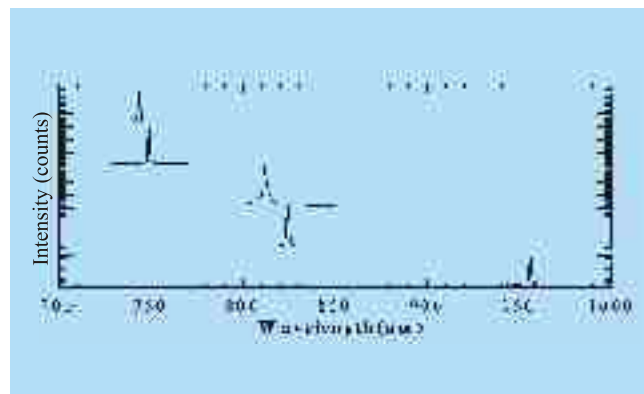
## L.16 Development of high power laser diodes

Semiconductor Laser Section (Solid-State Laser Division) at RRCAT has recently developed high power laser diodes in the wavelength range of 740 nm to 1000 nm. The complete laser structure was grown by metal organic vapour phase epitaxy technique and devices were fabricated through standard procedure using photolithography process. Figure L.16.1 shows the light versus current (L-I) characteristics of a laser diode operating at 853 nm in uncoated, unmounted conditions. The maximum peak power during pulsed operation obtained is 5.3 Watt. These laser diode structures

were tested under pulsed operation at room temperature for 500 nanosecond pulse duration with a duty cycle of 1:1000. Lasing action was observed with a typical current threshold of about 200A/cm<sup>2</sup>. Laser diode arrays consisting of 6-10 elements also have been developed and tested for operation in pulsed mode at room temperature. Figure L.16.2 shows a laser array with 6 elements under operation at room temperature installed in p-side down geometry where a metal single tip-electrode was used for back electrical connection. Figure L.16.3 shows the longitudinal spectrum of five laser diodes operating at different wavelength.



*Fig. L.16.1 L-I characteristics of a laser diode with 6 elements.*



*Fig. L.16.3 Longitudinal spectra of five diode lasers operating at different wavelengths.*

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*Fig.L.16.2 A Laser diode array.*