

frequency. Between the transducer and quartz a gold layer is used as electrode and the epoxy resin (Epotek 302) for bonding. The gold layer was produced by applying gold paint to the surface and then baking it in the furnace at 500°C for about two hours. This coating was found to have better adhesion to quartz than a vacuum deposited gold coating. For efficient transfer of acoustic energy from the transducer to the fused quartz, the electrode and bonding layers should be as thin as possible as their mechanical impedance is very different from that of LiNbO<sub>3</sub> or quartz. Therefore, special care has been taken during bonding to ensure a clean, even and thin epoxy layer. With the present technique epoxy layers of 1 μm thickness can be obtained.

The first AOM was fabricated with a 10mm length x 4mm width transducer and was tested in a Nd:glass laser for stable mode locking. At present, 8W RF power is required for 80% diffraction efficiency at 1.054 μm. The transducer is not cooled so CW operation of AOM was not possible. An improved version of AOM incorporating ar-

angement for water cooling is being fabricated so that CW operation can also be achieved.

#### **Diffraction filtered resonators with a copper vapor laser**

As part of a continuing effort to obtain nearly diffraction limited output beam from Copper Vapour Laser (CVL), the use of diffraction filtered resonator (DFR) was investigated. Using a conventional DFR (based on a semi-confocal stable resonator) with a 25 mm bore diameter CVL, diffraction limited output with average power of 0.4 W was obtained. The low output power results because these resonators yield a poor utilization of laser mode volume. A modified DFR configuration providing a larger mode volume without significant degradation of beam divergence has therefore been developed at CAT. With this new DFR configuration the 25 mm bore diameter CVL gave 2 W average power with a beam divergence of 0.1 mrad (about two times the diffraction limit).

## **INFRASTRUCTURAL DEVELOPMENT**

### **EQUIPMENT COMMISSIONED**

A two axes laser work station has been made to specifications by M/s HMT Ltd, Bangalore for use in laser material processing. The system has traverse capacity of 3 m x 1.2 m with computer controlled movements. Third axis movement is manual and limited to 250 mm only. The system has composite movements - work movement along major axis and beam movement along minor axis. It employs ball screws & servomotors for drives, and linear motion guides for precision movements. The system has an overall accuracy of 0.015 mm per meter in either axis. Besides the job clamping arrangement, job loading /unloading mechanism, beam dump-trays etc. have also been provided. The machine is made of welded steel structure and is quite rugged. It has safety inter-locks and automatic lubrication system. The machine uses CNC controller for two axes contouring movements and IBM PC is available with the system for direct numerical control thus avoiding the use of tape-punch /reader. The machine has been commissioned at Laser R & D Bldg and is working satisfactorily.

### **COMPUTER FACILITY**

The minicomputers at CAT are inter-connected via a computer network-CATNET. This network now supports

DOS machines also, enabling resource sharing among these machines. The communication facility (E-mail) has also been commissioned on CATNET. The centre organised a three week course on "Programming in C". It has also developed software for leave accounting, budget management, stores, audit etc.

### **CONSTRUCTION PROGRAMME**

The Indus-1 building has been completed and is already in use. The accelerator development laboratory and laser R&D blocks A,B&C are nearing completion. Construction of canteen building, overhead water tank, water supply distribution mains for the laboratory area has also commenced. Road area of about 40,000 sq.m. has been completed. Erection of 132 kV substation and switchyard has also been completed and pre-commissioning tests are in progress.

A total of 399 houses of various categories were sanctioned for the centre in the VII plan. Out of these, 355 houses are already complete and the construction of 30 houses is nearing completion. The construction of the balance 14 houses is likely to be started shortly. Additional 200 houses shall be constructed in the VIII plan period.