

are extensively used in Ultraviolet Photoelectron Spectroscopy (UPS) to study outer shells. Some other sources are employed in X-ray Photoelectron Spectroscopy (XPS) to study core electrons. There is a large gap between energies of photon sources used for UPS and XPS. For many applications, a tunable source is required. SR, with its continuum, provides such a tool. The technique of Absorption spectroscopy deals with the absorption of x-rays by atoms. This varies smoothly with photon energy except at some discrete energies where abrupt increase called absorption edges occurs. Photophysics beamline will be used for the studies of absorption and fluorescence of molecules, spectroscopy of photofragments, ionic fragmentation using core level ionization etc. One beam line will be used for high resolution VUV spectroscopy. Atomic and molecular spectral studies carried out under high resolution provide a wealth of information about the valence excitations which cannot be achieved easily by conventional sources due to their inherent limitations. One line will be set up for industrial applications in the field of microlithography, for making micro electronic devices and one line will be used for calibration of synchrotron light and its characteristics. Two beam lines will be set up by UGC, which will also set up an inter-University centre for SRS utilisation at CAT.

Computer Facility.

The computer network at CAT named CATNET consists of two super microcomputers (HORIZON-III) hooked to a local area network (LAN) based on standard ETHERNET with a data transfer rate of 10 M Bits/sec. For connecting all future mainframe and mini-computers to this LAN, necessary coaxial cables have been laid underground all over CAT. Workstation and personal computers are connected to existing super micro-computers using serial line data communication at the speed of 9600 baud. Presently about twenty five personal computers and workstations distributed all over CAT are using CATNET to access online data bases, electronic mail and super microcomputers.

To facilitate easy library information retrieval from multiple points, software has been developed for an online data base of library information. Using this package, the user can get complete information about any book, its author, publisher and its issue status in the library. Apart from information retrieval, many library management functions, like printing catalogues, lists of new arrivals and various reports are also provided by this package. This package has been developed in the UNIX based mini-computer on UNIBASE (UNIFY like) DBMS. The user interface is highly interactive, menu driven, friendly and self guided with on-line

contextual help and other prompts. Computer aided drafting has been introduced at CAT. Almost half of the CAT drafting work has shifted from conventional drawing board to the desk top computer. PCB layouts are also prepared using CAD. Two high speed eight pen plotters (120 cms/sec) have been installed for the plotting of complex drawings and computer generated scientific figures, graphs etc.

Visits Abroad.

Synchrotron Radiation Sources are built throughout the world by all advanced countries for research and development work, as well as for industrial applications. Many machines which were earlier built as colliders are now converted to work as SRSs. USSR made collider machines at Novosibirsk in Siberia. With their successful experience for last ten years, they have now started fabricating SRS. Two such machines are being installed by them at Moscow. A scientific delegation from CAT formed by Shri S. S. Ramamurthi, Shri V. K. Kulkarni, Shri S. Kotaiah, Shri G. Singh, Shri S.P. Mhaskar visited USSR to gain the information regarding different sub-systems of SRS. Full cooperation was offered to the delegation by the USSR scientists.

Another delegation headed by Dr. D.D. Bhawalkar, Director, CAT with Shri Raja Rao and Shri H.C. Soni from CAT and some other members from other organisations also visited USSR in connection with investigations in Laser technology and industrial accelerators. The main fields of interest in their visits to different institutes were the study of engineering aspects of the crystal growing equipments, laser applications in metal fabrication like cutting, welding, engraving, surface heat treatment as well as to see the SRSs which are operational or under construction. Dr. K.C. Rustagi attended the 4th International conference on superlattices, microstructures and micro devices at Trieste and presented a poster paper. He was also invited to



A view of the computer facility

give seminars on optical nonlinearities in composite materials and quantum dots at Kaiserslautern, Stuttgart and Karlsruhe.

Dr. M. Thirumaleshwar participated in the international cryogenic engineering conference at Southampton, UK and presented two papers.

Miss Deepa Angal attended the general accelerator physics course organised by CERN Accelerator school in Spain.

Mr. B. Singh visited National Research Council of Canada, Ottawa under BOYSCAST (Better opportunities for young scientists in chosen areas of science and technology) programme of DST, New Delhi. He was associated with the development of excimer lasers.

Publications.

Papers

1. 'Studies on hydrodynamics of laser irradiated plan on solid targets'.

D.D. Bhawalkar, L.J. Dhareshwar, and H.C. Pant. (Invited paper for special issue of Romanian journal of physics to commemorate 60th anniversary of Prof. Ursu)

2. 'Design of INDUS-I'.

G.Singh, G.K. Sahoo, D. Angal, B. Singh and S.S. Ramamurthi. (Paper presented at the International conference on 'Synchrotron Radiation-88' held at Novosibirsk, USSR in Aug. 88.)

3. 'Laser-a versatile tool'.

S.C. Mehendale and K.C. Rustagi (A popular article written in response to an invitation from the Editor, Impact of science on society, published by UNESCO).

4. 'Indigenous development of Industrial Accelerators'.

S.S. Ramamurthi, S.C. Bapna, H.C. Soni and S.Kotiah. (Paper presented at Indo-USSR Seminar on Industrial Applications of electron Accelerators at BARC, Bombay from, Nov. 1-3, 88.)

Internal Reports

1. 'Matching in accelerators'.

B. Singh, D. Angal and G. Singh, CAT/I/88-3.

2. 'Magnet field mapping system for SRS facility'.

M.G. Karmarkar, S.K. Shukla, S.P. Mhaskar and S.S. Ramamurthi,

CAT/I/88-4.

3. 'Super conducting wiggler for INDUS-I :- a proposal'.

S.C. Bapna, P.K. Nema, G. Singh S.S. Ramamurthi, CAT/I/88-6

4. 'D.C. Accelerator project report'.

Project Design Group, Accelerator Programme, CAT/I/88-7.

5. 'Design of Transfer Lines'.

D. Angal, G. Singh, S.S. Ramamurthi, CAT/I/88-8.

6. 'Design of Buncher for 15 Mev electron linear accelerator'.

S.A. Pande, P.R. Hannurkar, S.S. Ramamurthi, CAT/I/88-9.

7. 'Conceptual design report for 15-Mev linear electron accelerator'.

H.C. Soni, S.S. Ramamurthi, CAT/I/88-10.

8. 'Design report for a 450MeV synchrotron radiation source (INDUS-I)'.

Project Design Group, Accelerator programme, CAT, CAT/I/88-11.

9. 'Conceptual Design for a 1.4 GeV Synchrotron radiation source (INDUS-II)'.

Project Design Group, Accelerator Programme, CAT, CAT/I/88-12.

10. 'Study of pole shape at entry and exit of dipole magnets for booster synchrotron'.

S. K. Shukla, S.P. Mhaskar, S.S. Ramamurthi, CAT/I/88-13.

11. 'Electron beam transport line magnets for INDUS-I'.

S.K. Shukla, S.P. Mhaskar, S.S. Prabhu, S.S. Ramamurthi, CAT/I/88-14.

12. 'Conceptual design of beam diagnostic system for INDUS-I'.

Anil Banerji, D. K. Joshi, S.S. Ramamurthi, CAT/I/88-15.

13. 'Measurement of beam position in the storage ring INDUS-I'.

Anil Banerji, D. K. Joshi, S.S. Ramamurthi, CAT/I/88-16.

14. 'Study of photon induced gas desorption in INDUS-I'.

K.C. Ratnakala, M.L. Pandiyar R.J. Patel, G. Singh, S. S. Ramamurthi, CAT/I/89-1.

15. 'Design of a Helium liquefier (capacity : 11/h and 0.5 l/h) and a 4.2 K refrigerator using a three stage Gifford McMahon cycle cryorefrigerator'.

M. Thirumaleshwar, P.K. Kush, CAT/I/89-2.

16. Design of regenerators for a

Gifford McMahon cycle cryorefrigerator'.

P.K. Kush, M. Thirumaleshwar, CAT/I/89-3.

17. 'Cooling systems for IR-Detectors - a review'.

M. Thirumaleshwar, CAT/I/89-4.

Lectures and Seminars at CAT.

1. Seminar - cum-Discussion on INDUS-II.

A seminar-cum-discussion meeting was organized at CAT on 1st and 2nd Aug. 88 to discuss the specification of the next SRS to be built at CAT, namely INDUS-II.

Low emittance, high brilliance lattice equivalent to ALS machine at Berkeley was proposed by Accelerator Design team of CAT. The quality of the beam was further discussed by the user-scientists who preferred to have a 2 GeV machine with a larger flux at reasonable emittance. The technological imperatives of the 2 GeV machine will be studied by the design team before the actual design is taken up.

Similar discussions had been organized earlier to discuss INDUS-I machine configuration. However, beam lines and associated instrumentation and proposed experiment with INDUS-I were not discussed then and this was the topic for discussion between user scientists at this meeting. After detailed discussions, experimental areas were identified. Based on these, details of beamline instrumentation can be finalised. INDUS-I will have nine beam lines, of which five will be set up by BARC/CAT, two by universities and the remaining two will be available to other national laboratories, and industries. One of these is expected to be utilized for lithography.

2. Prof. V.K. Tripathi, IIT Delhi gave a lecture on 'Free Electron Laser', on 5th September, 1988.

3. Prof. R. S. Sirohi, from IIT Madras gave a lecture on 'How collimated is your beam' on 18th October, 88.

4. Dr. L.M. Kukreja spoke on 'Medical Laser Programme at CAT' on 17th November, 1988 and on 'Medical Laser activities at P.N. Lebedev Inst. of spectroscopy, USSR' on 18th Nov. 88.