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PHOTONICS NEWS

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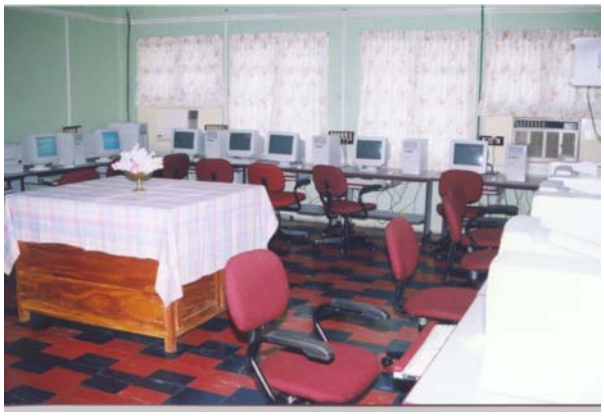
Computer Network Laboratory at ISP inaugurated

A full-fledged computer laboratory with a network of systems was inaugurated on November 18, 1999 at the International School of Photonics(ISP) by Prof. Martin Rem, Rector Magnificus of the Eindhoven University of Technology(EUT).



The ISP computer network laboratory being inaugurated by Prof. Martin Rem, Rector of EUT, the Netherlands. A view of the network laboratory is given on the right.

The Network Laboratory was established as part of the Programme of International Co-operation in Higher Education (MHO project) which aims at the overall development and strengthening of infrastructure facilities in the International School of Photonics. The network consists of one HP server and twelve terminals which facilitate full time on-line connectivity, thus supporting the teaching and research programmes of the International School of Photonics. The Eindhoven University of Technology is the collaborating institution with ISP under the MHO programme.

Besides Mr. J J van Schijndel of the Bureau of International Activities in EUT, who is the administrative co-ordinator of the MHO project, the inaugural ceremony was attended by the staff and students of ISP.

ISP and International Collaboration

Academic exchange programme between ISP and EUT, The Netherlands

The International School of Photonics(ISP) has established several collaborative research activities with a number of academic and research institutions abroad. Most important among these is the collaboration with the Eindhoven University of Technology(EUT) in the Netherlands. The Netherlands government is offering major financial assistance for strengthening the activities of ISP under the Programme of International co-operation in Higher education (MHO).

The academic tie-up between ISP and EUT includes mutual exchange of academic staff and students for a duration ranging from two to twelve weeks. The first

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staff visit from the ISP side took place on April 6th 1999 when Prof. V M Nandakumaran visited the Department of Applied Physics in EUT. His work involved the restructuring and remodelling of the M.Tech. courses in ISP. He also delivered a seminar in the Department of Applied Physics on "Chaos and its Control in Laser Systems".

Subsequently, Prof. C P Girijavallabhan, Director of ISP made a visit to the Department of Applied Physics at EUT from 1st July to 22nd September,1999.He was involved in modernising the course content of the M.Tech. degree courses of ISP under the curriculum development plan. Prof. C. P. Girijavallabhan also gave a lecture on "Prompt Electron Emission from Metal Targets under Nanosecond Laser Pulse Radiation" during the course of his visit to the university.

The first batch of Sandwich Ph.D. students from ISP, Mr. B Aneeshkumar and Mr. R Prasanth left for The Netherlands on 1st May, 1999. The Sandwich Ph.D. programme is approved under the Dutch assistance to ISP. The research work of these students is currently progressing in the Department of Applied Physics at the Eindhoven University of Technology. Mr. Prasanth and Mr. Aneeshkumar are working on the characterisation and modelling of quantum dot and quantum well structures.

Prof. P. Radhakrishnan of ISP visited the COBRA group and the Bureau of International Activities (BIA) at EUT for a period of two weeks in January, 2000 for supervising the work of Mr. Aneeshkumar. Prof. Radhakrishnan also gave a talk on "Fibre Optic Sensors" in the Department of Applied Physics, EUT on this occasion.

Mr. Frank Koppens, an eighth semester Master's Degree student from the Department of Applied Physics at EUT visited ISP in September 1999 and spent a period of three months in the ISP laboratories to carry out a project work under the Tinbergen Scholarship from the Nuffic in the Netherlands. He used the photoacoustic technique to study some of the characteristics of certain quantum well structures.

Mr. Ajay Kartha, an M.Tech. student of ISP is currently doing his project at EUT in the field of nonlinear optics under the Tinbergen scholarship.

It is hoped that the academic tie-up between ISP and EUT will generate more R&D activities at ISP in various branches of Photonics.

Photonics in the next century

The American Institute of Physics (AIP) has a good news for all Photonians. The prediction of AIP is that by the second decade of the 21st century, Photonics will compete more strongly with Electronics and Photonics will have an upper hand in a number of fields including computation and data transmission.

In the limelight....

Dr. Reji Philip, an alumnus of ISP, has joined the Raman Research Institute, Bangalore as a faculty member. His main research interest is nonlinear optics.

Dr. Santhosh Chidangil, former Research Associate in ISP has joined the Department of Physiology and Biophysics in the Co-operative Medical College, Kannur as a faculty member.

Dr. Jayan Thomas presently a CSIR-Research Associate working in ISP is migrating to Australia. He is expected to join The Centre for Photonics in the Australian National University in Canberra, Australia.

Dr. G Ajithkumar, Research Associate working at ISP is joining the Centre for Investigations in Optics in the State University of Mexico, Mexico City.

Dr. Geetha K Varier, former Ph.D. student who worked under Prof. V P N Nampoori has taken up position as a Post Doctoral Fellow at the University of Durham in UK. She is expected to work on problems related to the nonlinear optical behaviour of some Photonic materials.

Dr. Riju C Issac, former Ph.D. student who worked under Prof. C P Girijavallabhan has recently joined the University of Strathclyde, Glasgow, UK as a Post Doctoral Fellow. He is expected to work on problems associated with laser-plasma interactions.

Prof. V M Nandakumaran of ISP attended a one-day seminar organised by IEEE at the Vrijes University, Amsterdam.

Mr. M Shelly John, UGC-SRF working under the guidance of Prof. P Radhakrishnan attended the International Symposium on Photonics and Applications(ISPA) held in Singapore from November 29th to December 3rd, 1999. He presented two papers entitled "Nitrogen dioxide detection with a fibre optic evanescent wave sensor" and "Optical limiter using Samarium Phthalocyanine (SmPc) doped copolymer matrix" at the symposium.

NOTICE BOARD

Padmasree for Dr. D D Bhawalkar

The staff and students of the International School of Photonics join hands with the Laser Community of India in felicitating Dr. D D Bhawalkar, Director, Centre for Advanced Technology (Indore) who has received the prestigious PADMASREE Award of 1999. Dr Bhawalkar is the President of the Indian Laser Association. It is indeed a proud moment for all the Laser Technologists of the country to hear the news of the award.

WORKSHOP ON INDUSTRIAL & MEDICAL APPLICATIONS OF LASERS (WIMAL-2000)

A Workshop on Industrial and Medical Applications of Lasers will be organized by ISP on February 27th and 28th, 2000. Experts from the fields of industry and medicine will deliver lectures on relevant topics. Over fifty participants from all over India will be taking part in the Workshop. The workshop is sponsored by UGC, Photonics Society and Indian Physics Association (Cochin Chapter).

WE HEAR THAT.....

CW Atom Laser

The world's first continuous atom laser has been produced at the University of Munich and the Max Planck Institute for Quantum Optics in Germany. All the previous atom laser beams- coherent beams in which all the atoms have the same wavelength and direction, just like the photons in a laser beam- have been pulsed. The Munich group created a Bose Condensate of Rb atoms in a magnetic trap and then punched a hole in the trap with a weak rf field (PRL ***199****,82****,*** *3008).The atom laser lasted for 0.1 sec, its duration being limited by the number of atoms in the condensate. A quasi-continuous atom laser was demonstrated by researchers from Japan and US . They used the beam to perform Four Wave Mixing with matter waves for the first time.*

Tabletop Laser Fusion (TTLF)

Physicists at Lawrence Livermore National laboratory (LLNL) ,California have demonstrated tabletop laser fusion for the first time. Todd Ditmire and colleagues used a TTL to irradiate clusters of deuterium atoms (Nature ***398,*** *489, 1999) . The laser with peak intensity of* $2.6X10^{16}$ *watts* cm^{-2} *ionizes the D atoms and causes the cluster to explode. Pairs of D-ions then collide and fuse to form* He^3 *and a neutron with 2.45 MeV. The Livermore team achieved an efficiency of about* 10^5 *fusion neutrons per joule of laser energy which approaches the efficiencies obtained in fusion energy experiments with more powerful lasers. However, the experiments are more relevant to the development of a tabletop neutron source for the study of materials than for research in the fusion energy.*

Laser induced Fission and Creation of Anti-matter.

Cowan and co-workers of Livermore focused a Petta watt laser on to a gold coated uranium target causing ionisation of the atoms in the gold layer to form plasma. As the laser continued to interact with this plasma the Livermore team generated electrons of energies as high as 100MeV. The electrons collide with atoms in the target to generate high energy X-rays and gamma rays which in turn can knock neutrons out of gold nuclei and cause the fission of uranium nuclei. Besides various fission products like Sr, Ba, Y, Cs etc., the team also detected the presence of positrons which suggests that the high energy X-rays are creating electron – positron pairs in the target. ***Phys. World 12****, 5, 1999*

Nonlinear Optics lends a hand to Medical Imaging

Radiation from femto-second pulsed visible laser (Ti:Sapphire) is frequency down-converted by a nonlinear optical crystal to terahertz or millimeter wave radiation which offers much safer, potentially more informative imaging in comparison to X-ray

image of teeth, skin and soft tissues. The Terahertz Pulse Imaging (TPI) can produce diagnostic informations which cannot be offered by imaging systems like X-rays, MRI or Ultrasound. TPI is safer than X-rays for medical imaging since Terahertz waves are nonionising and the average power levels used are comparable to background levels encountered in everyday life. Moreover, with TPI, frequency can be varied over a wide range from

Some of the recent publications from ISP

1. Investigation of non linear absorption and aggregation in aqueous solution of RhB using thermal lens technique.
   C V Bindhu , S S Harilal, V P N Nampoori and C P G Vallabhan. *Pramana.**52**,435(1999).*

2. Photoacoustic study on photobleaching of Rhodamine 6G doped in poly methyl methacrylate
   Nibu A George, Aneeshkumar B, P Radhakrishnan and C P G Vallabhan. *J. Phys. D: Appl. Phys Vol. **32,** (1999).*

3. Two and three photon absorption in Rh 6G methanol solution using pulsed thermal lens technique.
   C V Bindhu, A Kurian, S S Harilal, V P N Nampoori and C P G Vallabhan. *J.Nonlinear. Op. Phys. and Mat.7 (1999)*

4. Optical limiting and thermal lensing studies in C_{60}.
   S S Harilal, C V Bindhu, V P N Nampoori and C P G Vallabhan. *J.Appl.Phys.**86**,1388(1999)*

5. Solvent effect on absolute fluorescent quantum yield of Rhodamine 6G determined using transient thermal lens technique.
   C V Bindhu, S S Harilal, V P N Nampoori and C P G Vallabhan. *Mod. Phys. Lett. B **13**, 563 (1999)*

6. Evaluation of electrical conductivity and thermal diffusivity of VoNc.
   J Thomas, V N S Pillai, V P N Nampoori and C P G Vallabhan. *J.Mat.Sci.Lett.**18**,963(1999).*

7. A fibre optic evanescent wave sensor for monitoring the rate of pulsed laser deposition of metal thin films.
   M Shelly John, P Radhakrishnan, V P N Nampoori and C P G Vallabhan. *Meas. Sci. Technol.,**10**,17(1999).*

8. Thermal diffusivity of some polymer supported halogeno benzimidizole complexes of Co and Cu – a photoacoustic study.
   S Sankara Raman, V P N Nampoori, C P G Vallabhan, N Saravanan and K K Mohammed Yusuff *J. Mat. Sc. Lett. **18,** 1887, (1999)*

9. Photoacoustic study of the effect of hydroxyl ion on thermal diffusivity of gamma alumina.
   S Sankara Raman, V P N Nampoori, C P G Vallabhan, G Ambadas and S Sugunan. *J.Appl. Phys. **85**(3), 1987 (1999)*

10. Numerical study of reverse period doubling route from chaos to stability in a two-mode intra cavity doubled Nd:YAG laser.
    Thomas Kuruvilla and V M Nandakumaran. *CHAOS **9**,208(1999)*

11. Suppression of chaos through reverse period doubling in coupled directly modulated semiconductor lasers.
    Thomas Kuruvilla and V M Nandakumaran.*Phys. Lett. **A 254**,59,(1999).*

12. Optical absorption studies of free and rare earth phthalocyanine doped borate glasses.
    G A Kumar, J Thomas, N George, B A Kumar, P Radhakrishnan, V P N Nampoori, C P G Vallabhan. *Phys.Chem.Glasses.**41**(2),89(2000)*

13. Physical and optical properties of phthalocyanine doped inorganic glasses.
    G.A Kumar, J Thomas, N George, N V Unnikrishnan, P Radhakrishnan, V P N Nampoori, C P G Vallabhan. *J. Mat. Sci., **35**,1(2000)*

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