

## Indian Physics Association awards

Young scientists who have done commendable research in physics were awarded for their work for the year 2008 by the Indian Physics Association (IPA) on 20 March 2009 at the Homi Bhabha Centre for Science Education, Mumbai. The welcome address was given by S. S. Major (General Secretary, IPA and IIT Bombay, Mumbai). In his opening remarks Bikash Sinha (President, IPA and Director, Variable Energy Cyclotron Centre, Kolkata) said that it is important to recognize the contribution of young scientists and that it is an asset for the IPA to recognize such talents.

S. Kailas (Vice-President, IPA and Associate Director, Physics Group, Bhabha Atomic Research Centre (BARC), Mumbai) briefed on the young scientist awards and introduced the awardees. He mentioned that the evaluation and selection was done by e-mail. The awards were given away by Sinha. They included a citation and a cash prize.

The Buti Foundation Award for Excellence in Physics was conferred on Anirban Sain (Department of Physics, IIT Bombay) for his contributions to soft condensed matter physics, involving polymers and biological systems, and, in particular, for his work on statistical dynamics of biopolymers, lifetime of adhesion bonds and bacterial cell division. The recipient also received a medal.

The S. N. Seshadri Memorial Instrumentation Award was conferred on Shivanand Chourasia (Laser and Neutron Physics Section, BARC) for his contributions to the indigenous development of a 40 Gigawatt peak power Nd:glass laser system for laser-plasma interaction studies and for playing a pivotal role in the design and development of various state-of-the-art diagnostics tools, which have been used for experiments in the frontier areas of laser-plasma and laser driven shock physics.

Shivanand's work is about the laser-plasma interaction studies and experiments related to laser-driven shocks using an indigenously developed 30 Gwatt/300–800 ps Nd:glass laser. Intense laser applications in the frontier areas of science have resulted in an ever-increasing demand for high brightness lasers with peak powers of several tens of Gigawatts to hundreds of Terawatts having pulse

duration of few hundreds of picoseconds and hundreds of femtoseconds respectively. Complex diagnostics with a high degree of spatial and temporal resolution has helped in understanding the complex laser-plasma interaction processes taking place in timescale of picoseconds to femtoseconds, and space scales of microns.

The high-power Nd:glass laser system developed indigenously at the Laser and Neutron Physics Section, BARC, has a high degree of stability and has been used by several groups of researchers from abroad and India. It is based on Master Oscillator Power Amplifier (MOPA) architecture. A number of high-speed plasma diagnostics have also been developed for X-ray and ion measurements. The aim of the experiments conducted was to study the generation and enhancement of X-rays and ion emission from laser plasma using novel target designs.

The N. S. Satya Murthy Award in Physics was jointly conferred on Dibyendu Das (Department of Physics, IIT Bombay) and Tapas Ganguli (Raja Ramanna Centre for Advanced Technology, Indore).

Das was awarded in recognition of his contributions to studies of simple models for non-equilibrium phenomena in soft condensed matter physics, and, in particular, for his work on the moving of dissipative systems of granular matter and motion of a single polymer submerged in fluid flows. In his presentation, Das revealed that a single polymer motion in shear flow is an important problem in non-equilibrium statistical physics, and also has some relevance for biological and chemical sciences. The static distribution functions for the radial and angular conformation of the end-to-end vector of a polymer in shear flow has been studied earlier experimentally, as well as via approximate theories.

For a linear (Rouse) polymer model, Das' work entailed the solving of the exact static distribution functions. Further, the tumbling dynamics (alternate stretched to coiled to stretched states) of the polymer is also of great interest in the field. The random time intervals separating two successive tumbling events are known (experimentally) to have a distribution with an exponential tail. No theoretical estimate of the decay constants associ-

ated with this exponential tail was known earlier – the problem is known to be hard as it is a first passage property of a non-Markovian process. Das and his colleagues made a systematic analytical estimate of the latter in certain limit, which serves as a guide to understanding the experimental numbers.

Tapas Ganguli was awarded for his contributions to growth and characterization of semiconductor films and semiconductor device fabrication and, in particular, for his work on epitaxial semiconductor layers and their high-resolution X-ray diffraction studies. Pulsed laser deposition (PLD) is an important and simple technique for the deposition of thin films. In this technique, a focused pulsed laser is used to ablate/evaporate the required material from a target onto a substrate. Ganguli and his team deposited and characterized ZnSe thin films on (001)-oriented single-crystal GaAs substrates. These thin films have a similar crystalline structure and orientation as the substrate and are referred to as epitaxial layers.

PLD is a standard technique for the deposition of oxide-based materials. However, for II–VI semiconductors, not much work exists and using a set of depositions and characterizations, the researchers investigated the applicability of PLD for the deposition of ZnSe.

IPA has also announced the R. D. Birla Memorial Award and M. M. Chugani Memorial Award for the year 2008 for excellence in physics. The former is given biennially for excellence in pure physics and carries a citation, gold medal and cash prize of Rs 50,000. For the year 2008 the award was given to M. G. K. Menon (Advisor, ISRO, Department of Space, Govt of India).

The M.M. Chugani Memorial Award is given for excellence in applied physics and carries a citation, gold medal and cash prize of one lakh rupees. This award for 2008 was given to Anil Kakodkar (Chairman, Atomic Energy Commission, Secretary, Department of Atomic Energy, Govt of India).

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