AWARDS

Professor Iijima's Scientific Achievements

Professor Sumio Iijima, a visiting professor of Department of Electronic Structures, has been selected as a Person of Cultural Merits in 2003 for his outstanding contribution to the discovery and elucidation of geometrical structures of carbon nanotubes by means of high-resolution electron microscpy. His scientific achievements not only have an enormous impact on the rapidly growing field of nanoscale material science but also open up a possibility toward application in various fields, such as fuel cells, catalysts, sensors, STM probes, and panel display.

Associate Professor Taira's Scientific Achievements

Associate professor Takunori Taira of Laser Research Center for Molecular Science received the Award of 2004 Commendation by the Minister of Education, Culture, Sports, Science and Technology (Persons of scientific and technological research merits) for his contribution to "Miniaturization and Improvement in Performance of Solid-State Lasers."

This award is given to the persons who made a great contribution in scientific technologies. Dr. Taira realized a microchip laser composed of a 500-μm Nd:YVO_4 crystal for the first time. He improved its output power and efficiency and succeeded also in realizing lasers made of Yb:YAG and Nd:YAG ceramics. These developments opened a new field of microchip lasers and variety of applications including experiments using a satellite in space.

Research Associate Fujiwara's Scientific Achievement

Research associate Dr. Hideki Fujiwara of Department of Molecular Assemblies (who moved to Osaka Prefecture Univesity on October, 2003) has received the 2004 Chemical Society of Japan Award for Young Chemists for his contribution to "Development of the first Antiferromagnetic Organic Superconductor." About a quarter century ago, the era of organic superconductors was opened by the discovery of the first organic superconductors, which stimulated greatly the chemists to search for new molecular superconductors. However, the overwhelming discovery of the cupper oxide superconductors around 1986–87 requested them to find a new way to develop new types of functional molecular conductors. Then, the research for developing magnetic organic conductors was started around 1992. Around 1999 Dr. Fujiwara and co-workers examined the electric and magnetic properties of organic metal, κ-$(BETS)_2FeBr_4$ at low temperature and found the antiferromagnetic transition at 2.5 K and the superconducting transition at 1.1 K. That is, κ-$(BETS)_2FeBr_4$ was fond to be the first antiferromagnetic organic superconductor. The coexistence of three-dimensional magnetic order and superconductivity was definitely proved by the subsequent physical measurements by Dr. Fujiwara. The discovery of the antiferromagnetic organic superconductor is one of the recent prominent achievements in the field of molecular conductors.

Mr. Yamanaka's Technological Achievements

Mr. Takaya Yamanaka, the chief of the technical section of Laser Research Center for Molecular Science, received the Award of the Technological Development in Chemistry for 2003.

The Chemical Society of Japan awards every year a person who has contributed to the development or improvement of experimental techniques in chemistry or chemical engineering. Mr. Takaya Yamanaka is recognized for his contribution to "Advanced Instrumentation for Spectroscopic Measurements and the Development of Online Booking System of Equipments for the Use of Molecular Scientists." Mr. Yamanaka developed the following useful systems for the investigators in molecular science: (1) the computer-controlled apparatus for fluorescence-lifetime measurements with ns-time resolution by using fast transient memories, (2) the apparatus for time-resolved spectroscopic measurements for ultraviolet synchrotron orbital radiation facility, (3) the maintenance of ultrafast lasers and the development of acquisition systems in ultrafast time-resolved measurements, and (4) the online booking system of equipments for the use of molecular scientists. In particular, the apparatus for fluorescence-lifetime measurements has provided molecular scientists in use since 1984. This is one of the most heavily used apparatus originally developed in IMS and applied to the studies including not only the spectroscopy of molecules in the gas phase, but also clusters and photo-catalysts.

Research Associate Miura's Scientific Achievement

Dr. Shinichi Miura received the Scientific Award of Molecular Simulation Society, Japan in 2004 for his contribution to "Computational Theory for Quantum Liquids." Dr. Shinichi Miura started his career in molecular simulation in Prof. Go's group at Kyoto University in collaboration with Prof. Hirata and obtained his Ph.D in 1995 from Kyoto University. After the stay at Prof. Klein's group at University of Pennsylvania, he moved to Tokyo Institute of Technology as a Joshu of Okazaki group, and is, now, working for Institute for Molecular Science.

He has been engaged in simulation study for quantum liquids for more than ten years. First, he studied proton transfer reaction between two formic acid molecules based upon ab initio path integral molecular dynamics calculation and clarified energy profile along the reaction coordinate. Second, he extended RISM integral equation theory to the quantum system and applied it to solutions of quantum solvent, that is alkali metal atom in liquid helium and rare gas molecule in it, and succeeded in analyzing the microscopic solvation structure of snowball and bubble models for these solutions, respectively. Third, he is challenging to include the exchange effect of particles in the calculation, that is, the simulation for Boson and Fermion. Along this way, he proposed one possible way to simulate quantum dynamics of Boson and Fermion based upon a pseudo-potential method. Further, he secceeded in simulating liquid helium in superfluid state using his new hybrid path integral Monte Carlo method, which has a suitable form to include a solute in the fluid. And, now, he is extending his calculation to open a new field of solution chemistry, that is, solvation of a solute in quantum solvent in the super fluid state.

Research Associate Dr. Imura's Scientific Achievement

Dr. Kohei Imura, Research Associate of Department of Molecular Structure, received the Young Scientist Award for the Presentation of an Excellent Paper in the Annual Meeting of The Japan Society of Applied Physics (2004 spring). His title of paper was "Observation of two-photon emission and dynamics of gold nanoparticles by near-field microscopy." He constructed an apparatus for near-field spectroscopy using a femtosecond Ti:sapphire laser as a light source, where the pulse duration at the near-field probe tip was < 100 fs. Using this apparatus, he succeeded in measuring two-photon induced emission from gold nanoparticles with a spatial resolution as high as ~50 nm, and in analyzing the origin of that as well. He also succeeded in direct imaging of spatial distribution of surface plasmon modes for nanorods. At the same time, he found by time-resolved measurements that the ultrafast relaxation process (especially the electron-phonon relaxation) is strongly dependent on position in single nanorods. These results are important for fundamental understanding and application of optical properties of metal nanoparticles, and those of plasmon resonances in nanometric systems.