

IIT Bombay Professor to strengthen national research on nano-magnets with Swarnajanti Fellowship

Professor Dr. G. Rajaraman from the Indian Institute of Technology, Bombay, a recipient of this year's SwarnaJayanti Fellowship plans to design and develop new spintronics materials or molecule-based magnets that aim to replace the conventional electronics-based applications. His research is expected to contribute to the development and designing of new generation spintronics devices such as spin transistors, spin-valves and so on.

As the country strives towards nanoscale design and assembly of functional materials, his research can address outstanding issues in molecular spintronics devices using molecular magnetic materials and could offer various devices predicted using computational tools. If one such device could be made, it would trigger the growth of spintronics devices to replace existing electronic devices worldwide.

The Swarnajayanti Fellowship was instituted by Govt. of India to commemorate India's fiftieth year of Independence. The prestigious fellowship is funded by the Department of Science & Technology.



As very few groups are working in spintronics devices, Dr. Rajaraman's fellowship will strengthen the national status of research in the area. It will boost the work of his group which has been using state-of-the-art computational tools to predict novel magnetic materials, which are discovered at later date. They are also actively pursuing research in the area of modelling bio-mimic reactions catalysed by high-valent metal-oxo/imido complexes.

In the area of molecule-based magnets, the best magnets were made either by trial and error method consuming an enormous amount of manpower and resources. His group has been utilizing state-of-the-art ab initio methods to screen a large number of molecules using high-performance computers and identify potential target molecules. This method has revamped the area and several novel molecular magnets with very high blocking temperatures were made using such technique reducing the need to rely on the trial and error method.

Professor Rajaraman received his early education in Bharathidasan University in Trichy, Tamilnadu, before earning his Ph.D. from the University Of Manchester, UK. After a couple of years of postdoctoral research in the laboratory of Professor Peter Comba in Heidelberg, Germany as Humboldt Fellow and with Professor D. Gatteschi and Prof R Sessoli in University of Florence, Italy as Marie Curie Fellow, he returned to India in the year 2009 to take up a position in the Department of Chemistry, IIT Bombay. He is an elected member of the international advisory board of molecule-based magnets. He has received a number of national and international awards. His research focuses on employing electronic structure methods to understand the structure, properties and reactivity of molecules possessing unpaired electrons (open-shell systems).