Stevens Institute of Technology

Nanotechnology Graduate Program

MOLECULAR NANOMAGNETS

Wednesday, November 15, 2006
Babbio Bldg, Room 104, Time 11am

Professor Myriam P. Sarachik
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Molecular magnets, sometimes referred to as single molecule magnets, are organic crystals containing a very large (Avogadro's) number of magnetic molecules that are nominally identical, providing ideal laboratories for the study of nanoscale magnetic phenomena. With molecular clusters of large total spin (10 or higher), their behavior straddles the border between classical and quantum magnetism. The molecules are magnetically bi-stable at low temperatures, exhibit macroscopic quantum tunneling between up- and down-spin orientations, and demonstrate quantum interference between tunneling paths. Interest in these materials has grown dramatically in the last several years, owing to their potential use for high-density information storage, as well as the possibility that they could provide the qubits needed for quantum computation. Typical behavior of the class will be examined by considering Mn12-acetate, a particularly simple prototype. The talk will end with a brief description of our recent discovery of magnetic "deflagration", a phenomenon closely analogous to the propagation of a flame front through a flammable chemical substance.

Myriam Sarachik earned a B.A. cum laude from Barnard College in 1954. She received a M.S. in 1957 and a Ph.D. in 1960 from Columbia University. She was Research Associate at the IBM Watson Laboratories for one year and at Bell Labs for two years. She joined the faculty of the City College of CUNY in 1964 as an Assistant Professor and was promoted to Associate Professor in 1967 and to Full Professor in 1971. She was named a Distinguished Professor in 1995, a designation she continues to hold. As an experimental condensed matter physicist, she has done work on superconductivity, the Kondo effect, disordered metallic alloys, metal-insulator transitions in doped semiconductors, hopping transport in solids, properties of strongly interacting electrons in two dimensions, and spin dynamics in molecular magnets. She received the 1995 New York City Mayor's Award for Excellence in Science and Technology, a 2004 Sloan Public Service Award from the Fund for the City of New York, the 2005 Oliver E. Buckley Prize in Condensed Matter Physics, and was named the 2005 L'ORÉAL-UNESCO for Women in Science North American Laureate. She served as President of the American Physical Society in 2003. She is a member of the National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, of the American Physical Society, of the New York Academy of Sciences, and of the American Association for the Advancement of Science.

Light refreshments will be served prior to seminar

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