



北京大学百年物理讲坛

Centennial Physics Lectures at Peking University

Lecture 20

Fundamental Interactions Revealed by Molecular Behavior in Space and Time

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地点： 北京大学物理学院西楼202会议室

Abstract

Heterogeneity in the mass, charge, and spin distributions is fundamental to all matter and gives rise to its distinct static and dynamic properties. Ultimately it is important to resolve this heterogeneity by measuring excitations at atomic dimensions. This spatial resolution can be achieved with inelastic electron tunneling spectroscopy (IETS) and microscopy with a low temperature scanning tunneling microscope (STM). Furthermore, by coupling the STM to a femtosecond laser, it has become possible to probe matter at the space-time limit. This talk illustrates by three examples the experiments in space and time to reveal the nature of the chemical bond responsible for molecular structures and intermolecular interactions, spin exchange interaction and spin-vibration coupling in single magnetic molecules, and single-molecule coherent vibration driven structural transformation. The fundamental interactions that could be obtained from probing molecules in space and time should be generally applicable to the understanding of interactions in other condensed matter systems.

Biography

Wilson Ho received his B.S. and M.S. degrees in chemistry from the California Institute of Technology in 1975, and his Ph.D. in physics from the University of Pennsylvania in 1979. He spent a year as a member of the technical staff at Cornell University prior to joining the University of California, Irvine in 2000 as Donald Bren Professor. In the last 25 years, his group has focused on probing single molecules and nanoscale assemblies with homemade scanning tunneling microscopes. His work has been recognized by fellowships in the American Physical Society and the American Association for the Advancement of Science, memberships in the U.S. National Academy of Sciences and the Academia Sinica, the Bonner Chemistry Prize by the University of Bonn, the Victor K. LaMer Prize of the American Chemical Society, the Medard Welch Award of the American Vacuum Society, the Irving Langmuir Prize and the Joseph F. Keithley Award of the American Physical Society.



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