



THURSDAY COLLOQUIUM

Department of Physics, Tsinghua University

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Title Quantum Mechanics from the Top Down:
Understanding and controlling quantum systems by
studying their classical counterparts I. Chaotic Transport
and Escape

Speaker Prof. John B Delos

College of William and Mary

Venue 清华大学理科楼郑裕彤讲堂

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Abstract:

Chaotic transport, and the escape of trajectories from defined regions of phase space, has been an important topic in dynamics for many years, because it describes phenomena that occur in many branches of physics. For example, some meteorites that fell on Antarctica are believed to have come from Mars; how they escaped from Mars' gravitational field is a problem in the theory of chaotic transport. At a smaller scale, one of the important topics in nanophysics is ballistic transport of electrons through a small junction: electrons enter a junction from one lead, bounce around within the junction following either regular or chaotic paths, and eventually find their way to an exit lead. A closely related problem is chaotic propagation of light rays in a distorted cylindrical glass bead. At the molecular level, we may think about the breakup of a temporarily bound complex, such as a He atom weakly bound to an I₂ molecule. At the atomic level, the ionization of an excited hydrogen atom in applied electric and magnetic fields is an ideal candidate for the laboratory study of chaotic transport. We examine the time required for the electron to escape as a function of its initial direction. This escape- time plot has fractal structure. In this talk, we describe new methods for analyzing and observing this fractal.

Introduction to the Speaker



John B Delos

Research Associate - University of British Columbia - 1970-1971;

Assistant Professor - College of William and Mary - 1971-1977;

Associate Professor - College of William and Mary - 1977-1983;

Visiting Research Scientist, FOM Institute, Amsterdam, 1979-1980;

Consultant, Naval Surface Weapons Center, 1981;

Professor - College of William and Mary - 1983-present;

Visiting Fellow, JILA, 1986-87;

Visiting Scientist, Harvard-Smithsonian Center for Astrophysics, 1992;

Visiting Fellow, JILA, 1994-1995