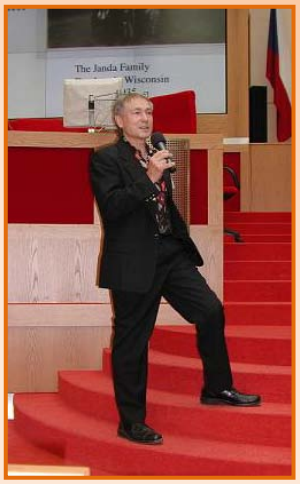
Institute Lecture

By Prof. Richard J. Saykally
Department of Chemistry, University of California, Berkeley

Water Music: The Latest Word on the Most Important Substance in the Universe



Date: 18th April, 2011 **Time:** 6:00 PM **Venue:** L-17, Lecture Hall

Abstract

As the third most abundant molecule in the Universe, the "universal solvent" in chemistry, and the basis of all life as we know it, water is a uniquely important substance. Nevertheless, our understanding of its fundamental nature remains incomplete, despite truly enormous efforts. This lecture will review recent advances in this understanding, facilitated by new developments in both experiment and theory. These include laser spectroscopy of water clusters, Xray and Raman spectroscopy of liquid microjets, and nonlinear laser spectroscopy of aqueous electrolyte surfaces. Currently debated subjects include the roles of water clusters in the atmosphere, the mechanism of aqueous evaporation, the nature of hydrogen bonding and structure in liquid water, the effects of salts on this hydrogen bond structure ("Hofmeister effects"), the hydration structures of fundamental ions, the surface behavior of aqueous ions, and the pH of the liquid water surface.

About the Speaker

Prof. Saykally is a world leader in laser spectroscopy of liquids, surfaces, and clusters. He and his group have pioneered many important advances in spectroscopy, including velocity modulation spectroscopy of ions, terahertz laser vibration-rotation-tunneling spectroscopy of clusters, infrared photon counting spectroscopy, and cavity ringdown spectroscopy. These have permitted the first detailed study of important textbook molecules, including the hydronium (H3O+), hydroxide (OH-) and ammonium (NH4+) ions, as well as small water clusters and carbon clusters. Recent work includes the spectroscopic determination of a universal water force field via the study of water clusters, the development of femtosecond nonlinear optical molecular imaging methods applied to interstellar dust particles and biological systems, femtosecond UV SHG/SFG studies of liquid electrolyte surfaces, and X- ray spectroscopy of volatile liquids and their surfaces.

Contact:

A. K. Chaturvedi
Dean of Research and Development