

## The **3M** University Lecturer in Chemistry 1998-1999



**Robert W. Field**

Robert T. Haslam and Bradley Dewey Professor of Chemistry  
Massachusetts Institute of Technology

Professor Robert W. Field is a distinguished molecular spectroscopist. He has developed a variety of laser spectroscopic techniques to examine the electronic and vibrational spectra of small, gas phase molecules. These techniques include Microwave Optical Double Resonance, Optical Optical Double Resonance, Optically Pumped Electronic Transition Lasers, Modulated Gain Spectroscopy, Perturbation Facilitated Optical Optical Double Resonance, Stimulated Emission Pumping ("Pump and Dump"), Frequency Modulation Enhanced Magnetic Rotation Spectroscopy, Sideband Optical Optical Double Resonance Zeeman Spectroscopy, and Optical Optical Microwave Triple Resonance Spectroscopy. Armed with these experimental techniques as well as powerful pattern recognition schemes such as Extended Spectral Cross Correlation, it has been possible to extract information from unprecedentedly complex spectra. He has shown that often it is the most complicated spectra that open a window into elegantly simple insights into the structure and dynamics of a molecule. Two of his favorite phrases are "beyond molecular constants" and "dynamics encoded in frequency domain spectra." Starting with his pioneering studies of spectroscopic perturbations, he has developed a series of increasingly comprehensive zero-order pictures of molecular structure that provide mechanistic insights into the early time dynamics of a wide variety of intramolecular processes: where is the excitation initially localized, where does it go first, how fast, why?

Professor Field was born on June 13, 1944 in Wilmington, Delaware. He graduated *magna cum laude* from Amherst College in 1965 where he had his first experience of spectroscopy in his A.B. thesis research with Professor Cooper H. Langford. Then, supervised by Professor William Klemperer at Harvard University, he gained his initial experience with multiple resonance spectroscopies and spectroscopic perturbations (of CO). After receiving his Ph.D. in Physical Chemistry in 1971, he did postdoctoral research with Professor Herbert P. Broida and Professor David O. Harris at the University of California Santa Barbara. At UCSB, he became a "laser spectroscopist" and recorded the first laser-microwave Microwave-Optical Double Resonance (MODR) and laser-laser Optical-Optical Double Resonance (OODR) spectra of molecules (BaO). In 1974 he began his academic career at the Massachusetts Institute of Technology, becoming Professor in 1982 and the Robert T. Haslam and Bradley Dewey Professor of Chemistry in 1999.

Professor Field has received many awards and honours as a result of his distinguished research in Molecular Spectroscopy and Dynamics. He was awarded the H.P. Broida Prize (1980) and the E.K. Plyler Prize (1988) from the American Physical Society, the Ellis Lippincott Award (1990) and William F. Meggers Award (1996) from the Optical Society of America, and as co-recipient with Professor James L. Kinsey of Dr. Yongqin Chen, the Nobel Laureate Signature Award of the American Chemical Society (1990) for the best Ph.D. thesis of the year. He received an honorary doctorate from his *alma mater*, Amherst College, in 1997 and was elected to the American Academy of Arts and Sciences in 1998. He has served on the editorial advisory boards of *The Journal of Chemical Physics*, *The Journal of Physical Chemistry*, *Annual Reviews of Physical Chemistry*, *Chemical Physics Letters*, and *The Journal of Molecular Spectroscopy*. He is the author of more than 270 papers, co-author (with H  l  ne Lefebvre-Brion) of *Perturbations in the Spectra of Diatomic Molecules*, and co-editor of *Molecular Dynamics and Spectroscopy by Stimulated Emission Pumping and Nonlinear Spectroscopy for Molecular Structure Determination*. He has supervised the Ph.D. research of 35 students.

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Professor Field will present three lectures during his visit to UWO:

Tuesday, October 12, 1999 4:00 p.m.

*Putting the Periodic Table Back into Molecular Electronic Structure: Atomic Ions in Diatomic Molecules*

Wednesday, October 13, 1999 4:00 p.m.

*Core-Nonpenetrating Rydberg States are Spectroscopic Black Holes: Molecular Ions in Molecules*

Thursday, October 14, 1999 4:00 p.m.

*Acetylene at the Threshold of Isomerization*

All Lectures will be given

in Room 193, Medical Sciences