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February Meeting

The 894th Meeting of the Northeastern Section of the American Chemical Society

Northeastern Section American Chemical Society

Joint Meeting with NOBCChE

Professor Wilton L. Virgo

Wellesley College

"Tracking Energy in Chemical Dynamics from MIT to Wellesley: What Are the Pathways for Electronic Energy Flow and Photochemistry?"

Thursday, February 12, 2009
Paresky Center - Main Campus Building
Simmons College - 300 The Fenway, Boston, MA

5:30 pm	Social Hour
6:30 pm	Dinner
7:30 pm	Evening Meeting – Dr. E. Joseph Billo, NESACS Chair, presiding Speaker: Prof. Wilton L. Virgo

Dinner reservations should be made **no later than 12:00 noon on Thursday, February 5, 2009.** Please contact Marilou Cashman at mcash0953@aol.com or by phone at (800) 872-2054 or (508) 653-6329**.** Reservations not canceled at least 24 hours in advance must be paid. Anyone who needs handicapped services/transportation, please call a few days in advance so that suitable arrangements can be made. **Payment is made at the door by cash or check (no credit cards.) Members, $28.00; Non-members, $30.00; Retirees, $18.00; Students, $10.00.**

Directions to Simmons College

From the West
Take Route 90 East (Massachusetts Turnpike) to Exit 22. Stay left and follow signs marked "Prudential Center/West 9." Stay on Huntington Ave. west approximately 1 mile. Pass Museum of Fine Arts on right, then turn right at next light on Louis Prang St. Continue through two lights. The main building of Simmons will be on left. Turn left on Avenue Louis Pasteur. Simmons's library is on left. Passengers may be dropped off here.

From the South
Take I-93 North to Exit 26, "Storrow Drive". Follow local directions below.

From the North
Take I-93 South to Exit 26, Storrow Drive west/North Station. Keep left on exit and follow signs for Storrow Drive west. Follow local directions below.

Local Directions
Look for sign "Kenmore Square, Fenway, Route 1 South" and exit left, following sign for "Fenway 1 South." Do not take Kenmore Square exit. Stay right at light, following sign for "Boylston St. Outbound, Riverway 1." Get in left lane and proceed to first light. Turn left onto Park Drive. Follow Park Drive to lights (gas station on right corner) and cross Boylston Street and Brookline Avenue. Stay left. At next set of lights, bear left following "Fenway" sign to reverse direction. At lights, continue straight, crossing Brookline Avenue again. You will be on "The Fenway." Turn right onto Avenue Louis Pasteur after Emmanuel College. Simmons's library is on left. Passengers may be dropped off here.

MBTA Directions: Take MBTA green line E train (Heath Street) to Museum stop. Turn right onto Louis Prang Street. From here you can see Simmons's green cupola. Walk past Isabella Stewart Gardner Museum on left. Simmons College, 300 The Fenway, will be on left.

THE PUBLIC IS INVITED

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Abstract:

One of the major goals in the field of physical chemistry is to elucidate the mechanism of energy flow during a chemical reaction. Since the 1960s, there has been a great deal of scientific research focused on understanding the detailed mechanism of energy flow involving Inter-System Crossing by analyzing molecular spectra. However, there has never been sufficient information in traditional spectra to determine the important mechanistic details. At MIT, our research is focused on inventing new models to describe the mechanism of intramolecular chemical energy flow in highly energized, profoundly distorted forms of organic molecules. Our work provides strong support for a new deterministic doorway mechanism for chemical energy flow in molecules, rather than the more traditional, purely statistical decay mechanism. Using a simple experimental method to observe the time-evolution of a spectrum, we can obtain all the necessary information in order to use a deconvolution procedure that extracts the energy of the doorway state and relevant coupling matrix elements that describe the decay mechanism.

At Wellesley College, the main research problem to be addressed is how photochemical energy is partitioned and transformed as atmospheric reactions proceed through multiple channels involving photodissociation. Photochemistry provides the driving force behind the chemical reactions that mediate the production and removal of ozone in the atmosphere. We are designing and building a velocity map imaging apparatus in order to elucidate the major photochemical mechanisms and processes that initiate and drive atmospheric chemical reactions related to ozone production and removal. The experiment provides deep insight into the ways that energy is funneled through different photodissociation channels. The goal is to understand the fundamental chemistry of the key molecular protagonists that mediate atmospheric reactions. With the fundamental understanding of atmospheric chemistry derived from these chemical dynamics experiments, one can begin to accurately model and predict the chemical response of the global atmosphere to both natural and anthropogenic perturbations. Since atmospheric chemistry is governed by the photodissociation of molecules by sunlight and the internal energy of vibrating molecules, the proposed experiment will yield deep insight into the chemistry of global climate change.