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Lecture Series



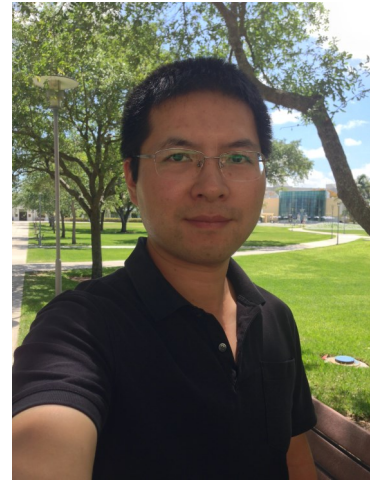
FLORIDA INTERNATIONAL UNIVERSITY

## “Optical Multi-dimensional Coherent Spectroscopy”

**Dr. Hebin Li**  
Assistant Professor  
Department of Physics  
Florida International University

**Friday, February 6th 2015**  
**LECTURE: 9:00 AM - 10:00 AM**

**ENGINEERING CENTER**  
**ROOM EC 1112**  
**10555 WEST FLAGLER STREET**  
**MIAMI, FL 33174**



**Abstract:** The concept of multi-dimensional coherent spectroscopy originated in nuclear magnetic resonance (NMR) where it revolutionized NMR studies of molecular structure and dynamics and led to the Nobel Prize in Chemistry in 1991. In the past decade, the same concept has been implemented in the optical region with femtosecond lasers.

In this presentation, I will introduce optical multi-dimensional coherent spectroscopy and its applications to study a potassium (K) vapor and semiconductor nanostructures. The K vapor provides a simple test model to validate the method, while the obtained 2D spectra reveal the surprising collective resonance due to the dipole-dipole interaction in a dilute gas. By extending the technique into a third dimension, 3D spectra can unravel different pathways in a quantum process and provide complete and unambiguous information to construct the full Hamiltonian of the system.

**Biography** Hebin Li is currently an assistant professor in the Department of Physics at Florida International University. He studies the interaction of light with matter by using cutting-edge optical tools. He is particularly interested in many-body quantum systems consisting of interaction atoms, molecules and electrons. He develops and uses techniques and ideas in ultrafast spectroscopy and quantum optics to probe and manipulate quantum dynamics of such systems. He received his B.S. in physics from Wuhan University in 2001, and his Ph.D. in physics from Texas A&M University in 2010. Before joining the faculty at FIU in 2013, he worked as a Research Associate at JILA, a joint institute of the National Institute of Standards and Technology (NIST) and the University of Colorado at Boulder. For more information, please visit his website at <http://faculty.fiu.edu/~hebli/>.

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**Map:** <http://campusmaps.fiu.edu/Engineering Center>