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WEEKLY CALENDAR

April 23-27, 2012

DEPARTMENTAL COLLOQUIUM

"The Role of Quantum Entanglement and Coherence in Chemical Processes"

3:40 PM, April 26, 2012
109 Nicholson Hall

Sabre Kais
Purdue University

Host: Jonathan Dowling

• *Refreshments served at 3:15 PM in 232 (Library) Nicholson Hall* •

Applications of the concepts of quantum information theory are usually related to the powerful and counter-intuitive quantum mechanical effects of superposition, interference and entanglement. I will discuss the role of entanglement in complex systems such as photosynthesis, dissociation of molecules, molecules trapped in optical lattice and the mechanism with which birds determine magnetic north.

Bio: Prof. Kais research is in the field of quantum critical phenomena, finite size scaling, quantum phase transitions, electronic structure and stability of matter under external fields, global optimization and quantum information and computation. In particular, his research in quantum information focuses on quantifying entanglement, quantum algorithms for solving the many-body problem, teleportation using quantum dots, decoherence in spin systems and ultra cold molecules implementations of qubits (<http://www.chem.purdue.edu/kais/>). In 1989, Prof. Kais received his Ph.D. in Chemical Physics from the Hebrew University. After a postdoctoral appointment at Harvard University 1989-1994, he joined the Chemistry Department at Purdue in 1994 as an Assistant Professor. Since 2002, he is a full professor of Chemical Physics. He received the National Science Foundation Career Award in 1997. He was also awarded the Purdue University Faculty Scholar Award (2004-2009), and the Guggenheim Fellowship Award (2005). In 2007, Prof. Kais was the Elected Fellow of the American Physical Society and the Elected Fellow of the American Association for the Advancement of Science. He has courtesy professorships appointment at both the Department of Computer Science and the Department of Physics at Purdue. He has published over 140 peer-reviewed papers and served on the editorial board of several Chemistry and Physics Journals. Currently, he is the director of a new funded National Science Foundation (NSF) Center for Chemical Innovation: Quantum Information and Computation for Chemistry The Center will investigate information techniques used to gain novel viewpoints on diverse chemical processes from photosynthesis to bond breaking. (<http://web.ics.purdue.edu/~kais/qc/>).