California State University, Sacramento

Department of Physics & Astronomy Fall 2004

Physics Colloquium Series

Can We Make Atoms Sing and Molecules Dance? Using Fast Light Pulses to Observe and Control Nature

During the past decade, there has been a revolution in the field of ultrafast lasers. Visible light pulses of only a few optical cycles in duration can now be generated from a simple laser. These laser pulses can be used to literally rip atoms apart, generating "laser-like" x-ray beams in the process. Moreover, using computer algorithms, we can "teach" a laser to generate a properly shaped light pulse in time, that allows us to force an atom to radiate laser-like x-rays of specific wavelengths. This allows us, for example, to channel laser energy into a specific x-ray wavelength, or to force molecules to vibrate along a particular bond. This work is a first step towards using light as a catalyst to control chemical reactions.

Margaret Murnane

University of Colorado at Boulder **and** ***JILA***

Thursday, October 28, 2004

4:00-5:20 PM MND 1015

OPEN & FREE TO ALL STUDENTS & FACULTY