SACRAMENTO STATE

Department of Physics and Astronomy

SPRING 2021 Colloquium Series - Virtual

"Attosecond Science: Resolving the electron dance"

Dr. Arvinder Sandhu

University of Arizona

The emergence of attosecond science has enabled the direct measurement and control of dynamics in molecules and materials on the natural timescale of electrons. Pioneering attosecond experiments have obtained unique insights into familiar atomic and molecular processes, such as ionization, tunneling, and relaxation by capturing real-time snapshots of the underlying electron dynamics. My research expands the scope of attosecond science to explore 'complex' processes in molecules and materials, where dynamical complexity stems from various interactions, including the coupling between the electronic and structural degrees of freedom, electronic correlations, external light fields, or a combination thereof. As an example, I will discuss the nuclear motion mediated evolution of an electron hole near a conical intersection of a polyatomic molecule. Conical intersections are an important area of investigation because they serve as nature's energy funnels in many biochemical processes, e.g., vision, light harvesting, etc. I will show that apart from the quantitative measurements of electronic couplings responsible for charge and energy redistribution in molecules, we can also monitor the evolution of quantum coherence in such dynamics. I will also discuss our new efforts to develop new light sources that combine the strengths of attosecond spectroscopy and x-ray science to attain unprecedented resolution for temporal and spatial imaging, thereby revolutionizing our ability to map and control elementary processes in biomolecules, interfaces, and quantum materials.

Thursday, April 1, 2021
4:00 – 5:20PM

Talk will be via Zoom – contact physics@csus.edu for links

Open & Free to all students, faculty and public