



Wednesday
October 13, 2021
3:30 pm
Room 1311 EECS

Prof. Louis F. DiMauro

The Ohio State University

Scaling Intense Laser-Atom Interactions from Low to High Frequency

Over the past three decades, the tailoring of a light field for manipulating the dynamics of a system at the quantum level has taken a prevalent role in modern atomic, molecular and optical physics. As first described by L. V. Keldysh, the ionization of an atom by an intense laser field will evolve depending upon the light characteristics and atomic binding energy. Numerous experiments have systematically investigated the dependence of the intensity and pulse duration on the ionization dynamics. However, exploration of the wavelength dependence has been mainly confined to wavelengths near $1 \mu\text{m}$, or in the language of Keldysh to the multiphoton or mixed ionization regime. It is technically possible to perform more thorough test the strong-field limit (tunneling), and exploit the scaling laws at wavelengths greater than $1 \mu\text{m}$. In addition, the emergence of XFELs has broadened the scope into the x-ray regime. This new perspective on strong-field interactions is driving a renewed interest in the fundamental physics and a renaissance in applications. This talk will examine the implication of the strong-field scaling as it pertains to the production of energetic particles, the generation of attosecond pulses and molecular imaging.

About the Speaker: Louis F. DiMauro is Professor of Physics and Hagenlocker Chair at the Ohio State University (OSU). He received his BA (1975) from Hunter College, CUNY and his Ph.D. from University of Connecticut in 1980 and was a postdoctoral fellow at SUNY Stony Brook before arriving at AT&T Bell Laboratories in 1981. He joined the staff at Brookhaven National Laboratory in 1988 rising to the rank of senior scientist. In 2004 he joined the faculty at OSU. He was awarded 2004 BNL/BSA Science & Technology Prize, 2012 OSU Distinguish Scholar Award, the 2013 OSA Meggers Prize and the 2017 APS Schawlow Prize in Laser Science. He is a Fellow of the American Physical Society, the Optical Society of American and the American Association for the Advancement of Science. He has served on numerous national and international committees, government panels, as the 2010 APS DAMOP chair, vice-chair of the NAS CAMOS committee and currently serves on the NAS Board of Physics and Astronomy. His research interests are in experimental ultra-fast and strong-field physics. In 1993, he and his collaborators introduced the widely accepted semi-classical model in strong-field physics. His current work is focused on the generation, measurement and application of attosecond x-ray pulses and the study of fundamental scaling of strong field physics.