



# PHYSICS COLLOQUIUM

Fay Ajzenberg-Selove Distinguished Lecture

## Harnessing Attosecond Science in the Quest for Coherent X-Rays

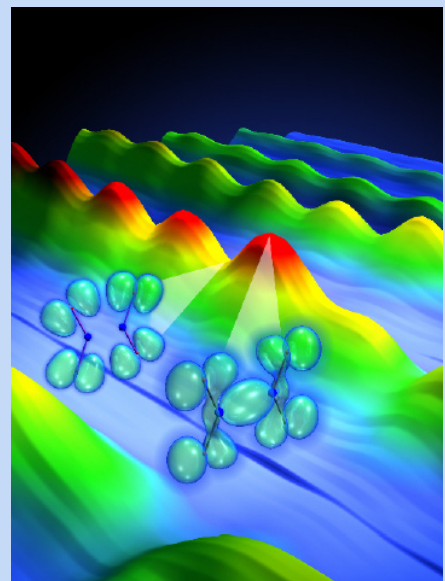


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Host: Everett and Yavuz

**Abstract:** To generate coherent x-ray beams, extreme nonlinear optical techniques have succeeded in upshifting visible laser light into the soft x-ray region of the spectrum. This ability has given us a new coherent light source that spans a large spectral bandwidth, with pulse durations on sub-femtosecond or attosecond ( $1 \text{ as} = 10^{-18} \text{ s}$ ) time-scales. Equally intriguing is the fact that we have learned how to use light to coherently manipulate electrons in atoms and molecules on their fundamental, attosecond, timescales. The richness and complexity of attosecond science and technology is only just beginning to be uncovered. As I will discuss in this talk, attosecond science can capture the complex, interwoven dance of electrons in molecules and materials. Attosecond science also shows great promise for developing new ultrasensitive molecular imaging and spectroscopic techniques. Finally, attosecond science represents the most promising avenue to achieve what had seemed hopelessly impractical until now—the generation of bright, coherent, hard x-ray beams using a tabletop-scale apparatus.



2241 Chamberlin Hall • Friday, March 6, 2009 • 4:00 P.M.

cookies & coffee served at 3:30 p.m.