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## WEEKLY CALENDAR

September 26, 2011

### Departmental Colloquium

Thursday, 3:40 PM, September 29, 2011  
109 Nicholson Hall

**"Coherent Attosecond Beams at keV Photon Energies and  
Applications in Materials and Molecular Science"**

Margaret Murnan  
University of Colorado at Boulder

*Host: Mette Gaarde*

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

Bright coherent high harmonic beams can now be generated from tabletop lasers, at photon energies that span from the ultraviolet to  $>1.6$  keV ( $<7.8$  Å). This corresponds to efficiently combining together  $> 5000$  laser photons. In the future, it may even be possible to realize a coherent ultrafast version of the Roentgen X-ray tube in a tabletop-scale apparatus. Example applications of high harmonic beams in materials and molecular science will also be discussed, including uncovering how magnetic materials behave on timescales less than the characteristic exchange interaction time, nanoscale 3-dimensional lensless imaging, capturing the coupled motions of electrons and atoms in molecules, and following energy flow in nanostructures.

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### Publications:

1. "Spin-Resolved Tunneling Studies of the Exchange Field in EuS/Al Bilayers", Y.M. Xiong, **S. Stadler**, **P.W. Adams**, and G. Catelani, Phys. Rev. Lett. 106, 247001 (2011).
2. "Mystery of Excess Low Energy States in a Disordered Superconductor in a Zeeman Field", Y. L. Loh, N. Trivedi, Y. M. Xiong, **P. W. Adams**, and G. Catelani, Phys. Rev. Lett. 107, 067003 (2011).
3. "Small Lorentz violations in quantum gravity: do they lead to unacceptably large effects?", Rodolfo Gambini, Saeed Rastgoo and **Jorge Pullin**, Classical and Quantum Gravity 28 (2011) 155005 (6 pp).