

# Physics & Astrophysics Colloquium

## Advances in Measuring Ultrafast Atomic Dynamics with Scanning Tunneling Microscopes

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4:00 PM Friday, January 27, 2023, Room 211, Witmer Hall

### **Abstract:**

Remarkable progress has been made in the past decade towards the dream of imaging ultrafast dynamics in condensed matter systems with atomic resolution using scanning tunneling microscopes. This dream is driven by the richness of information that is accessed examining dynamical evolution of physical systems on fundamental temporal and spatial scales. Watching atoms evolving in concert with their neighbours on the picosecond and femtosecond time scale has long been regarded as a critical step forward in resolving some of the challenges that underlie complex quantum materials such as high temperature superconductivity, formation of localized quantum states, and charge transport in photovoltaics. Although the motivation to realize an ultrafast STM has been strong since the early years following the invention of the STM, it has taken the combination of numerous technological advancements in order to actually result in instruments with practical functionality. Experiments on selected atomic spin systems and correlated electron systems will be presented in the context of a brief history of the development of ultrafast scanning tunneling microscopes.

**Refreshments at 3:30 PM in Witmer Hall, Room 215**

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