

**Department of Physics and Astronomy**  
Stony Brook University  
7:30 pm  
ESS Building, Room 001  
Friday, March 10, 2023

---

# Imaging the Dynamics of Electrons in Quantum Materials

Prof. Thomas K. Allison

**Abstract:** The dynamics of electrons in molecules and materials underly many fascinating phenomena and important technologies. However, our ability to image these dynamics has previously been quite limited due to the extremely small length and time scales involved. I will describe recent breakthroughs in my laboratory at Stony Brook that enable the dynamic imaging of electron dynamics at surfaces and interfaces using a new technique called time-resolved momentum microscopy. This realizes a long-standing goal of the field of ultrafast spectroscopy to record "movies" of electron motion with femtosecond time resolution and Angstrom spatial resolution. A wide range of samples can now be put under the microscope (literally), from surface-adsorbed molecules to single layers of atoms!

**Bio:** Thomas K. Allison earned his B.S. in Engineering Physics from Cornell University in 2003 and his Ph. D. in Physics from the University of California, Berkeley in 2010. After a postdoc at JILA in Boulder, CO, he joined the faculty at Stony Brook University in 2013 as a professor in both the Physics and Chemistry departments. He is the recipient of the U.S. Dept. of Energy Early Career Award, the U.S. Air Force of Scientific Research Young Investigator Award, and the Stony Brook University Discovery Prize. Allison's research group develops new laser technology to tackle a wide range of problems in the field of ultrafast spectroscopy.

---

