CSU PHYSICS COLLOQUIUM

“The Preparation and Measurement of Pure Quantum States”

Professor Wes Campbell
University of California Los Angeles

Monday, March 1st at 4:00 pm
Virtual via Zoom (see announcement for link)

Abstract

Quantum mechanical systems with two levels arise in multiple disciplines of physics, astronomy, chemistry, computer science, and materials science. The rules that govern the process and outcomes of measurements of quantum two level systems give us insight into more complex scenarios as well as the power and limitations of quantum computers. In particular, what is known as the purity of a quantum state is an important aspect of near-term quantum-enhanced sensors and processors, though it lags behind the performance achieved for other operational primitives of these systems. Focusing on trapped atomic ions as near-ideal quantum two-level systems, I will discuss both the improvement of measurements of quantum states as well as their utility for enhancing the functioning of other processes in these systems.

Biography

A number of years after receiving a highly prestigious certificate for 'Excellent participation in Science' in Mrs. Borgmann's 1st grade class, Wes Campbell went on to Harvard, where he worked on molecule cooling and trapping. After receiving his Ph.D. in 2008, he began a postdoc at the Joint Quantum Institute where he helped to develop the use of mode-locked lasers for trapped ion quantum information processing. At UCLA, Wes's group in the Department of Physics and Astronomy has been focusing on applications of mode-locked lasers for slowing and cooling difficult species, as well as development of new tools for trapped ion quantum information processing.