Department of Mathematics,
University of California San Diego

Quantum Computing Colloquium

Prof. Victor Albert
Caltech

Harnessing exotic configuration spaces for quantum applications

Abstract:

The position states of the harmonic oscillator describe the location of a particle moving on the real line. Similarly, the phase difference between two superconductors on either side of a Josephson junction takes values in the configuration space of a particle on a circle. More generally, many physical systems can be described by a basis of “position states,” describing a particle moving on a more general configuration or state space. Most of this space is usually ignored due to the energy cost required to pin a particle to a precise “position”. However, as our control over quantum systems improves, utilizing more of this higher-energy space harbors benefits for protecting quantum information and probing quantum matter. I will discuss quantum applications taking advantage of state spaces associated with the harmonic oscillator, as well as molecular rotational and nuclear states.

Bio: Victor V. Albert received his Bachelor’s degree in physics and mathematics from the University of Florida in 2010 and his Ph.D. in physics from Yale University in 2017. He is currently a Lee A. DuBridge Postdoctoral Scholar in Physics at the California Institute of Technology. He pursues an interdisciplinary line of research in quantum science, including open quantum systems, error-correction, experimental realizations, and topological band theory.

Host: James McKernan

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