SACRAMENTO STATE

Department of Physics and Astronomy

SPRING 2023 Colloquium Series

"Phase Transition in the Diamond Lattice Using Quantum Monte Carlo"

Artyom Filippov

Sac State Physics Major Senior Project Research

My project was to implement the 3-dimensional diamond lattice into our in-house built quantum Monte Carlo simulator of particles with SU(N)-symmetric spin model and explore the transition between magnetically ordered and disordered phases in the model. By measuring the magnetic order parameter, spin stiffness, of the simulated systems we can identify in which phase the system is, and by tuning the number of spin colors (control parameter N) we search for the phase transition. Considering interactions only between nearest neighbors I was able to identify the range of integer N for which the transition occurs, and to understand the nature of the transition I now collect data from the simulations with next nearest neighbor interactions.

Thursday, May 4, 2023

4:00 - 5:20PM

MND1015

Open & Free to all students, faculty and public