University of Victoria

PHYSICS AND ASTRONOMY COLLOQUIUM (In Person & Online)

Dr. Thomas E. Baker

University of Victoria

“Why is it called the density matrix renormalization group?”

Abstract

“Solving arbitrary quantum problems for many-body physics is known to be harder than all known computers can efficiently accomplish. Nevertheless, even approximate solutions can create advances in technology. One computational strategy to solve a lattice model is the use of entanglement renormalization methods where the eigenvalue problem is decomposed into a series of tensors. The relevant procedure for this is the singular value decomposition which provides all elements of the density matrix. The density matrix lacked a firm mathematical footing until the mid-1900s when it became firmly grounded in information theory. By combining these ideas, an efficient solver for quantum and classical problems can be created, including the density matrix renormalization group. I will develop these ideas and introduce the DMRjulia library, a tensor network library coded in Julia that is as fast or faster than lower-level implementations. If time allows, I will discuss new applications of the code to new problems and use cases.”

Wednesday, January 18, 2023

3:30 p.m. PST

ECS 116

Zoom link available on Uvic Event Calendar