



PHYSICS AND ASTRONOMY COLLOQUIUM

Dr. Roman Krems

UBC

“Can Machine Learning Outperform a Physicist”

Abstract

“Machine learning models are usually trained by a large number of observations (big data) to make predictions through the evaluation of complex mathematical objects. However, in many applications in science, particularly in quantum condensed-matter physics, obtaining observables is expensive so information is limited. In this work, we consider the limit of ‘small data’. Usually, ‘big data’ are for machines and ‘small data’ are for humans, i.e. humans can infer physical laws given a few isolated observations, while machines require a huge array of information for accurate predictions. Here, we explore the possibility of machine learning that could build physical models based on very restricted information. In this talk, I will show how to build such models using Bayesian machine learning and how to apply such models to two types of problems: (1) the inverse problems aiming to infer Hamiltonians from dynamical observables; (2) the extrapolation problems aiming to make predictions in parts of the Hamiltonian parameter space, where neither experiment nor theory are feasible.”

Wednesday, September 30, 2020

3:30 p.m.

via Zoom: <https://uvic.zoom.us/j/99605059029>