UCLA Department of Physics & Astronomy

COLLOQUIUM

Thursday, November 9th, 2023 at 4 p.m.
PAB 1-434

Cosmology with Probabilistic Neural Networks

Tuan Do
UCLA

While our understanding of the Universe's composition and formation has advanced in the last two decades, fundamental questions persist. The nature of the majority of the Universe, comprising 27% Dark Matter and 68% Dark Energy, remains unknown. To unveil these mysteries, astronomers are constructing ambitious telescopes and sky surveys. LSST and Euclid will soon come online, surveying vast portions of the sky with unprecedented depth.

Machine learning is essential for analyzing and interpreting the enormous volume of data. Our group translates machine learning methods to cosmology, using probabilistic neural networks that combine deep neural networks with Bayesian inference. This approach yields accurate predictions and uncertainty estimates for galaxy distances (redshifts) based on brightness and multi-wavelength images. I will also discuss our approach to measuring cosmic shear for weak-lensing and improving the interpretability of neural networks for astrophysics.

Refreshments at 3:30 p.m. PAB Patio. **Undergraduates Welcome!**