MONTANA STATE UNIVERSITY | College of LETTERS & SCIENCE

Physics Colloquium

Friday, March 11th, 2022
4:10 – 5:00 PM
Barnard Hall 103

Keeping Up With Experimentalists: Accurate Predictions for Multimessenger Gravitational Wave Astrophysics

Nils Deppe

Abstract:

The first detection of a binary neutron star merger through gravitational waves took place in 2017. The event was accompanied by counterpart detections all across the electromagnetic spectrum and established that such events can produce short gamma-ray bursts and heavy elements. Despite the tremendous success, our ability to model such merger events remains a major limiting factor in understanding these rich high-energy collisions. The errors in numerical simulations of binary neutron star mergers are larger than experimental errors and difficult to quantify. Additionally, while binary black hole simulations are sufficiently accurate for current observatories like LIGO, this will no longer be true for the next-generation ground-based gravitational-wave observatories like Cosmic Explorer and Einstein Telescope. I will discuss my work combining breakthroughs in parallel computing and numerical algorithms that are necessary to take full advantage of current and future multi-messenger gravitational wave detections.

Host: Neil Cornish

**** Refreshments served in the Barnard second floor atrium at 3:45 ****