MONTANA STATE UNIVERSITY | College of LETTERS & SCIENCE

Physics Colloquium

Friday, March 9, 2018
4:10 – 5:00 PM
Barnard Hall (EPS) 103

Probing Fundamental Physics with Compact Binaries: Current and Future

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Abstract:

Astrophysical compact binaries that consist of neutron stars and black holes offer us excellent testbeds for exploring fundamental physics. For the first part of this talk, I will focus on probing nuclear physics with gravitational waves from the binary neutron star merger event GW170817. In particular, I will discuss whether the gravitational-wave source is also consistent with a hybrid star / neutron star binary, where the former has a quark core with nuclear matter envelope constructed from a nuclear matter equation of state with a first-order phase transition. For the second part of my talk, I will concentrate on probing gravitational physics. I will begin by reviewing the current status of testing strong-field gravity with gravitational wave and binary pulsar observations. I will then explain the future prospect on the strong-field test of gravity in terms of using black hole / pulsar binaries that are yet to be discovered, and the application of universal ("I-Love") relations for neutron stars to gravitational wave and binary pulsar observations.

Host: Nico Yunes

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