Dissertation Defense
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Date: Wednesday, November 28th 2018
Time: 1:00 pm to 2:00 pm
Location: UTRGV
Campus: East Campus
Advisor: Soumya Mohanty

Abstract

"Data analysis methods for gravitational wave searches from binary inspirals and gamma-ray bursts"

"We investigate and develop data analysis methods for gravitational wave searches from binary inspirals and gamma-ray bursts. The first technique is a low-latency fully coherent network analysis of gravitational wave detector data to infer information on compact binary coalescence. It uses the stationary phase approximation, optimizes using particle swarm optimization, and an implementation is developed for high-performance computing.

The second technique concerns gamma-ray bursts. Given a set of observed astrophysical events, such as gamma ray bursts, it is possible to combine gravitational wave detector data that is temporally associated with these events to infer population properties of the sources. A method is presented for better integration of available non-gravitational wave data--mainly from the electromagnetic signature of the events--into such population studies. Given a population model for the gravitational wave emission properties of a class of astrophysical sources, the method combines gravitational and non-gravitational wave data into a joint likelihood function and obtains maximum likelihood estimates of the model parameters. A toy model is used to illustrate the application of the method."