ICTS Thesis Synopsis Seminar

Title : Testing general relativity using observations of gravitational waves from the inspiral, merger and ringdown of binary black holes

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Date : Wednesday, May 16, 2018

Time : 3:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : The recent observations of gravitational waves (GWs) from compact binary coalescences composed of neutron stars and/or black holes by the advanced LIGO-Virgo detectors have firmly opened the field of GW astronomy. These observations, for the first time, have also allowed us to test Einstein's theory of general relativity (GR) in the strong-field dynamical regimes of gravity. The inspiral-merger-ringdown (IMR) consistency test proposed in this thesis, was among the first strong-field tests of GR performed on an actual GW observation. It helped establish the consistency of the first LIGO event and a subsequent detection, with a binary BH system described in GR. In this talk we discuss:

1. the formulation of the IMR consistency test
2. the testing of the analysis pipeline using simulated GW observations
3. studies of the robustness of the IMR consistency test
4. results from LIGO-Virgo observations
5. prospects with future GW detectors