ICTS Seminar

Title	:	Parameter estimation for strong phase transitions in supranuclear matter using gravitational-wave astronomy
Speaker	:	Peter Tsun Ho Pang (Nikhef, Amsterdam)
Date	:	Friday, July 10, 2020
Time	:	02:00 pm
Abstract	:	At supranuclear densities, explored in the core of neutron stars, a strong phase transition from hadronic matter to more exotic forms of matter might be present. To test this hypothesis, binary neutron-star mergers offer a unique possibility to probe matter at densities that we can not create in any existing terrestrial experiment. In this work, we show that, if present, strong phase transitions can have a measurable imprint on the binary neutron-star coalescence and the emitted gravitational-wave signal. We construct a new parameterization of the supranuclear equation of state that allows us to test for the existence of a strong phase transition and extract its characteristic properties purely from the gravitational-wave signal of the inspiraling neutron stars. We test our approach using a Bayesian inference study simulating 600 signals with three different equations of state and find that for current gravitational-wave detector networks already twelve events might be sufficient to verify the presence of a strong phase transition. Finally, we use our methodology to analyze GW170817 and GW190425, but do not find any indication that a strong phase transition is present at densities probed during the inspiral.
Online seminar	:	Please use this link to join the seminar - https://guest.lifesize.com/672942. (Google chrome is preferred)