ICTS Seminar

Title : Testing general relativity using multiband observations of binary black hole mergers.

Speaker : Sayantani Datta (Chennai Mathematical Institute)

Date : Wednesday, July 29, 2020

Time : 02:00 pm (IST)

Abstract : Intermediate mass binary black holes (IMBBHs) of component masses in the range 10^2-10^3 and Stellar mass binary blackholes (SMBBHs) are prominent sources for multiband astronomy, i.e, joint observations by space- and ground-based gravitational wave detectors. This is because they will have good visibility in both the space based detector such as Laser Interferometric Space Antenna and the proposed third generation ground based detectors like Cosmic Explorer and Einstein Telescope. Here we take this opportunity of multiband observations of these class of sources to understand the strong-field dynamics of gravity and, in particular, test the general theory of relativity (GR). We show that such multiband gravitational wave observations will enable us to do multi-parameter tests of GR, where two or more of the post-Newtonian (PN) coefficients can be simultaneously measured. We also demonstrate that this is possible due to the breaking of degeneracies among various binary parameters. In particular we demonstrate that the multiband observations of SMBBHs would measure most of the known PN coefficients to an accuracy below a few percent—two orders-of-magnitude better than the best bounds achievable from even 'golden' binaries in a third generation ground-based detector such as Cosmic Explorer or a space-based detector such as LISA.

Online seminar : Please click on the below link to join the meeting

Link: https://guest.lifesize.com/1126104 (supported browser: Google Chrome)