INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
2A & 2B, Raja S.C. Mullick Road, Jadavpur, Kolkata-700032, India

Seminar Notice

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School of Physical Sciences

Title:	**Story of compact binaries: from radio pulsars to gravitational wave mergers**
Speaker:	**Debatri Chattopadhyay,Cardiff University,UK**
Date:	**March 23, 2022 (Wednesday)**
Time:	16:00 Hours (IST)
Venue:	**Physics Seminar Room (C-406), 3rd Floor, Centenary Building, IACS**
Abstract:	'Compact binaries' - stellar binary systems consisting of compact objects (neutron stars or black holes), were elusive systems to astronomers till the discovery of the Hulse-Taylor binary (a pulsar-neutron star system) in 1975. While about twenty more radio pulsar-neutron star systems were detected from the 70s till today, the first binary black hole system was detected at their merger through gravitational waves by LIGO in 2015. From then, over seventy confirmed double black holes, two double neutron stars and two neutron star-black hole systems have been observed by LIGO/Virgo, ruling the dataset of current gravitational wave detectors. Predicted by theoretical astrophysicists for a long time, these compact binaries provide a plethora of information in an array of topics - stellar evolution, binary physics, alternate theories of gravity, magnetohydrodynamics and off late, even the expansion of the universe! I will lead you through the story of compact binaries - from birth, through their evolution to their mergers. Specifically focussing on their masses and spin signatures, I will show how uncertainties of theoretical stellar binary physics can be constrained and secrets of their birth environments can be identified by comparing the aspects of simulations to combined radio and gravitational wave observations. With more sophisticated detectors being added in near future, compact binaries are likely to become a dominant source of multi-messenger astronomy - revealing more secrets of the observable universe.

All are cordially invited to attend the seminar