TIFR Centre for Interdisciplinary Sciences
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Colloquium

The New Wave in Physics, Astronomy and Technology

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Gravitational waves are generated by accelerated masses, the charge of gravity, and the propagating tidal field can move other masses. Though there are gravitational waves all around us, their amplitude is too small to be detected, except in those rare situations involving the merger of binary systems of stellar mass compact objects like neutron stars or black holes. Naturally, such events happen very far from us at extra-galactic distances and reliable detection then needs instruments that can measure relative displacement smaller than a billionth of the atomic size. An optical interferometer operated at the quantum noise limit turns out to be a natural choice, but needs several enhancements and precautions before it can function as a gravitational wave detector. Barely a week after the advanced LIGO detectors started calibrated stable operation, a few month ago, relatively strong gravitational waves from a pair of orbiting and merging black holes were detected, marking an impressive beginning for gravitational wave astronomy. I will discuss the physics of gravitational waves and the detectors, and some aspects of the first source seen and heard by the LIGO Scientific Collaboration. The event also inspired the cabinet approval for the LIGO-India project proposed by the IndIGO Consortium for an identical detector in India, to be operated as part of the gravitational wave detectors network of the next decade.

Thursday, Mar 31st 2016

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS