TIFR Centre for Interdisciplinary Sciences
21, Brundavan Colony, Narsingi, Hyderabad 500 075

# Seminar

# LIGO: A laser strainmeter for the Universe

## Rana Adhikari

**Dept. of Physics California Institute of Technology**

After 50 years, the LIGO project has detected the gravitational radiation from the merger of astrophysical black holes. With an improvement of 1-2 orders of magnitude in the noise, these devices would be able to sense the fluctuations in space-time from all black holes within the observable universe. There are two chief obstacles in this path: quantum mechanics and statistical mechanics. The quantum fluctuations of the electromagnetic field of empty space limit the ability to measure optical phase shifts. The Fluctuation-Dissipation theorem dictates the amount of thermal fluctuation of the measurement device. Recent advances in the study of thin-film amorphous oxides indicate that one of these fundamental physics limits may be possible to overcome.

***Monday, Aug 22nd 2016***

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

***Seminar Hall, TCIS***