

## **Public Lecture**

### **Gravitational Waves: A New Window on the Universe**

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The Laser Interferometer Gravitational Wave observatory comprises two detectors located in Hanford, WA and Livingston LA. These detectors are 4km long Fabry-Perot Michelson interferometers and the most sensitive length measuring devices in the world. They are able to sense a change equivalent to 1/1000th the diameter of a proton over their 4km baseline. The interferometers utilise a 1064nm Nd-YAG laser to illuminate the cavity mirrors. The mirrors are operated as free test masses, requiring multiple stage pendulum suspensions and inertial seismic isolation to ensure that seismic noise does not limit the detector sensitivity. The final stage of the suspension is fabricated entirely from fused silica to ensure that thermal noise does not limit their sensitivity.

In this talk, I will describe the technology development necessary to realize the LIGO detectors, and also describe the latest results from observing runs 1-3. I will provide some insight into the astrophysics which can be gained from these “dark systems”, only observable by listening to the Universe. I will also highlight future opportunities including LIGO India, and the current UK-India collaborative activity under a Newton-Bhabha award.

***Monday, Mar 2<sup>nd</sup> 2020***

***4:00 PM (Tea/Coffee at 3:30 PM)***

***Auditorium, TIFR-H***