



ICTS Astrophysics and Relativity Seminar (HYBRID)

Title : Pushing LIGO's quantum limits

Speaker : Dhruva Ganapathy (MIT Kavli Institute)

Date : Monday, 15th May 2023

Time : 11:30 am (IST)

Abstract : The Advanced LIGO detectors operate at a regime where quantum uncertainty imposes a fundamental limitation to sensitivity in the form of quantum shot noise and quantum radiation pressure noise. During the last gravitational wave observing run O3, the LIGO and Virgo detectors used quantum states of light known as squeezed states of light in order to reduce high frequency quantum shot noise. The improved sensitivity from shot noise reduction was, however, accompanied by an increase in quantum radiation pressure noise at low frequencies, which can be viewed as a consequence of measurement back-action. The LIGO A+ upgrade includes the addition of a 300m optical filter cavity to manipulate squeezed states to counteract this back-action, using a technique known as frequency dependent squeezing. In this talk, I will present the experimental realization of frequency dependent squeezing in the full-scale LIGO A+ detector.

Venue : **Offline:** Emmy Noether Seminar Room (ICTS)

Online: Please click the below link to join the seminar.

<https://icts-res-in.zoom.us/j/81282848626?pwd=QXo0R1MxTE5tOXdiWTRDQkEyRWFwUT09>

Meeting ID: 812 8284 8626

Passcode: 151523