IMPRINTS OF GRAVITATIONAL WAVE MEMORY ON THE ENTANGLEMENT BETWEEN QUANTUM PROBES

SEMINAR

Gravitational wave (GW) memory predicts permanent distortions in the constituents of a system when kept in the passage of a specific GW. Although known for quite some time, this effect is still not verified in the current GW observations, mainly due to the ambient noise and the restrictions on the motion of the experimental apparatus. Here, we consider entanglement between two-level quantum probes in a GW burst background to understand whether GW memory can influence their dynamics. In this regard, first, we investigate the typical entanglement harvesting condition and find that the measure of the entanglement has an infrared divergence in terms of the detector energy gap when the GW burst relates to memory. We point out the resemblance of this finding with the leading term in Weinberg's soft-graviton theorem. Second, we investigate the radiative process of entangled probes in a GW burst background. We observe that for GW bursts with and without memory, the collective transition profiles of the entangled probes will be characteristically different. We discuss the implications of our findings.

DR. SUBHAJIT BARMAN
IIT Madras

25 SEPTEMBER 2024

03:00 PM

PAMU SEMINAR ROOM

Everyone is invited to attend