

## TATA INSTITUTE OF FUNDAMENTAL RESEARCH

## **ICTS Seminar**

- Title: Quantum Brownian motion: Transition from monotonic to oscillatory<br/>Behaviour
- Speaker : Urbashi Satpathi, Raman Research Institute, Bangalore
- Date : Wednesday, July 25, 2018
- Time : 2:00 PM
- Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore
- : We analyse the growth of the mean square displacement as a function Abstract of time proceeding solely based on the fluctuation dissipation theorem and a choice of response function. The response function used in our analysis satisfies certain positivity conditions that a putative response function must satisfy, namely, Wightman positivity and passivity. As with earlier analyses, we find a logarithmic spreading of the mean square displacement in the quantum regime indicating that this behaviour is robust. We also studied the Brownian motion of a charged particle in the presence of magnetic field. In this case we have studied the mean square displacement as a function of time for both the high temperature classical domain and the low temperature quantum domain. As one increases the magnetic field strength, there is a transition in the behaviour of the mean square displacement from monotonic to a damped oscillatory in both the regimes. These features are analysed using two different bath models: the Ohmic bath and the single relaxation time bath. For both models this transition feature of the mean square displacement remains unchanged qualitatively, exhibiting the robustness of this feature of the mean square displacement.