

## ICTS Colloquium

Title : Quantum geometry of many-particle ground states

Speaker : R Shankar, Institute of Mathematical Science, Chennai

Date : Monday, October 31, 2016

Time : 3:00 pm

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : The inner product is central to the physical interpretation of quantum mechanics. It also induces a geometry in the space of physical states of a quantum system. This is the so called quantum geometry and it has been studied since the early days of quantum mechanics. In the past few decades, these ideas have been applied to characterize the phases of quantum matter.

In this talk, we will review some of these developments. The story starts with the quantum Hall effect and the identification of the Hall conductivity with a topological invariant, the Chern number. We then describe the geometry underlying this identification, i.e the relation between the Pancharatnam-Berry curvature and the "anomalous velocity". We then describe the quantum metric and some of its known physical manifestations. Finally, using simple examples, we illustrate how topological transitions also involve drastic changes in the quantum geometry.