



ICTS Colloquium

Title : Unraveling aspects of the disordered quantum many-body problem

Speaker : Aavishkar Patel (Flatiron Institute, USA)

Date : Wednesday, 22 January 2025

Time : 11:30 AM (IST)

Abstract : The next generation of technologies can be made possible by exploiting the wealth of physical phenomena arising from quantum many-body systems with strongly interacting electrons. Key examples of such systems are the theoretically poorly-understood high-Tc superconductors, which achieve superconductivity at temperatures far larger than ordinary metals. In addition to strongly interacting electrons, high-Tc superconductors have significant amounts of inhomogeneity (disorder) at a microscopic level. While disorder is conventionally thought to affect electrons one at a time, I will argue that disorder can also significantly modulate strong interactions between electrons. I will show that the resulting disorder in electron interactions is crucial in determining the physics of the “strange metal” normal state of high-Tc superconductors that gives rise to superconductivity upon cooling. In addition to explaining the observed phenomenology of the strange metal, I will also provide testable predictions regarding its microscopic nature. Finally, I will speculate on the role of disordered interactions in determining the key properties of other phases of the high-Tc superconductors as well as those of other complex materials.

Venue : Madhava Lecture Hall

Zoom Link: <https://icts-res-in.zoom.us/j/99870289819?pwd=Fx4QM0iilfb1ltB29i0xCpDWyhVywY.1>

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