TIFR Centre for Interdisciplinary Sciences
21 Brundavan Colony, Narsingi, Hyderabad 500075

Seminar

Quantum Correlations, Chaos and Information

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Harnessing the power of the quantum world for information processing is a key for mankind to enter a new information age. Devices employing the laws of quantum physics have superior information processing capabilities than their classical counterparts. What aspects of quantum mechanics make this possible? I will discuss my work in elucidating the role of quantum correlations, focussing on quantum discord, in quantum information processing. Quantum information theory has a deeper message for us. How physical systems process and exchange information is crucial to gaining insights into the workings of our universe. For example, the connections between entropy, information and thermodynamics form the cornerstone of statistical mechanics. Study of quantum information sheds light on the very foundations of quantum theory. For example, it has helped us address the question of characterizing chaos and its signatures in quantum systems. I will describe my work on ways to detect the footprints of chaos in the quantum world using quantum entanglement, discord and continuous measurement quantum tomography. Experimental implementations and connections to quantum simulations will also be discussed. I will conclude by discussing future directions of my research program which spans quantum information, complex systems and mathematical biology.

Thursday, Jan 21st 2016

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS