UTC Research Institute

"Frontiers of Science and Technology with Controlled Quantum Systems"

given by **Dr. Rick Mukherjee**

Hamburg University, Germany

Tuesday, January 16, 1:30 p.m.,
MDRB 218 (Conference Room)*

Public Invited

The ability to precisely control a quantum system helps us to better understand the subtleties of the microscopic world. A controlled quantum system provides the platform to study some of the foundational aspects of quantum physics but also paves the way for building the next-generation quantum technology. I will briefly introduce my research interests which falls under the umbrella of AMO (Atomic, Molecular and Optical) physics with applications to quantum simulation, metrology and information theory. In the talk, I will discuss the optimal preparation and characterisation of non-classical states using techniques involving Bayesian statistics and neural networks. I will conclude with an explicit example of a novel quantum protocol that leverages the non-classical nature of the quantum dynamics to solve an optimization problem with the potential of quantum advantage.

Rick received his PhD at the Max Planck Institute for the Physics of Complex Systems, Germany, where he investigated the benefits of using divalent Rydberg atoms to study strongly correlated many-body systems. This was followed up with two full-time postdoc positions, one at Rice University, USA and the other at Imperial College London, UK. During his postdoc years, his research primarily focussed on exploring the use of various AMO platforms for quantum simulation and information theory. At Imperial, Rick applied machine learning techniques to control and optimise many-body quantum dynamics to achieve desired results useful for building quantum technology. Between postdocs, he earned visiting fellowships to visit ITAMP Harvard University and IISER Bhopal. Recently, Dr. Mukherjee has been awarded a five year position at Hamburg University to lead the theory team in building the first scalable neutral-atom based quantum computer for solving optimization problems.

** UTC MultiDisciplinary Research Building (MDRB), Room 218, 701 E. MLK Blvd., Chattanooga TN, 37403*

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