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University of Miami, Physics Department Colloquium

Date: Wednesday, Feb 26, 2024
Time: 4:00 pm – 5:00 pm
Location: Wilder Auditorium – Rm 112, Knight Physics Building

Crossing the Entanglement Frontier in Extreme Regimes

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Abstract

The Nobel Prize in Physics 2022 celebrated experiments that confirmed the existence of Entanglement between two photons. Now, one of the biggest challenges in modern science is discovering how Entanglement manifests in systems of increasing size and complexity, such as quantum computers made of thousands of interacting qubits and world-wide communication networks.

In this talk, I discuss recent results in quantifying Entanglement in many-body systems and their meaning. In particular, newfound quantum laws dictate that classical information (the outcome of a measurement) can freely spread into the Universe, while broadcasting quantum information (the wavefunction of a system) is subject to limitations, as local Entanglement in systems of many particles is inevitably suppressed.

Then, I outline how new ways to identify, quantify and manipulate Entanglement can accelerate the transition of quantum technologies from paper to reality, solving critical problems about diagnostics of quantum hardware, quantum simulation, and quantum programming.

Biography

Davide Girolami develops ideas for investigating the power and limits of quantum information processing. His main results include theoretical, computational, and experimental methods to evaluate quantum coherence and quantum correlations in complex systems.

Davide is currently Associate Professor at Politecnico di Torino. Previously, he was J. R. Oppenheimer Fellow and Director's Fellow at Los Alamos National Laboratory, EPSRC Fellow/J. Martin Fellow and Junior Research Fellow of Wolfson College at University of Oxford, and a postdoctoral fellow at National University of Singapore. He holds a PhD from University of Nottingham.