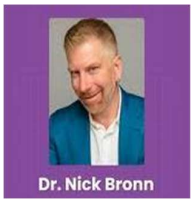
S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Condensed Matter and Materials Physics

08th May 2026 **3.00 PM** **ONLINE / FERMION**

SPEAKER



Dr. Nick Bronn, Global Strategic Research Development lead, IBM Quantum

About the speaker: In his current role, Dr. Nick Brønn forges partnerships between IBM and researchers in academia and national laboratories, both within and outside of the United States. By navigating the intersection of researcher interests and the computational capabilities of current quantum systems, he helps accelerate the adoption of quantum computing as a primary engine for scientific discovery. This work bridges the gap between high-level strategy and deep technical execution, drawing on his background as a quantum algorithm engineer, open-source software developer, digital content creator, and builder of quantum hardware on which he once experimented with in the lab.

Dr. Nick Brønn earned his Ph.D. in experimental condensed matter physics from the University of Illinois in 2013. After employing that background to develop IBM quantum hardware for 7 years, he transitioned "up the stack" in 2020 to use open-source software as his tool of choice in which to conduct "experiments" on quantum computing platforms. This transition offered him a comprehensive, "full-stack" perspective of the architecture, allowing him to collaborate externally on a variety of topics including superconducting qubits and their integration, quantum simulation, quantum machine learning, circuit compilation, and error suppression, among others. Today, he uses this breadth of experience to interface fluently with researchers across the many scientific fields poised to be transformed by the promise of quantum computation.

TITLE OF THE TALK

Outlook for Quantum Simulation with Superconducting Quantum Computers

ABSTRACT

Simulating quantum systems was the foundational motivation for building quantum computers and is also a practically relevant challenge. Quantum computers constructed from superconducting qubits have recently become competitive with the best approximate classical algorithms for quantum simulation-like tasks. In this talk, I'll give an overview of the physics of superconducting qubits followed by IBM's hardware roadmap for scaling these processors towards fault tolerance. While algorithms for simulating quantum dynamics have been well-known for decades, algorithmic performance before the era of quantum error correction becomes a key consideration. To overcome these obstacles, new sampling-based hybrid methods have emerged for static properties. This presentation will review the simulation of quantum systems to obtain both static and dynamic observables and present recent results using each technique.

HOST FACULTY

Prof. Manoranjan Kumar, Professor

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