

Mathematics Colloquium: Many-body physics in superconducting devices

Sep 13, 2024, 3:30 - 4:30 PM

Speaker: Stephen Sorokanich (NIST)

Title: Many-body physics in superconducting devices

Abstract : The Josephson junction – a thin insulating film sandwiched between two superconductors – is arguably the most important building block of modern superconducting circuits. In recent years large arrays of Josephson junctions have found applications in quantum information processing, quantum metrology, quantum-limited amplification, and many-body simulation. Modern circuits may contain hundreds or even thousands of junctions, and while it is often possible to model such devices as effective single-variable quantum systems, in principle each junction represents an independent quantum degree of freedom which may be strongly-coupled to one another.

In this talk, I will discuss recent advances in the modeling, simulation, and mathematical analysis of large quantum circuits containing many Josephson junctions, with emphasis on their many-body aspects. Our uniquely-interdisciplinary research program is focused on predicting and optimizing the behavior of these circuits.

Time: Friday, September 13, 3:30pm – 4:20pm

Place: Exploratory Hall, room 4106