

University of Miami, Physics Department Colloquium

Date: Wednesday, Feb 8, 2023
Time: 4:00 pm – 5:00 pm
Location: Wilder Auditorium – Rm 112, Knight Physics Building

Convergent Strategies for Design and Characterization of Low-Dimensional Quantum Materials

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Abstract

Low-dimensional materials are ideal test-beds for studying fundamental solid-state physics and hold significant promise as future platforms for technological advancement. Recent advances in both bottom-up and top-down fabrication techniques have enabled piecewise modification of crystal structure and composition, generating a pantheon of new experimentally accessible nanomaterials. At the same time, the ability to tailor emergent behavior at the atomic-scale requires precise knowledge of structure-function relationships using high resolution spatial imaging techniques. In this talk, I will highlight our recent successes in directing novel electronic, magnetic, optical and plasmonic behavior in 0D, 1D, and 2D systems using a family of techniques based on both atomic force microscopy and scanning tunneling microscopy (individually and in consort). Focusing on high watermarks from my own research career, I will discuss how convergent fabrication and characterization techniques have laid the groundwork for the next generation of low-dimensional quantum materials.