DEPARTMENT OF
PHYSICS &
ASTRONOMY

Physics & Astronomy Colloquium

Dr. Alejandro Lopez-Bezanilla

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(Host: Prof. Wade DeGottardi)

3:30 - 4:30 p.m. | Tuesday, April 21, 2026

Rm: ESB I 120

Title: Exploring Materials Applications with Quantum Annealers

Abstract. Numerous materials display complex magnetic behavior that emerges from how spins—tiny atomic magnets—interact across lattice patterns such as fractal, Lieb, and Kagome structures. Simulating these interactions on conventional computers can be challenging because the number of possible magnetic configurations grows rapidly with system size. Quantum annealers offer a promising alternative. Their qubits behave like controllable magnetic moments, allowing the hardware to physically reproduce the same equations that govern real magnetic systems. In this presentation, I will describe recent advances that allow us to translate materials lattice models into forms directly compatible with quantum annealer hardware, enabling the device to operate as a laboratory for exploring frustrated magnetism. Our results show that quantum annealing can capture key magnetic features of these geometries, demonstrating a practical path for studying and understanding magnetic materials using today's quantum technology.