Notre Dame Science
Department of Physics

SUPERCONDUCTING QUBITS GROW UP: QUANTUM COHERENCE IN CIRCUITS WITH MANY DEGREES OF FREEDOM

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Quantum coherence in superconducting circuits has been a fruitful playground for theorists and experimentalists seeking possible routes towards quantum computation, or teaching microwave photons new quantum optics tricks. While coherence times in such circuits have seen a remarkable increase of 5 orders of magnitude over the last decade, a different property has remained largely stagnant: following the "simpler is better" mantra of quantum coherence, circuits across all borders between phase, flux, and charge qubits, consistently employ less than a handful of circuit elements. A recent experiment with a new circuit composed of over 40 elements, dubbed "fluxonium", could be the kick-off for a paradigm change and make the world of superconducting circuits a lot bigger.

In this talk, I will discuss the highlights and obstacles for quantum coherence in superconducting circuits, their applications in circuit QED, and our theoretical work on describing circuits with many degrees of freedom.

Condensed Matter Seminar

All interested persons are cordially invited to attend.