Yale Institute for Nanoscience and Quantum Engineering

Friday- February 13, 2015

12:00 to 1:00 p.m.

BECTON SEMINAR ROOM

Light lunch will be served at 11:45 a.m.

Katharine Jensen

Department of Mechanical Engineering & Material Science, Yale University

"Sticking to Soft Solids"

Soft robotics, biolocomotion, and commercial adhesives all rely on the contact mechanics of compliant solids. To isolate the essential physics underlying these diverse phenomena, we study the contact mechanics of a rigid sphere to a soft, sticky substrate. We measure the quasi-static deformation of the substrate as the sphere establishes contact and is pulled off. We find that the classic elastic theory of adhesion fails to describe our data. Counterintuitively, the solid deformation profiles are well-fit by predictions for surface-tension-dominated fluids. Currently, we are exploring the contribution of surface tension to the force generated by soft contacts. Our results may impact the design of functional systems that rely on soft contact.

Michael J. Hatridge

Department of Applied Physics, Yale University

"A Fock State Detector for Qubit Measurement"

Superconducting qubits are now routinely monitored with high fidelity using coherent cavity pulses and linear amplifiers. However, when entangling remote qubits via joint measurement - a very desirable quantum information primitive - these amplifiers are required to possess nearly perfect quantum efficiency. On the other hand, protocols based on flying Fock states can be constructed which tolerate arbitrarily low transmission, trading success rate for state preparation fidelity. I will discuss current and upcoming experiments using existing cQED tools to generate concurrent remote entanglement via microwave Fock state detectors.

HOST: Paul Fleury