



Physical Sciences Seminar

Kinetic Inductance, Josephson Inductance and the Superconductor-Insulator Quantum Phase Transition

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Superconductors mediate a flow of energy with zero loss. The energy moves not only through the electromagnetic fields, but also as kinetic energy in the current of Cooper pairs which carries both charge and mass. From a phenomenological point of view, it is arbitrary what we attribute to charge or mass as both have the same physical consequence. Both result in inductance of the superconducting circuit. Cooper pair scattering or tunneling reduces the number of pairs which carry a fixed current, resulting in larger kinetic inductance. When the total inductance becomes large enough, the superconductor becomes an insulator because the self-charge of a single Cooper pair gives rise to a Coulomb blockade that stops the flow of current. This talk will describe experiments with 2D superconducting films and series arrays of Josephson junctions demonstrating a superconductor-insulator transition. Possible applications of kinetic inductance in the burgeoning field of cavity optomechanics will also be mentioned.

Monday, October 18, 2021 03:00pm - 04:00pm

Big Seminar Room B (big) 63 seats (I23.EG.102)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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