



Physical Sciences Seminar

First-order quantum breakdown of a bosonic disordered superconductor

Thibault Charpentier (Institut Néel CNRS Grenoble | France)

Host: Andrew Higginbotham

Superinductances made of disordered superconductors provide a simple, easy to fabricate, alternative to Josephson junctions chains. To obtain such a large inductance one has to significantly increase the resistance of the material and approach the insulating state terminating superconductivity where some unusual physics takes place. In this talk we discuss how strong disorder deeply modifies the superconducting state of amorphous indium oxide (a:InO) films. By measuring the kinetic inductance of superconducting a:InO resonators, we show that the transition to superconductivity is bosonic with a critical temperature ruled by superconducting phase fluctuations.

Upon reaching the critical disorder terminating superconductivity, the superfluid stiffness remains surprisingly finite at the transition to insulation. This indicates an unexpected first-order nature of the disorder-driven quantum phase transition to insulator.

Our strongly disordered superconducting resonators act as superinductance with wave impedance greater than the resistance quantum, providing a new alternative for high impedance devices.

Tuesday, July 12, 2022 11:00am - 12:00pm

ISTA Campus Heinzl Seminar Room / Office Bldg West (I21.EG.101)



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