Abstract Submitted
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Bose metal shows no cyclotron resonance[1] YOUCHENG WANG, Institute for Quantum Matter, Johns Hopkins University , IDAN TAMIR, Weizmann Institute of Science, Department of Condensed Matter Physics, DAN SHAHAR, Institute for Quantum Matter, Johns Hopkins University , N. P. ARMITAGE, Johns Hopkins University — It is observed that many thin superconducting films with not too high disorder level (generally $R_N/\Box \leq 2000$ Ohms) placed in magnetic field show an anomalous metallic phase where the resistance is low but still finite as temperature goes to zero, which is in contradiction with conventional wisdom that Bosons can either condense or be localized in the ground state. Previous studies have found that in this phase superconducting correlations persist but there is limited theoretical understanding, and how the electrodynamics might differ from conventional metals remains unclear. Here we report in weakly disordered amorphous InO_x thin films, that this "Bose metal" metal phase possesses no cyclotron resonance and hence non-Drude electrodynamics. The absence of a finite frequency resonant mode can be associated with a vanishing downstream component of the vortex current parallel to the supercurrent and an emergent particle-hole symmetry of this anomalous metal, which establishes its non-Fermi liquid character.

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Youcheng Wang
Johns Hopkins Univ

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