

Dynamics of stripe and order parameter domains in unconventional superconductors

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We have observed telegraph-like switching noise in the resistivity of underdoped cuprate nanowires and in the critical current of Josephson junctions in the ruthenate superconductor Sr₂RuO₄. In both cases, we believe that this noise indicates the presence of a fluctuating domain structure, giving insight into the nature of the unconventional superconductivity in these systems. In the cuprates, we attribute the resistivity fluctuations to stripe domain nucleation and dynamics in the pseudogap regime and discuss ongoing experiments designed to reveal the relevant spatial and temporal scales. In the Sr₂RuO₄, the switching noise suggests the existence of a complex p-wave order parameter of the form $p_x + ip_y$ that supports chiral domains. We present SQUID interferometry measurements and corresponding simulations that support this order parameter symmetry.