Abstract Submitted
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Unusual Persistence of Superconductivity Against High Magnetic Fields in the Strongly-Correlated Iron-Chalcogenide Film FeTe:O$_x$ IVO DIMITROV, WEIDONG SI, WEI KU, SU-JUNG HAN, QIANG LI, Brookhaven National Laboratory — We report an unusual persistence of superconductivity against high magnetic fields in the iron chalcogenide film FeTe:O$_x$ below 2.52 K. Instead of saturating like a mean-field behavior with a single order parameter, the measured low-temperature upper criticial field increases progressively, suggesting a large supply of superconducting states accessible via magnetic field or low-energy thermal fluctuations. We demonstrate that superconducting states of finite momenta can be realized within the conventional theory, despite its questionable applicability. Our findings reveal a fundamental characteristic of superconductivity and electronic structure in the iron-based superconductors.

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