Large tunable kinetic inductance in a twisted graphene superconductor

Paritosh Karnatak[1]
Rounak Jha[1,2], Martin Endres[1], Kenji Watanabe[3], Takashi Taniguchi[4], Mitali Banerjee[2] and Christian Schönenberger[1,5]

1 Department of Physics, University of Basel, Basel, Switzerland
2 Laboratory of Quantum Physics (LQP), École Polytechnique Fédérale de Lausanne (EPFL), CH-1015 Lausanne, Switzerland
3 Research Center for Functional Materials, National Institute for Material Science, 1-1 Namiki, Tsukuba 305-0044, Japan
4 International Center for Materials Nanoarchitectonics, National Institute for Materials Science, 1-1 Namiki, Tsukuba 305-0044, Japan
5 Swiss Nanoscience Institute, University of Basel, Basel, Switzerland

paritosh.karnatak@unibas.ch

Abstract

The discovery of emergent phases such as correlated insulators and superconductors in graphene-based moiré heterostructures offers a playground with a rich phase space that is electrostatically tunable.
Here, we investigate superconductivity in magic angle twisted trilayer graphene (MATTG) by integrating it as the weak link in a SQUID (superconducting quantum interference device) loop. We study the current phase relation (CPR) of MATTG in various configurations by electrostatically tuning the two weak links. We show that superconducting MATTG has a large kinetic inductance up to 150~nH per square which is electrostatically tunable. This opens avenues for using MATTG as a tunable element in superconducting circuits.

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