

Abstract Submitted
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Anomalous Cooper pair interference on Bi_2Te_3 surface LI LU, JIE SHEN, YUE DING, YUAN PAN, FAN YANG, FANMING QU, ZHONGQING JI, XIUNIAN JING, JIE FAN, GUANGTONG LIU, CHANGLI YANG, GENGHUA CHEN, Institute of Physics, CAS — We have performed phase-sensitive measurements on particularly designed superconducting quantum interference devices constructed on the surface of topological insulators Bi_2Te_3 in such a way that a substantial portion of the interference loop is built on the proximity-effect-induced superconducting surface. Two types of Cooper interference patterns have been recognized at low temperatures. One is s-wave like and is contributed by a zero-phase loop inhabited in the bulk of Bi_2Te_3 . The other, being identified to relate to the surface states, is anomalous for that there is a phase shift between the positive and negative bias current directions. The results support that the Cooper pairs on the surface of Bi_2Te_3 have a 2π Berry phase which makes the superconductivity p-wave-like. Mesoscopic hybrid rings as constructed in this experiment are presumably arbitrary-phase loops suitable for studying topological quantum phenomena.

[1] J. Shen, et al., arXiv:1303.5598v3

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