Surface transport coefficients for three-dimensional topological superconductors

HONG-YI XIE, YANG-ZHI CHOU, MATTHEW FOSTER, Rice Univ — We argue that surface spin and thermal conductivities of three-dimensional topological superconductors are universal and topologically-quantized at low temperature. For a bulk winding number \( \nu \), there are \(|\nu|\) “colors” of surface Majorana fermions. Localization corrections to surface transport coefficients vanish due to time-reversal symmetry (TRS). We argue that Altshuler-Aronov interaction corrections vanish because TRS forbids color or spin Friedel oscillations. We confirm this within a perturbative expansion in the interactions, and to lowest order in a large-\(|\nu|\) expansion. We suggest that 3D topological superconductors are a closer analog of the 2D quantum Hall effect than 3D topological insulators.

1This research was supported by the Welch Foundation under Grant No.C-1809 and by an Alfred P. Sloan Research Fellowship (BR2014-035)