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**Odd-frequency superconducting pairing in topological insulators**
ANNICA BLACK-SCHAFFER, Uppsala University, ALEXANDER BALATSKY, NORDITA — We discuss the appearance of odd-frequency spin-triplet $s$-wave superconductivity, first proposed by Berezinskii [J. Exp. Theor. Phys. 20 287 (1974)], on the surface of a topological insulator proximity coupled to a conventional spin-singlet $s$-wave superconductor. Using both analytical and numerical methods, we show that this disorder robust odd-frequency state is present whenever there is an in-surface gradient in the proximity induced gap. Such a gradient exists in both superconductor-normal state junctions as well as when an in-surface supercurrent is present. The time-independent order parameter for the odd-frequency superconductor is proportional to the in-surface gap gradient. The induced odd-frequency component does not produce any low-energy states.

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