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Interaction-mediated surface state instability in disordered three-dimensional topological superconductors with spin SU(2) symmetry

We show that arbitrarily weak interparticle interactions destabilize the surface states of 3D topological superconductors with spin SU(2) invariance (symmetry class CI), in the presence of non-magnetic disorder. The conduit for the instability is disorder-induced wavefunction multifractality. We argue that time-reversal symmetry breaks spontaneously at the surface, so that topologically-protected states do not exist for this class. The interaction-stabilized surface phase is expected to exhibit ferromagnetic order, or to reside in an insulating plateau of the spin quantum Hall effect.

Reference: <http://arxiv.org/abs/1204.3639>