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Duality of a compact topological superconductor model and the Witten effect FLAVIO NOGUEIRA, Leibniz Institute for Solid State and Materials Research, IFW Dresden and Inst. for Theor. Phys. III, Ruhr University Bochum, ZOHAR NUSSINOV, Dept. of Physics, Washington University, JEROEN VAN DEN BRINK, Leibniz Institute for Solid State and Materials Research, IFW Dresden and Inst. for Theor. Phys. III, Ruhr University Bochum — We consider a compact abelian Higgs model in 3+1 dimensions with a topological axion term and construct its dual theories for both bulk and boundary at strong coupling. The model may be viewed as describing a superconductor with magnetic monopoles, which can also be interpreted as a field theory of a topological Mott insulator. We show that this model is dual to a non-compact topological field theory of particles and vortices. It has exactly the same form of a model for superconducting cosmic strings with an axion term. We consider the duality of the boundary field theory at strong coupling and show that in this case θ is quantized as $-8\pi n/m$ where n and m are the quantum numbers associated to electric and magnetic charges. These topological states lack a non-interacting equivalent.

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