Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Topological phases and topological surface states of three-dimensional time-reversal invariant superconductors ANDREAS SCHNYDER, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, CA 93106, USA, SHINSEI RYU, Department of Physics, University of California, Berkeley, CA 94720, USA, AKIRA FURUSAKI, Condensed Matter Theory Laboratory, RIKEN, Wako, Saitamo 351-0198, Japan, ANDREAS LUDWIG, Department of Physics, University of California, Santa Barbara, CA 93106, USA — We study topological phases of time-reversal invariant singlet superconductors in three spatial dimensions. In these particle-hole symmetric systems the topological phases are characterized by a winding number [1], similar to the Z_2 invariant of the Z_2 topological insulators. At a two-dimensional surface the topological properties of this quantum state manifest themselves through gapless surface states, that are robust against localization from random impurities respecting the discrete symmetries of the system. We construct a tight-binding model on the diamond lattice that realizes the topologically nontrivial phase and perform numerical studies of the winding number and the surface states of this model.

[1] A. P. Schnyder, S. Ryu, A. Furusaki, and A. W. W. Ludwig, arXiv:0803.2786 (PRB in press).

Andreas Schnyder
Kavli Institute for Theoretical Physics,
University of California, Santa Barbara, CA 93106, USA

Date submitted: 18 Nov 2008 Electronic form version 1.4