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Symmetry-protected topological invariant and Majorana impurity states in time-reversal invariant superconductors BERND ROSENOW, LUKAS KIMME, Universität Leipzig, TIMO HYART, Instituut-Lorentz, Leiden University — We address the question of whether individual nonmagnetic impurities can induce zero-energy states in time reversal invariant topological superconductors, and define a class of symmetries which guarantee the existence of such states for a specific value of the impurity strength [1]. These symmetries allow the definition of a position space topological Z_2 invariant, which is related to the standard bulk topological Z_2 invariant. Our general results are applied to the time reversal invariant p-wave phase of the doped Kitaev-Heisenberg model [2], where we demonstrate how a lattice of impurities can drive a topologically trivial system into the non-trivial phase. Finally, signatures of impurity states in the spin-susceptibility are described.

[1] L. Kimme, T. Hyart, and B. Rosenow, arXiv:1308.2496, (2013).
[2] T. Hyart, A.R. Wright, G. Khaliullin, and B. Rosenow, Phys. Rev. B 85, 140510(R) (2012).

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