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Majorana modes in time-reversal invariant s-wave topological superconductors SHUSA DENG, LORENZA VIOLA, Dartmouth College, GERARDO ORTIZ, University of Indiana, Bloomington — We present a time-reversal invariant s-wave superconductor supporting Majorana edge modes. The multi-band character of the model together with spin-orbit coupling are key to realizing such a topological superconductor. We characterize the topological phase diagram by using a partial Chern number sum, and show that the latter is physically related to the parity of the fermion number of the time-reversal invariant modes. By taking the self-consistency constraint on the s-wave pairing gap into account, we also establish the possibility of a direct topological superconductor-to-topological insulator quantum phase transition.

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