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Surface state of superconducting topological crystalline insulator
TATSUKI HASHIMOTO, KEIJI YADA, MASATOSHI SATO, YUKIO TANAKA, Nagoya Univ — Topological crystalline insulator SnTe has Dirac fermions protected by mirror symmetry [1,2]. (001) surface is particularly unique in mixing of two Dirac cone. It has been known that In doped SnTe become superconductor at low temperature. After the observation of zero-bias conductance peak which may originate from Andreev bound state in 2012 [3], In-SnTe has drawn attention as a candidate of topological superconductor and topological crystalline superconductor. Although it has been indicated the possibility of the existence of topological surface state by the experiments, theoretical calculation of the surface states for this material has not been done before now. First, we consider possible pair potentials for In-SnTe from crystal point group. Next, we calculate surface state for the possible pairings. Here, we use the recursive Green's function method and calculate in the semi-finite system. As a result, we find that wide variation of surface states can appear depending on the pairing symmetry and surface direction.

[1] L. Fu et al., Phys. Rev. Lett. 106, 106802 (2011).
[2] Y. Tanaka et al., Nat. Phys. 8, 800(2012).
[3] S. Sasaki et al., Phys. Rev. Lett. 109, 217004 (2012).

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