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Spinless Weyl semimetals and Z_2 topological crystalline insulator with glide symmetry HEEJAE KIM, Tokyo Institute of Technology, SHUICHI MURAKAMI, TIES, Tokyo Institute of Technology — A topological crystalline insulator (TCI) is one of the symmetry protected topological phases protected by crystalline symmetries such as rotational symmetry, mirror symmetry etc. In recent works, a new class of three-dimensional (3D) Z_2 TCI with a nonsymmorphic glide plane symmetry is theoretically predicted both for spinless and spinfull systems. Our study shows that a spinless Weyl semimetal (WSM) phase always emerges between a normal insulator (NI) and TCI phases transition in general glide symmetric spinless systems. In particular, we find how the Z_2 topological invariant is changed by pair creations and pair annihilations of Weyl nodes in general phase transition. To confirm this scenario, we introduce a simple spinless tight-binding model on a 3D rectangular lattice with two sublattices and two orbitals with glide plane symmetry. Using this model, we show that the spinless WSM phase emerges between the NI and TCI phases, and the changing of Z_2 topological invariant comes from the behavior of Weyl nodes. Our numerical calculation also shows that surface Fermi arcs in the spinless WSM phase evolve into a surface Dirac cone in the TCI phase.

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