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Classification of reflection symmetry protected topological semimetals and nodal superconductors CHING-KAI CHIU, University of British Columbia, ANDREAS SCHNYDER, Max Planck Institute Stuttgart — While the topological classification of insulators, semimetals, and superconductors in terms of nonspatial symmetries is well understood, less is known about topological states protected by crystalline symmetries, such as mirror reflections and rotations. In this work, we systematically classify topological semimetals and nodal superconductors that are protected, not only by nonspatial (i.e., global) symmetries, but also by a crystal reflection symmetry. We find that the classification crucially depends on (i) the codimension of the Fermi surface (nodal line or point) of the semimetal (superconductor), (ii) whether the mirror symmetry commutes or anticommutes with the nonspatial symmetries and (iii) how the Fermi surfaces (nodal lines or points) transform under the mirror reflection and nonspatial symmetries. The classification is derived by examining all possible symmetry-allowed mass terms that can be added to the Bloch or Bogoliubov-de Gennes Hamiltonian in a given symmetry class and by explicitly deriving topological invariants.

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