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Topological Nodal-Line Fermions in the Non-Centrosymmetric Spin-Orbit Metal PbTaSe2.[1] GUANG BIAN, Princeton University, PRINCETON TEAM — We report on the existence of topological nodal-line states in the non-centrosymmetric compound single-crystalline PbTaSe2 with strong spin-orbit coupling. Remarkably, the spin-orbit nodal lines in PbTaSe2 are not only protected by the reflection symmetry but also characterized by an integer topological invariant. Our detailed angle-resolved photoemission measurements, first-principles simulations and theoretical analysis illustrate the physical mechanism underlying the formation of the topological nodal-line states and associated surface states. Our work paves the way towards exploring the exotic properties of the topological nodal-line fermions in condensed matter systems and, potentially, the rich physics arising from the interplay between the topological nodal-line states and the emergent superconductivity in this compound.

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