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Topological Crystalline Metal in Orthorhombic Perovskite Iridates YIGE CHEN, University of Toronto, YUAN-MING LU, University of California, Berkeley, HAE-YOUNG KEE, University of Toronto — Since topological insulators were theoretically predicted and experimentally observed in semiconductors with strong spin-orbit coupling, more and more attention has been drawn to topological materials which host exotic surface states. These surface excitations are stable against perturbations since they are protected by global or spatial/lattice symmetries. Succeeded in achieving various topological insulators, a tempting challenge now is to search for metallic materials with novel topological properties. Here we predict that orthorhombic perovskite iridates realize a new class of metals dubbed topological crystalline metals, which support zero-energy surface states protected by certain lattice symmetry. These surface states can be probed by photoemission and tunnelling experiments. Furthermore, we show that by applying magnetic fields, the topological crystalline metal can be driven into other topological metallic phases, with different topological properties and surface states.

Yige Chen
University of Toronto

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