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Unconventional superconductivity in half-Heusler semimetals[1]
PHILIP BRYDON[2], Department of Physics, University of Otago, LIMIN WANG, Center for Nanophysics and Advanced Materials, University of Maryland, MICHAEL WEINERT, DANIEL AGTERBERG, Department of Physics, University of Wisconsin, Milwaukee — We consider the superconductivity of the topological half-Heusler semimetals YPtBi and LuPtBi, where pairing occurs between $j = 3/2$ quasiparticles. This permits Cooper pairs with quintet or septet total angular momentum, in addition to singlet and triplet states. Purely on-site interactions can generate unconventional (quintet) time-reversal symmetry-breaking states with topologically nontrivial point or line nodes. Furthermore, due to the broken inversion symmetry in these materials, the usual s-wave singlet state can mix with a p-wave septet state, also with topologically stable line-nodes.

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