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Majorana surface modes of topological septet pairing in spin-3/2 semi-metals WANG YANG, CONGJUN WU, University of California San Diego — Multi-component electronic systems exhibit richer structures of topological superconductivity beyond the conventional scenarios of spin singlet and triplet pairings in spin-1/2 systems. Examples include the half-Heusler compounds RPtBi series (R for rare earth), whose electronic structures are described by effective spin-3/2 particles due to strong spin-orbit coupling. Recent experiments provide evidence to unconventional superconductivity in these materials with nodal spin septet pairing. We systematically study topological pairing structures in spin-3/2 systems and calculate surface spectrum, which exhibit zero energy flat band and cubic dispersion. These unusual features of surface states can be tested in future spectroscopy experiments.

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