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Nodal Topological Superconductivity in Monolayer NbSe$_2$ WEN-YU HE, BENJAMIN T. ZHOU, JAMES J. HE, NOAH F. Q. YUAN, TING ZHANG, K. T. LAW, Hong Kong Univ of Sci Tech, HONG KONG UNIV OF SCI TECH COLLABORATION — Recently, it was shown that the in-plane upper critical field H_{c2} of superconducting monolayer NbSe$_2$ can be six times higher than the Pauli limit field. This is due to the Ising spin-orbit coupling (SOC) which pins electron spins to the out-of-plane directions and protects the electron spins from being aligned to the in-plane directions. In this work, we show that in a wide range of experimentally accessible regimes where the in-plane magnetic field is higher than the Pauli limit field but lower than H_{c2}, a monolayer NbSe$_2$ becomes a nodal topological superconductor. The bulk nodal points appear on the $\Gamma- M$ lines of the Brillouin zone where the Ising SOC vanishes. The nodal points are connected by Majorana flat bands, similar to the Weyl points being connected by surface Fermi arcs in Weyl semimetals. The Majorana flat bands are associated with a large number of zero energy Majorana fermion edge modes which induce spin-triplet Cooper pairs.

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