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**Double Berry monopoles and topological surface states in the superconducting B-phase of $UPt_3$** ANDRIY NEVIDOMSKYY, Department of Physics, Rice University, PALLAB GOSWAMI, National High Magnetic Field Laboratory, Florida State University — The recent phase sensitive measurements in the superconducting B-phase of $UPt_3$ provide strong evidence for the triplet, chiral $k_z(k_x \pm ik_y)^2$ pairing symmetries, which endow the Cooper pairs with orbital angular momentum projections $L_z = \pm 2$ along the c-axis. Such pairing can support both line and point nodes, and both types of nodal quasiparticles possess nontrivial topology in the momentum space. We show that the point nodes located at the intersections of the closed Fermi surfaces with the c-axis, act as the double monopoles and the antimonopoles of the Berry curvature, and generalize the notion of Weyl quasiparticles. Consequently, the B phase should support an anomalous thermal Hall effect, various magnetoelectric effects such as the polar Kerr effect, in addition to the protected Fermi arcs on the (1,0,0) and the (0,1,0) surfaces. The line node at the Fermi surface equator acts as a vortex loop in the momentum space and gives rise to the zero energy, dispersionless Andreev bound states on the (0,0,1) surface. At the transition from the B-phase to the A-phase, the time reversal symmetry is restored, and only the nodal ring survives inside the A-phase.

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