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Topological properties of possible singlet chiral superconducting states for URu_2Si_2 PALLAB GOSWAMI, LUIS BALICAS, National High Magnetic Field Laboratory and Florida State University — We show that the current thermodynamic measurements in the superconducting phase of URu_2Si_2 are compatible with two distinct singlet chiral paired states $k_z(k_x \pm ik_y)$ and $(k_x \pm ik_y)^2$. Despite possessing similar low temperature thermodynamic properties, these two pairings are topologically distinguished by their respective orbital angular momentum projections along the c-axis, $m = \pm 1$ and $m = \pm 2$. The point nodes of these states act as the charge-m monopoles and anti-monopoles of the Berry's gauge flux, which are separated in the momentum space along the c-axis, and the Berry's flux through the ab plane equals m. These topologically nontrivial point nodes, give rise to m copies of protected spin degenerate, chirally dispersing surface states on the ca and the cb planes, which carry surface current, and their energies vanish at the Fermi arcs. The Berry's flux through the ab plane gives rise to anomalous spin and thermal Hall conductivities, and various magnetoelectric effects. However, the clear determination of the bulk invariant can only be achieved by probing the pairing symmetry via a corner Josephson junction measurement, and Fourier resolved surface sensitive measurements of the Fermi arcs.

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