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Topological Superconductivity in Non-Centrosymmetric Materials

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Recent interest in the effect of intrinsic spin-orbit coupling in materials that exhibit an excitation gap has led to the notions of topological insulators and topological superconductors. Intrinsic spin-orbit coupling is enhanced in non-centrosymmetric materials, as in this case already band-diagonal matrix elements contribute. We study non-centrosymmetric superconductors with various point group symmetries. For self-consistent order parameter profiles we calculate the surface density of states, showing intricate structure of spin-polarised Andreev bound states. The topology's effect on the surface states and the tunnel conductance is thoroughly investigated, and a topological phase diagram is constructed for open and closed Fermi surfaces showing a sharp transition between the two for the cubic point group O.

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