# Majorana-like excitations in a ferromagnetic topological crystalline insulator

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As qubits resistant to local decoherence, Majorana bound states (MBSs) open prospects for fault-tolerant quantum computation. These zero-energy excitations are predicted to emerge at one-dimensional (1D) junctions of nonconventional superconductors and topologically trivial systems, i.e., at the terminations of relevant 1D quantum wires[1] or at boundaries, such as vortices, of 2D counterparts[2]. Here we show, by using soft point-contact spectroscopy, that an electron-hole gap with a broad zero-bias conductance maximum develops at the topological surfaces of diamagnetic, paramagnetic, and ferromagnetic $Pb_{1-y-x}Sn_yMn_xTe$, where $y > 0.67$ and $0 < x < 0.10$. The temperature dependence of the gap shows a critical behaviour with Tc up to 4.5 K, which however is not accompanied by a global superconductivity. We assign these findings to the presence of 1D topological states adjacent to surface atomic steps in topological crystalline insulators of IV-VI compounds[3]. Within this scenario, the interplay of carrier-carrier interactions, spin exchange with Mn ions, and pairing coupling within the at 1D channels results in MBSs with lifted Kramers degeneracy, which are immune to the ferromagnetic ordering in the sample interior.

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