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Probing the topological superconductivity in helical metal: a quantum magnetic impurity RUI WANG, BAIGENG WANG, DINGYU XING, Nanjing University — The Kondo problem in superconducting topological insulator surface (STIS) is investigated. Different from the traditional Kondo physics in convention superconductor, a pseudo Kondo singlet state is revealed, which is the singlet states formed by the local magnetic moment and a complex pseudo spin composed of both the real spin and orbital angular momentum components. Rich in-gap physics is found, due to the competition between Bardeen-Schrieffer-Cooper singlet and the pseudo Kondo singlet. Remarkably, it is proved that the quantum magnetic impurity is only coupled to half of the degrees of freedom in STIS, and therefore the topological superconductivity remains robust and perfectly preserves the superconductor coherent peaks. These findings are unique in STIS, indicating that the quantum magnetic impurity can be used as an effective method to distinguish different types of topological superconductivity.

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