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Anderson Chern insulators JAMES JUN HE, TONG ZHOU, YAO LU, The Hong Kong Univ of Science and Technology, Z.C. GU, Perimeter Institute, Canada, K.T. LAW, The Hong Kong Univ of Science and Technology — Previously, it was shown that quantum spin Hall insulators (QSHI) with helical edge states can be turned into a trivial insulator with Chern number $N = 0$ by applying magnetic fields. Further increase of the magnetization can result in a quantum anomalous Hall insulator (QAHI) which supports chiral edge state with $N = 1$. In this work, we show that for intermediate magnetization strengths, before the QSHI is turned into a QAHI, a topologically non-trivial phase which supports a single branch of chiral edge states can be obtained by increasing non-magnetic disorder. We call this phase the Anderson Chern insulator phase. In contrast to QAHI in which the chiral edge states are protected by the bulk gap, the gapless chiral edge states in Anderson Chern insulators survive even though the bulk gap is closed by disorder. Moreover, an Anderson Chern insulator exhibits quantized conductance of e^2/h instead of $2e^2/h$ as for topological Anderson insulators. Therefore, we propose that this Anderson Chern insulator phase is a new phase of topological matter.

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