

Abstract Submitted  
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**disorder effect on quantum transport properties of ultra thin Fe film** XIAOTIAN ZHANG, Peking Univ, KOHJI NAKAMURA, Mie University, RYUICHI SHINDOU, ICQM, School of Physics, Peking University — Ferromagnetic ultrathin films are experimentally known to often exhibit perpendicular magnetic anisotropy, when being placed on certain substrates. Based on reported ab-initio band calculations of free-standing Fe-monolayer and that on MgO substrate, we will introduce an effective tight-binding model, which capture a part of an electronic structure near Fermi level for both cases. We will show that the model supports electronic bands with non-zero Chern number and chiral edge modes which cross a direct band gap on the order of 50meV. Unluckily, however, the direct band gap is also masked by another dispersive bands which have non-zero Berry's curvature in the k-space. To demonstrate how disorder kills conducting characters of the latter bulk bands while leave intact those of the chiral edge modes, we will clarify behaviors of localization length and conductance in the effective model with on-site disorders.

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