Abstract Submitted
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Quantum criticality in Kondo quantum dot coupled to helical edge states of interacting 2D topological insulators[1] CHUNG-HOU CHUNG, SALMAN SILOTRI, Department of Electrophysics, National Chiao-Tung University, HsinChu, Taiwan, R.O.C. — We investigate theoretically the quantum phase transition (QPT) between the one-channel Kondo (1CK) and two-channel Kondo (2CK) fixed points in a quantum dot coupled to helical edge states of interacting 2D topological insulators (2DTI) with Luttinger parameter $0 < K < 1$[1]. For $K < 1$, the strong coupling 2CK fixed point of the model was argued to be stable for infinitesimally weak tunnelings between dot and the 2DTI based on a simple scaling dimensional analysis[2]. We re-examine this model beyond the scaling dimension analysis via a 1-loop renormalization group (RG) approach combined with bosonization and re-fermionization techniques near weak-coupling and strong-coupling (2CK) fixed points. We find for $K \to 1^-$ that the 2CK fixed point can be unstable towards the 1CK fixed point and the system may undergo a quantum phase transition between 1CK and 2CK fixed points. The QPT in our model comes as a result of the combined Kondo and the helical Luttinger physics in 2DTI, and it serves as the first example of the 1CK-2CK QPT accessible by the controlled RG approach. We extract quantum critical and crossover behaviors. [1] C.-H. Chung and S. Silotri, arXiv:1201.5610. [2] K.T. Law, C.Y. Sheng, Patrick A. Lee, and T.K. Ng, Phys. Rev. B **81**, 041305(R) (2010).

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