Title: Non-Fermi Liquid transport in a mesoscopic device via Topological Kondo effect.

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Abstract: Investigation of Non-Fermi Liquid (NFL) signature of transport, that is deviation from T^2 dependence of resistivity at low temperatures, is a highly active area of research. One major problem is that the NFL behavior occurs at extremely low temperatures and different perturbations can destroy the signature easily, hindering its stability at various experimental platforms. In this work, we provide a robust route to observe NFL transport behavior. Here, the NFL temperature dependence of resistivity occurs through a novel Topological Kondo effect (TKE), which arises due to coupling of conduction electrons and topologically degenerate Majorana fermions [2, 3]. One way to realize such TKE is by using mesoscopic superconducting device that can host Majorana bound states (MBS). Motivated by these, in this work [1] we propose a simple mesoscopic device made of $FeSe_{0.45}Te_{0.55}$ layer, containing magnetic domain walls. We show that this device has strong potential to host MBS. Next, connecting this device with external metallic leads, we show that indeed, in this setup one can achieve TKE at higher temperature, thus giving a more practical route to observe NFL transport. We also show that the TKE is robust against perturbation such as exchange anisotropy in coupling.

References:

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