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Topological Kondo Effect with Majorana Fermions

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Abstract:

The Kondo effect is a striking consequence of the coupling of itinerant electrons to a quantum spin with degenerate energy levels. While degeneracies are commonly thought to arise from symmetries or fine-tuning of parameters, the recent emergence of Majorana fermions has brought to the fore an entirely different possibility: a "topological degeneracy" which arises from the nonlocal character of Majorana fermions. In this talk, I shall explain that nonlocal quantum spins formed from these degrees of freedom give rise to a novel "topological Kondo effect". This leads to a robust non-Fermi liquid behavior. This effect leads to several unique transport signatures in mesoscopic superconducting systems, which would demonstrate the non-local quantum dynamics of Majorana fermions.