

Local-moment fluctuations and Kondo physics in twisted bilayer graphene

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Abstract

Twisted bilayer graphene (TBG) has shown two seemingly contradictory characters: (1) quantum-dot-like behavior in STM indicates that then electrons are localized; (2) the transport experiments suggest the itinerant character. Two features can both be captured by a topological heavy-fermion model, in which the topological conduction electron bands couple to the local moments on a triangular lattice [1]. We study the local moment physics and the Kondo effect in this model. We first calculate the RKKY interactions between the local moments. We demonstrate that the RKKY interactions will lead to a U(4) Hund's rule of the ground states, and study the corresponding local moment fluctuations on top of the ground states [2]. We then analyze the Kondo effect induced by the hybridization between topological conduction electrons and local moments. The stability and topology of the Kondo phase are also discussed [3].

References

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2. H. Hu, B. A. Bernevig, and A. M. Tsvelik, *arXiv:2301.04669* (2023)
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