

Doniach Diagram of Disordered Graphene

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Abstract (Arial 10)

We derive the quantum phase diagram of disordered electron systems as function of the concentration of magnetic impurities n and the local exchange coupling J in disordered graphene. Using the Kernel Polynomial Method (KPM), we have calculated the distribution of RKKY interaction and Kondo temperature as well as their ratio, J_{RKKY}/T_K . We find a sharp cut-off in the wide distribution of the ratio which allows us to define a critical density of magnetic impurities n_c below which Kondo screening wins at all sites of the system in disordered graphene above the critical exchange coupling J_c above which there is no more than one free magnetic moment in the whole sample. We find that J_c does not depends on the disorder strength and the magnetic coupled phase is more stable against Kondo screening but is more easily destroyed by disorder, because of pseudo gap at Dirac point.

References

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Figures