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TÉMA

Classical and quantum correlation in coupled spin systems and their influence on the differential conductance

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In recent years inelastic spin-flip spectroscopy using a low-temperature scanning tunneling microscope has been a very successful tool for studying not only individual spins but also complex coupled systems. When these systems interact with the electrons of the supporting electrodes correlated many-particle states can emerge, making them ideal prototypical quantum systems. In this presentation I will show how the controlled coupling of individual spin systems can lead not only to an energy shift of the eigenstates reminiscent of an externally applied field, but also to a bias asymmetry in the differential conductance. Using S = 1 and S = 1/2 model systems of CoHx on a h-BN/Rh(111) substrate [1] in conjunction with model Hamiltonians [2] which takes the coupling and correlation to the environment explicitly into account enables to precisely determine and control the emergence of correlations between the two subsystems on tip and sample [3].

[1] P. Jacobson et al. , Nature Communications 6, 8536 (2015).

[2] M. Ternes, NJP 17, 063016 (2015).

[3] M. Muenks, et. al., arXiv:1605.02798 [cond-mat.mes-hall] (2016).

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