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Spin dynamics in transition metal chains on Cu_2N/Cu (100)

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Successful scanning tunneling microscopy (STM) experiments have managed to assemble transition-metal spin chains on Cu_2N/Cu (100) and measure the spin dynamics. Here, we will present our theoretical results rationalizing the excitation spectra of Fe chains and the spin swtiching dynamics where spin-flip and decoherence dynamics compete [1,2]. We will also analyze the inelastic electron tunneling magnetic spectra of Mn chains on Cu_2N/Cu (100). We have recently unveiled a spin-polarized edge state in these type of chains with excellent agreement between density functional theory (DFT) calculations and experiment [4]. We will further show that the spectra asymmetry and their evolution with chain size is a consequence of the Kondo physics frustrated by the magnetic excitations of the chain. Heterogeneous chains where Fe and Mn atoms are mixed give rise to unexpected features. While Kondo peaks are absent from Mn and Fe chains, certain FeMn chains contain Kondo peaks [5]. Via DFT and spin-flip modelling, we rationalize these findings, and show, that contrary to Mn chains, FeMn cannot be considered a macrospin [6].

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