

Shot noise detection of spin filtering in non-magnetic molecular junctions

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When the size of electric conductors is confined to several angstroms, novel magneto-transport properties can emerge. Using conductance and shot noise measurements, we show that a metal-molecule-metal junction based on nonmagnetic electrodes and a molecule with a finite spin, can serve as a very efficient spin filter with quantum spin transport near the upper limit of e^2/h . With the aid of calculations, the detected spin filtering is ascribed to spin-dependent quantum interference at the molecular scale. The demonstrated system paves the way for controlled spin injection without the need for magnetic electrodes.