Spin-blockade in a Hubbard chain with spin-dependent impurities[1] CHANG-QIN WU, YAO YAO, Department of Physics, Fudan University, Shanghai, CHINA — We investigate the spin/charge transport in a one-dimensional strongly-correlated system using adaptive time-dependent density matrix renormalization group method. The model we consider is a non-half-filled Hubbard chain with spin-dependent impurities, which is found to display the blockade of spin current while little influence on charge current. We have considered (1) the spread of a wave packet of both spin and charge in the Hubbard chain and (2) the spin and charge currents induced by a spin-dependent voltage bias that is applied to the ideal leads attached at the ends of this Hubbard chain. It is found that the spin-charge separation plays a key role in the spin-blockade and a large on-site repulsion U is required for more effective utilization of this phenomenon in some spin-related devices, like spin memory.

Chang-Qin Wu
Department of Physics, Fudan University, Shanghai, CHINA

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