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Controlling entanglement and spin-correlations in double quantum dots with electrical currents in the non-equilibrium regime[1] C. A. BUSSER, Ludwig-Maximilians-Universität, München, F. HEIDRICH-MEISNER, FAU Erlangen-Nuremberg and LMU Munich — We study the non-equilibrium dynamics in a parallel double-quantum dot structure induced by a large bias voltage. By applying both a magnetic flux and a voltage, it is possible to generate spin-spin-correlations between the two quantum dots. The sign and absolute value of these correlations can be controlled by changing the bias voltage. Using a canonical transformation we argue that the mechanism that drives the spin-spin correlations can be understood in terms of an effective Ruderman-Kittel-Kasuya-Yosida (RKKY) interaction that is mediated by the current. Our study is based on the Anderson-impurity model and we use time-dependent density matrix renormalization group simulations to obtain currents and spin-correlations in the non-equilibrium regime. We also perform quench in the Hamiltonian to prove the stability of the entangled state.

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