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Dynamical and thermodynamical control of open quantum Brownian motion¹ FRANCESCO PETRUCCIONE, University of KwaZulu-Natal, ILYA SINAYSKIY, National Institute for Theoretical Physics — Open quantum Brownian motion was introduced as a new type of quantum Brownian motion for Brownian particles with internal quantum degrees of freedom. Recently, an example of the microscopic derivation of open quantum Brownian motion has been presented [I. Sinayskiy and F. Petruccione, Phys. Scr. T165, 014017 (2015)]. The microscopic derivation allows to relate the dynamical properties of open Quantum Brownian motion and the thermodynamical properties of the environment. In the present work, we study the possibility of control of the external degrees of freedom of the "walker" (position) by manipulating the internal one, e.g. spin, polarization, occupation numbers. In the particular example of the known microscopic derivation the connection between dynamics of the "walker" and thermodynamical parameters of the system is established. For the system of open Brownian walkers coupled to the same environment controllable creation of quantum correlations is investigated.

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