The Ground State Problem for a Quantum Hamiltonian Model Describing Friction

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Abstract. In this paper, we consider the quantum version of a Hamiltonian model describing friction. This model consists of a particle which interacts with a bosonic reservoir representing a homogeneous medium through which the particle moves. We show that if the particle is confined, then the Hamiltonian admits a ground state if and only if a suitable infrared condition is satisfied. The latter is violated in the case of linear friction, but satisfied when the friction force is proportional to a higher power of the particle speed.