Quantum work extraction efficiency for noisy quantum batteries

Vittorio GIOVANNETTI - *NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore*

We present a theoretical analysis of the energy recovery efficiency for quantum batteries composed of many identical quantum cells undergoing noise. While the possibility of using quantum effects to speed up the charging processes of batteries have been vastly investigated, in order to translate these ideas into working devices it is crucial to assess the stability of the storage phase in the quantum battery elements when they are in contact with environmental noise. In this work we formalize this problem introducing a series of operationally well-defined figures of merit which gauge the highest efficiency one can attain in recovering useful energy from quantum battery models that are formed by large collections of identical and independent elements (quantum cells or q-cells).