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Dynamical blockade of a reservoir for optimal performances of a quantum battery

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The development of fast and efficient quantum batteries is crucial for the prospects of quantum technologies. We show that both requirements are accomplished in the paradigmatic model of a harmonic oscillator strongly coupled to a highly non-Markovian thermal reservoir [1]. At short times, a dynamical blockade of the reservoir prevents the leakage of energy towards its degrees of freedom, promoting a significant accumulation of energy in the battery with high efficiency. The possibility of implementing these conditions in LC quantum circuits opens up new avenues for solid-state quantum batteries.

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Theme

Theme 1. Energy advantage and cost of quantum technology

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Track Classification: Theme 2. Quantum effects in energy processes and materials