Dissipative Charging of a Quantum Battery

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We show that a cyclic unitary process can extract work from the thermodynamic equilibrium state of an engineered quantum dissipative process. Systems in the equilibrium states of these processes serve as batteries, storing energy. The dissipative process that brings the battery to the active equilibrium state is driven by an agent that couples the battery to thermal systems. The second law of thermodynamics imposes a work cost for the process; however, no work is needed to keep the battery in that charged state. We consider simple examples of these batteries and discuss situations in which the charged state has full population inversion, in which case the extractable work is maximal, and circumstances in which the efficiency of the process is maximal.