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Enhancing energy storage crossing quantum phase transitions in an integrable spin quantum battery

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We investigate the performance of a one dimensional dimerized XY chain as a quantum battery. Such integrable model shows a rich quantum phase diagram which emerges through a mapping of the spins into auxiliary fermionic degrees of freedom. We consider a charging protocol relying on the double quench of an internal parameter, notably the strength of the dimerization. Within this picture we observe a substantial enhancement of the energy stored per spin as a consequence of driving the system across certain quantum phase transitions.

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Abstract category

Quantum Simulations

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