

## **Quantum correlations from work statistics of many-body systems**

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We study manifestations of quantum coherence and quantum criticality in the work distribution function (WDF) of many-body systems. We consider general processes whose drive couples to a conserved charge in a subsystem. In the sudden limit we find exact relations between moments of the WDF and charge coherence in the initial state. While the first two moments are captured by the charge susceptibility, charge coherence affects the third moment  $\langle W^3 \rangle$ . We then study the crossover to the adiabatic limit in solvable models and near quantum critical points. We demonstrate our results in quantum dots (QDs), where the WDF allows to directly measure the Kondo binding energy.