

# No-go theorem for the characterisation of work fluctuations in coherent quantum systems

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In this talk I will describe a recent no-go result that essentially shows that a notion of stochastic work can not exist for quantum processes in which the initial state is found in a quantum superposition of different energy states [1]. More precisely, we show that there exists no measurement scheme to estimate work fluctuations which satisfies that (i) the work statistics agree with standard results, as given by the two-point-measurement scheme [2], for initial non-coherent states, and at the same time that (ii) the average measured work corresponds to the difference of average energy for closed quantum systems. The implications of this result in several proposals to measure fluctuations of work in quantum systems [2-5] will be discussed, as well as a measurement scheme to approximately describe work fluctuations in coherent processes using two copies of the state [1].

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[3] A.E. Allahverdyan, Phys. Rev. E 90, 032137 (2014).

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[5] H.J.D. Miller and J. Anders, arXiv:1610.04285 (2016).