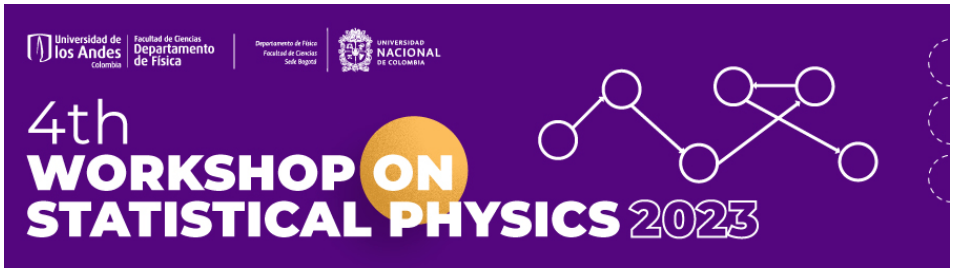

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A path integral approach to work in the Margenau-Hill scheme

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An important task in quantum thermodynamics consists of the characterization of work and heat in the quantum domain. A common approach to this problem, known as the two-point measurement (TPM) scheme, consists of performing two projective energy measurements at the beginning and at the end of a given evolution protocol. Although its importance for the development of the understanding of work statistics in the quantum regime, the TPM scheme has a fundamental limitation: since the initial projective measurement diagonalizes the initial state in the energy basis, the effect that the initial coherences may have on the energetics of the system is lost.

The Margenau-Hill (MH) scheme is an alternative scheme that allows initial coherent states in the energy basis relying on the replacement of the first projective measurement by an estimation of the initial Hamiltonian from the result of a single projective measurement at the end of the evolution protocol. The joint probability distribution describing the scheme, known as the MH distribution, is given by the following quasi-probability distribution
$\mathrm{P}^{MH}(n,m) = \frac{1}{2}\mathrm{Tr}\left[\rho_S(0)(\bar{\Pi}_{E_m^\tau}\Pi_{E_n^0} + \Pi_{E_n^0}\bar{\Pi}_{E_m^\tau})\right]$

In this talk I present a path integral formulation for work in the MH scheme developed in close analogy to that of the TPM scheme, providing further insight on the role of initial coherence in quantum thermodynamic setups.

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