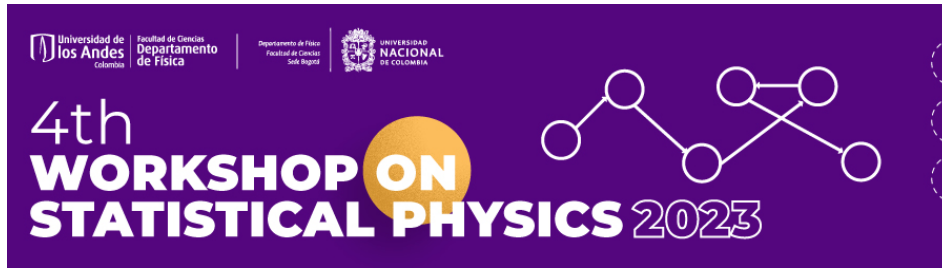


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Heat exchange fluctuation relation for the transition from a micro-canonical to a canonical ensemble in a classical harmonic oscillator

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Hereby we investigate the thermalization of a classical harmonic oscillator starting from a micro-canonical ensemble at energy E_0 and finishing in a canonical one at temperature T . We derived analytically that the probabilities $P(Q)$ and $P(-Q)$ of gaining or losing a certain amount of heat Q are related as $P(Q) = \exp(-2Q/kT)P(-Q)$, a result we also verified through molecular dynamics simulations with an overdamping Langevin equation algorithm. Our results give insight into the thermalization process and contributes to extend fluctuation relations to micro-canonical initial states.

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