

# Microcanonical method for the study of first order transitions

We propose to use a generalization of the microcanonical ensemble to simulate first order phase transitions [1]. A fluctuation-dissipation formalism allows to extract information from thermodynamic integration. Interestingly, the computed quantities (latent heat, surface tension, critical temperature, etc) are defined in the Canonical Ensemble, but they just happen to be easier to compute microcanonically. An application of the method to the simulation of three-dimensional first-order phase transitions in the presence of quenched disorder will be discussed [2].

[1] V. Martin-Mayor, Phys. Rev. Lett. **98**, 137207 (2007).

[2] L.A. Fernandez, A. Gordillo, V. Martin-Mayor, J.J. Ruiz-Lorenzo, work in progress.