

DISSIPATION AND THE FOUNDATIONS OF STATISTICAL THERMODYNAMICS

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ABSTRACT

The argument of the Evans Searles Fluctuation Theorem [1], namely the dissipation function [2] is also the key quantity in all linear and nonlinear response theory [3]. It is also the key quantity in the proof of the newly discovered equilibrium relaxation theorems. For the first time we have, subject to certain simple assumptions, a proof of thermal relaxation to the canonical distribution function [4] postulated by J. Willard Gibbs.

REFERENCES

- [1] D.J. Evans and D.J. Searles, Phys. Rev. E 50,1645(1994).
- [2] D.J. Searles and D.J. Evans, J.Chem. Phys., 113,3503(2000).
- [3] D.J. Evans, D.J. Searles and S.R. Williams, J. Chem. Phys., 128, 014504(2008), *ibid*, 128, 249901(2008).
- [4] D.J. Evans, D.J. Searles and S.R. Williams, J. Stat Mech.,P07029(2009).