

Dissipation and the Foundations of Classical Statistical Thermodynamics

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In this talk I will discuss the derivation of the postulates of statistical mechanics from the laws of mechanics and the axiom of causality – that cause precedes effect. In order to do this we derive three main theorems: the Fluctuation Theorem¹ that gives the relative probability that path integrals of the dissipation take on equal but opposite values; the Dissipation Theorem² that relates nonequilibrium averages to time integrals of correlation functions involving dissipation and the Relaxation Theorem³ that shows how nonequilibrium systems can, under specified circumstances, relax to that quiescent state we call equilibrium. The mathematically defined dissipation function is central to each of these theorems.⁴

References

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