

Title: Evolutionary forces: a stochastic thermodynamics perspective

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The analogy between the way evolution by natural selection operates and thermodynamics has been explored extensively and since the early formulation evolutionary dynamics models. Yet this analogy remained mainly constrained to detailed-balanced models. I will show how, through the notion of thermodynamic force, novel insights about evolutionary dynamics can be gained. Indeed generic evolutionary dynamics are genuinely non-detailed balanced, and characterized by effective interactions. Such interactions highlight the limits of the typical understanding of evolution in terms of climbing of fitness landscape, and are also responsible for engendering robustness of reproduction to evolving organisms. I will clarify this emergent phenomenon and relate it to viral evolution experiments.