

## CHAPTER OVERVIEW

### 11: Linear Response Theory

Correlation functions provide a statistical description of the dynamics of molecular variables; however, it remains unclear how they are related to experimental observables. You have probably sensed this from the perspective that correlation functions are complex, and how can observables be complex? Also, correlation functions describe equilibrium dynamics, but from a realistic point of view, exerting external forces should move the system away from equilibrium. What happens as a result? These questions fall into the realm of nonequilibrium statistical mechanics, an area of active research for which formal theories are limited and approximation methods are the primary tool. Linear response theory is the primary approximation method, which describes the evolution away or toward equilibrium under perturbative conditions.

[11.1: Classical Linear Response Theory](#)

[11.2: Quantum Linear Response Functions](#)

[11.3: The Response Function and Energy Absorption](#)

[11.4: Relaxation of a Prepared State](#)

### Contributors and Attributions

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