

## CHAPTER OVERVIEW

### 2: Principles of Statistical Mechanics

In a book on classical or quantum mechanics, the chapter corresponding to this one would be titled “Foundations of Classical (or Quantum) Mechanics”. Here, I am careful to use the term “principles” rather than “foundations”. The term “foundations” suggests rock solid, logically rigorous, hard and fast rules, such as the experimental evidence that undergirds quantum theory. Statistical mechanics lacks such a rigorous undergirding. Remember that our first job in statistical mechanics is to find the questions. Of course, we can ask any question we wish, but we need to find profitable questions. Such a task is not and cannot be one of rigor.

Our treatment here is based on classical mechanics, not quantum mechanics. This approach is easier and more straightforward than the approach through quantum mechanics, and—as you will soon see—there are quite enough difficulties and subtleties in the classical approach! After we investigate the principles of statistical mechanics from a classical perspective, we will outline (in section 4.10) the generalization to quantum mechanics.

[2.1: Microscopic Description of a Classical System](#)

[2.2: Macroscopic Description of a Large Equilibrium System](#)

[2.3: Fundamental Assumption](#)

[2.4: Statistical Definition of Entropy](#)

[2.5: Entropy of a Monatomic Ideal Gas](#)

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[2.7: Using Entropy to Find \(Define\) Temperature and Pressure](#)

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