CHAPTER OVERVIEW

1: Ideal Gases

In this section, we will investigate a new, mechanical model that can be viewed as an application of the models previously studied. Although we will take a step back in complexity and examine a particle, rather than a rigid-body, model, to compensate for this simplification we will not look at one particle, or two particles, but rather *many* particles. "Many" in this case means approximately 10^{23}!

Since there are *so* many particles we will no longer be interested in the motion of any one individual particle, but rather in the average motions of the entire group of particles. We will try to use our understanding of mechanics, applied to individual *microscopic* particles, to learn about the *macroscopic* properties of the entire group.

To simplify matters we will assume that the particles do not interact except via elastic collisions with each other and collisions with the walls of the container in which they are contained. Thus, there are no non-contact interactions, such as the force of gravity, nor contact interactions, such as connecting ropes, springs,etc., between the particles.

If we imagine our collection of particles to represent individual atoms in a gas this model is referred to as the *ideal gas model*. The study of the ideal gas forms the entrance into the field of physics known as thermodynamics.

Thumbnail: In an ordinary gas, so many molecules move so fast that they collide billions of times every second. (Public Domain; Greg L via Wikipedia)