7.0: Overview

We began this course by focusing on energy and transfers of energy between different physical systems. In 7A we tried to answer was what happened to a physical system from a time before to a time after the system interacted with other systems. We tried to avoid needing to understand the details of the interaction. We discovered that changes of energy of a physical system is a very useful measure of the interaction, although it is not the only measure. We couldn't completely avoid the details of interactions, however, since force was involved in the amount of energy transferred during an interaction.

We saw how we could apply this energy formalism to more traditional thermodynamic systems (gases, heat engines) as well as to mechanical systems. We also developed a simple particulate model of matter in 7A that involved modeling the bonds between atoms and molecules as analogous to masses hanging on springs, the masses being in continuous random oscillation. This simple model allowed us to explain and predict many of the thermal properties of matter in its various states. Again, we avoided the details of oscillations and focused only on changes in energies.

In this chapter, we continue our focus on the results of interactions. We are still trying to address what happens to a physical system from a time before to a time after the system interacted with other systems. We will analyze two new physical quantities (momentum and angular momentum) that round out our understanding of the results of an interaction. We still cannot completely avoid the details of interactions, since force will determines whether momentum is transferred during an interaction.

The first model in this chapter gets us into the meaning of linear momentum and how changes in momentum are related to forces. Then in the second model of this chapter, we explore the fascinating world of rotating objects. We extend the ideas of force, impulse, and momentum to their analogous rotational or angular counterparts: torque, angular impulse, and angular momentum.

Contributors

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