

Reading: Chapter 3, 4.1-7

Problems:

1. Goldstein, Problem 3-18.
2. Goldstein, Problem 3-27.
3. Goldstein, Problem 3-31.
4. A proton of energy 4 MeV scatters off a second proton at rest. One proton comes off at an angle of 30° in the lab system. What is its energy? What is the energy and scattering angle of the second proton?
5. Show that the drag force on a satellite moving with velocity v in the earth's upper atmosphere is approximately $f_D = \rho A v^2$ where ρ is the atmospheric density and A is the cross-sectional area perpendicular to the direction of motion. Assume that the air molecules are moving slowly compared with v and that their collisions with the satellite are completely inelastic, i.e. the whole kinetic energy of relative motion is converted into heat.