

## Structure of Nature: Homework 1

Due: Tuesday, Feb 10<sup>th</sup>

Reading:

1. Chapter 1 in The Character of Physical Law

Questions: (Write a concise paragraph responding to each question)

1. Describe in your own words the advantages of Newton's Theory of Gravitation over Kepler's Three Laws.
2. Describe three systems for which gravity acts on different distance scales. Give the approximate size of each system.

Problems & Exercises: (These involve specific numerical information, organize the answers neatly)

1. Use the web site <http://nssdc.gsfc.nasa.gov/planetary/factsheet/> to look up the approximate radius (distance from sun) of the orbits for all of the planets.
2. Divide each of these values by the radius of Earth's orbit to obtain the relative sizes of the orbits.
3. Use this information to sketch scale models of the solar system. Use one sheet of paper for the inner planets (Mercury, Venus, Earth and Mars) and another for the outer planets (Jupiter, Saturn, Uranus, Neptune, and Pluto). Assume circular orbits, this is very accurate for all planets except Pluto.
4. (optional) Use Kepler's 3<sup>rd</sup> Law to predict the periods for the orbits from the information you obtained in exercise 2.