1. In this chapter we consider linear waves — waves with small (tends to zero) amplitudes.

2. In a cold plasma approximation, we neglect thermal and pressure effects.

3. Section 4.1 is a review of describing waves using Fourier transforms. This means that we look at field quantities in frequency $\omega$ and wavenumber $k$ (wavevector) space (Fourier space).

4. The widths of a wave packet in physical and Fourier spaces satisfy the uncertainty principle (inequality). I.e., the wider a wave packet in the physical space, the narrower it is in the Fourier space, and vice versa.

5. The dispersion relation of a particular kind of waves for a given medium describes the relation between frequency and wavenumber. It is the most important information about that kind of waves.

6. The phase velocity of a wave is simply ratio between $\omega$ and $k$ along the $k$ direction. However, it does not propagation of energy or information, which are carried by the group velocity $v_g = \nabla_k \omega$.

7. If $\omega$ is simply proportional to $k$ in the dispersion relation, the group velocity and phase velocity are just the same. This kind of waves is called non-dispersive, and the shape of a wave packet remains the same during propagation. Otherwise, it is called dispersive.

Homework #2 (due Friday, September 25th, before class): Problem # 3.2(a)-(c), 3.3, 3.4, 3.6, 3.9