PHY1106: Waves and Oscillators	Dr. Pete Vukusic

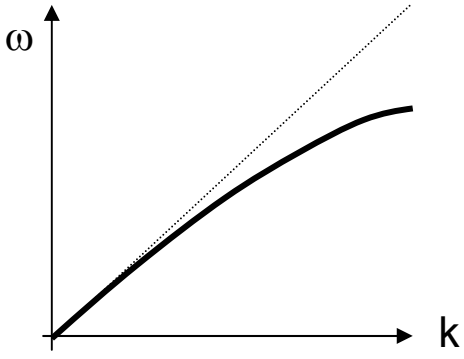
Lecture 17.

Lecture objectives.

- To understand that when the group and phase velocities of a wave packet are different, then the wave is termed "dispersive".
- This dispersion can be either anomalous or normal. Each is different and has a distinct graphical form which differs from that of the zero dispersion case.
- Dispersive waves on a string caused by damping give rise to the anomalous dispersion.
- Normal dispersion is the cause of white light splitting into a spectrum on passing through a glass prism.

Post-lecture tasks.

- Draw and label the ω vs k graph which illustrates the various forms of dispersion.
- Is it true or false that the following graph has $v_g<v_p$ and therefore represents a wave with normal dispersion?
  Explain your reasons.



- When EM waves travel through a metal, they disperse and satisfy the following relation between ω and k (σ is conductivity and μ is permeability). Write down expressions for the phase velocity and group velocity and state the type of dispersion.

$$\omega = \frac{2k^2}{\mu\sigma}$$