

Physics 202, Lecture 20

Today's Topics

- **Wave Motion**
 - **General Wave**
 - **Transverse And Longitudinal Waves**
 - **Wave speed on string**
 - **Reflection and Transmission of Waves**
 - **Wave Function**
 - **Sinusoidal Waves**
 - **Standing Waves**

General Waves

- **Wave:**

- Propagation of a physical quantity in space over time

- $q = q(x, t)$

- **Examples of waves:**

- Water wave, wave on string, sound wave, earthquake wave, electromagnetic wave, “light”, quantum wave....

- **Mechanic wave:**

- Propagation of small motion (“disturbance”) in a medium.

- Physical quantity to be propagated: displacement.

Recall: Displacement is a vector.

Transverse and Longitudinal Waves

- ❑ If the direction of mechanic disturbance (displacement) is **perpendicular** to the direction of wave motion, the wave is called **transverse wave**.
 - ❑ If the direction of mechanic disturbance (displacement) is **parallel** to the direction of wave motion, the wave is called **longitudinal wave**.
- see demos.
- ❑ In general, a wave can be a combination of the above modes.
 - ❑ The definition can be extended to other (non-mechanic) waves.
 - e.g **Electromagnetic waves are always transverse.**