PHY1106: Waves and Oscillators	Dr. Pete Vukusic

Lecture 18.

Lecture objectives.

- To understand the concept of characteristic impedance (z) of a medium – that it is the measure of the resistance of a material to wave propagation (formula for and definition of z).

- To understand the amplitude transmission (T) and reflection (R) coefficients for a wave impinging on boundary between two media (formulae for R and T in terms of z).

- To be familiar with the form of reflection and transmission at a junction in impedance and to know of some special cases of reflection and transmission (e.g. at a *soft* wall; at a *hard* wall, etc.) Here, R can be either negative or positive, and T can be greater than 1.

Post-lecture tasks.

- Write down the derivation of the formulae associated with R and T for a wave impinging upon a boundary.

- The first boundary condition we used in deriving reflection and transmission coefficients for waves on a string was that the wave function must be continuous at all times. Why must this be so?

- A semi-infinite string is fixed (a) rigidly at its end and then (b) freely at this end. Calculate the reflection coefficients in both these cases. Under the same conditions what are the transmission coefficients?

- A wave passes from a medium with z = 0.4 to a medium with z= 0.1. Calculate the amplitude of reflection and transmission and this interface.