

## Waves

*Periodic Waves* :  $f = \frac{1}{T}$  ;  $v = \lambda f$

*Doppler Effect* :

$$1. \text{Moving source: } \lambda' = \lambda \mp v_s T \Rightarrow f_o = \frac{v}{\lambda'} = f_s \left( \frac{1}{1 \mp \frac{v_s}{v}} \right)$$

– : source moving toward observer

+ : source moving away from observer

$$2. \text{Moving Observer: } f_o = f_s \pm \frac{v_o}{\lambda} = f_s \left( 1 \pm \frac{v_o}{v} \right)$$

+ : observer moving toward source

- : observer moving away from source

*Interference* :

Constructive interference: Difference in path lengths is zero or an integer number of wavelengths (for two wave sources vibrating in phase)

Destructive interference: Difference in path lengths is a half-integer number of wavelengths (for two wave sources vibrating in phase)