

Lecture 14, Oct 11, 2022

Travelling Waves

- Particles in the wave undergo simple harmonic motion
- $v_y(x, t) = \pm A\omega \cos(kx \pm \omega t + \phi_0)$
- $a_y(x, t) = \mp A\omega^2 \sin(kx \pm \omega t + \phi_0)$
- To find a travelling wave's velocity and acceleration (of a medium particle), take $\frac{\partial}{\partial t}$
- Speed of wave in gas: $v = \sqrt{\frac{\gamma k_B T}{m}}$ where m is the atomic mass, or $\sqrt{\frac{\gamma RT}{M}}$ where M is the molar mass
 - $\gamma = 1.67$ for a monoatomic gas, 1.4 for a diatomic gas