Why Study Waves & Oscillations

- They are omnipresent in everyday life, science, & technology
- The ways of thinking & mathematical techniques we learn here give perfect prep for quantum mechanics, & for later physics & engineering courses.

**Equipartition Theorem:** For any system in thermal equilibrium, each term in the total energy that is proportional to a velocity$^2$ or a position$^2$ gets on average, $\frac{1}{2} k_B T$ of thermal energy, if the energy spacing between quantum levels is $\ll k_B T$.

All oscillators show sinusoidal variation, for small amplitudes. Why?