Last time, we saw that there are special wavefunctions, of the form

$$\Psi(x,t) = \Psi_n(x) \exp(-iE_n t/\hbar)$$

whose probability is stationary (does not change with time).

The wavefunctions $\Psi_n(x)$ must be solutions of the time-independent Schrödinger equation

$$H\Psi_n(x)=E_n\Psi_n(x)$$

where E_n is the exact energy of the particle when its wavefunction is $\Psi(x,t) = \Psi_n(x) \exp(-iE_n t/\hbar)$.

For a vibrating molecule (harmonic oscillator), we used a symmetry argument to prove that the Gaussian is an eigenstate with energy $E0=\hbar/2$ if mass m and force constant k are equal to 1.

Today: does the time-independent Schrödinger equation have more than one stationary state, unlike classical mechanics?