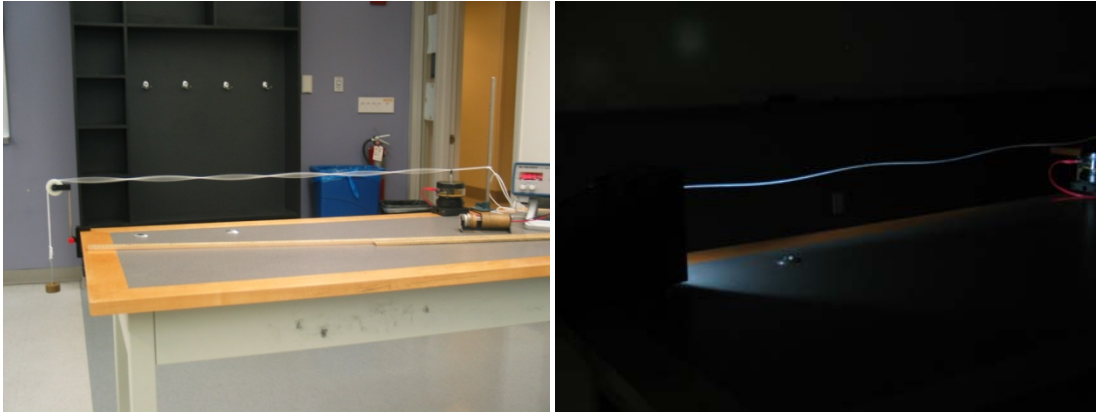


Standing Waves on a String



Purpose: To demonstrate standing waves on a string.

Locations: Room 146; shelf N5(mech. vibrator, string & strobe); function generator/BNC adapter on G4 & G5; banana cords on ends of cabinets A & H; rod/clamp, mass set & mass hanger on I2/I3

The function generator (sine wave mode, max. amplitude) can be adjusted to drive the mechanical vibrator at resonant frequencies. Use the slot adaptor banana plug for the vibrator to hold the string. The tension may also be adjusted to find standing wave patterns. The first photo was taken at 54 Hz with 205 g of tension. Standing waves should occur when there is an integer number of half wavelengths along the horizontal length of the string. The linear density of the string under 205 g is about 4.51×10^{-3} kg/m, but changes slightly (about 3.27×10^{-4} m/m/g) with tension. (See corresponding lab write-up for details.) For a neat visual effect you can use the strobe to “freeze” the vibrating string by strobing with the exact frequency of vibration (2nd photo, lights out!), or show the strings slowly going thru its motion by strobing slightly off resonant frequency.