**de Broglie and Heisenberg Practice Problems**

1. Find the wavelengths of (a) an 85 kg person skiing at 50 km/hr, (b) a 10.0 g bullet fired at 250 m/s, (c) a lithium atom moving at 2.5 x 105 m/s.
2. The muon has a mass 206.8 times that of an electron. Calculate the wavelength of a muon traveling at 8.85 x 105 cm/s.
3. Calculate the uncertainty of position of (a) a 1.50 mg mosquito moving at a speed of 1.40 m/s if the speed is known to within +/- 0.01 m/s. (b) a proton moving at a speed of (5.00 +/- 0.01) x104 m/s. The mass of a proton is 1.67 x 10-27 kg.
4. Calculate the uncertainty of position of (a) an electron moving at a speed of (3.00 +/- 0.01) x 105 m/s. (b) a neutron moving at the same speed.