PHYS2063 Wave Physics Fall 2017 HW #11 Due 1 Dec 2017

(1) When light of variable wavelength shines on a particular metal, no photoelectrons are emitted if the wavelength is greater than 550 nm. For what wavelength of light would the maximum energy of photoelectrons be 3.5 eV?

(2) What is the typical de Broglie wavelength associated with an atom of helium in a gas at room temperature, given that the average thermal energy equals (3/2)kT, where k is Boltzmanns constant? Repeat the calculation if the temperature is 2K, that is, two degrees above absolute zero. Compare the wavelength you find to the (approximate) size of a helium atom. Do you expect something peculiar to happen when $T = 2$K? Does something peculiar in fact happen? You might want to watch the video http://alfredleitner.com/superfluid.html.