

Physics 267: Problem #11

Consider two lasers: an Argon-ion laser emitting at 488 nm, and a Helium-Neon Laser emitting at 633 nm. The intensity of the two lasers are identical and measured to be  $1 \text{ W/cm}^2$ .

1. How many photons from each laser would be incident on one square cm every second?
2. Find the energy of a single photon at the two wavelengths of the lasers in both joules and electron volts.
3. Using  $p = E/c$ , find the radiation pressure in terms of the intensity,  $I$ .
4. If the energy of the photons from the Helium-Neon laser is just enough to liberate electrons from a material, what is the kinetic energy of electrons emitted when using the Argon-ion laser? Give your answer in electron volts.