Exercises in Experimental Physics 4

Seminar 3
submission deadline: 28.04.20

1. Using the Planck equation determine the average number of photons $\overline{n}$ per unit volume in a cavity with equilibrium radiation at temperature T. (2p)

2. Using the Planck equation determine the average kinetic energy of a photon in a cavity with equilibrium radiation at temperature T. (2p)

3. Using the Planck equation determine the coefficient b in the Wien's displacement law written for the maximum of the spectral energy density u_λ, namely $\lambda_{max}T = b$. For your calculations you will need to solve a transcendent equation, you can do it numerically or graphically. With the b-value determined, find the wavelength the Sun and human body most efficiently emit. (2p)