

Series 2.

Exercise 1

- (a) The tungsten filament of a bulb is a cylinder of height $h = 20$ mm and radius $r = 0.5$ mm elevated at a temperature of about $T = 2500$ K. Estimate the electro-magnetic power emitted by the bulb.
- (b) The power emitted by the bulb is focused on an image I' by a lens of radius $R_l = 25$ mm and focus $f = 150$ mm. Compute the order of magnitude of the electro-magnetic intensity measured on the image I' .
- (c) How close to the bulb should we go to be exposed directly to an intensity comparable to the intensity we collect on the image I' at point (b).

Exercise 2

- (a) The sun has a radius of about $R_{\text{sun}} = 6.958 \times 10^8$ m. and the temperature on its surface is $T_{\text{sun}} = 5772$ K. With these data, estimate the electro-magnetic power emitted by the sun.
- (b) A lens (radius $R_l = 25$ mm and focus $f = 150$ mm) is used to focus the radiation coming from the sun onto an image I' . Compute the order of magnitude of the intensity measured on I' .
- (c) How close to the sun should we go to be exposed directly to an intensity comparable to the intensity we collect on the image I' at point (b). Are we still close to the earth surface?