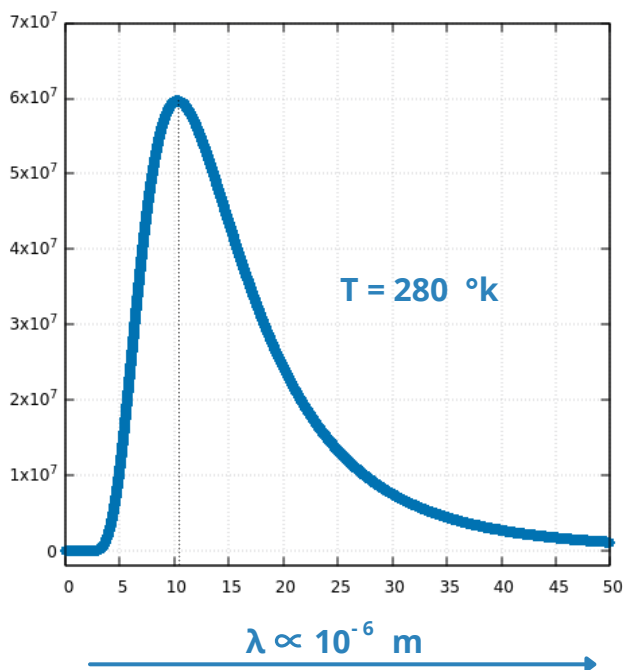


Atividade 5 - Lei de Planck - T do Sol e T da Terra

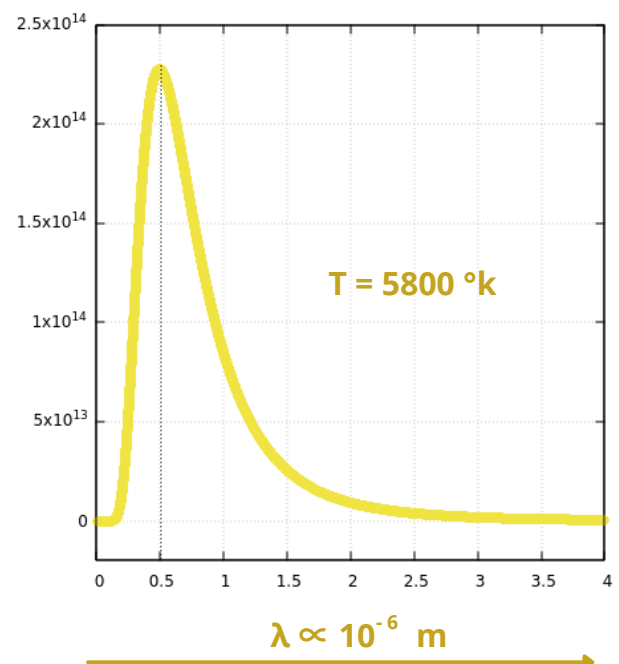
Equações Utilizadas:

$$\Theta(\lambda, T) = \frac{a_1}{\lambda^5} \left[\exp\left(\frac{a_2}{\lambda T}\right) - 1 \right]^{-1} \quad \text{onde,} \quad \begin{cases} a_1 = 2\pi hc_2 \approx 3,75 \times 10^{-16} \text{ Jm}^2 / \text{s} \\ a_2 = hc / k_B \approx 1,44 \times 10^{-2} \text{ mK} \end{cases}$$

Plot Lei de Planck para T_Terra



Plot Lei de Planck para T_Sol



Código Fortran (90)

```
1 program plot_planck
2 implicit none
3 real*8 a1,a2,l,C1,i
4 real*8 T_Terra,planck,expo,arg_exp
5 real*8 T_Sol,planck2,expo2,arg_exp2
6
7 a1 = 3.75d0*1.0e-16
8 a2 = 1.44d0*1.0e-2
9 T_Terra = 280.d0
10 T_Sol = 5800.d0
11 i = 0.01d0
12 l = 1.0e-6
13 do while (i <= 50)
14   C1 = a1/((i**5)*(l**5))
15   arg_exp = a2/((i*l)*T_Terra)
16   arg_exp2 = a2/((i*l)*T_Sol)
17   expo = exp(arg_exp - 1)
18   expo2 = exp(arg_exp2 - 1)
19   planck = C1 / expo
20   planck2 = C1 / expo2
21   print*, i,planck
22   write(101,*) i,planck
23   write(102,*) i,planck2
24   i = i + 0.0001d0
25 end do
26 end program
```

Código Gnuplot

```
1 #Compilação e Execução do Código
2 gfortran plot_planck.f90 -o plot_planck
3 ./plot_planck
4 #
5 #Plot_T_SOL
6 gnuplot
7 set term png size 800,800
8 set out "Plot_T_Sol.png"
9 set grid
10 set nokey
11 set yrange [-0.2*10**7:7*10**7]
12 plot 'fort.101' u 1:2 w lp lc 6 lt 7
13 exit
14 #
15 #Plot_T_Terra
16 gnuplot
17 set term png size 800,800
18 set out "Plot_T_Terra.png"
19 set grid
20 set nokey
21 set yrange [-0.2*10**14:2.5*10**14]
22 set xrange [0:4]
23 plot 'fort.102' u 1:2 w lp lc 5 lt 7
24 exit
25
```