

(1/27, 30 mins) Write a program that includes functions that convert between wavelength, frequency, and energy, and between  $F_\lambda$  (in  $\text{ergs}/\text{cm}^2/\text{s}/\text{\AA}$ ) and  $F_\nu$  (in  $\text{ergs}/\text{cm}^2/\text{s}/\text{Hz}$ ). All of these functions should exist in a single file in Python (preferred), IDL, C, C++, or Fortran file. Use the routines to determine frequency and energy at 5500  $\text{\AA}$  as well as the conversion factor between  $F_\lambda$  and  $F_\nu$  at 3000 $\text{\AA}$ , 5500 $\text{\AA}$ , and 8000 $\text{\AA}$ .

Using

$$F_\nu = F_\lambda \frac{\lambda^2}{c}$$
$$\frac{F_\nu}{F_\lambda} = \frac{\lambda^2}{c}$$

the conversion factor is  $\frac{\lambda^2}{c}$ . This produces a conversion factor of  $3.002 \times 10^{-20}$  for  $\lambda = 3000\text{\AA}$ ,  $1.009 \times 10^{-19}$  for  $\lambda = 5500\text{\AA}$ , and  $2.135 \times 10^{-19}$  for  $\lambda = 8000\text{\AA}$ .