input: measured voltage through diode @ lab. V

→ current / area @ lab

$$\Sigma_I = \frac{I}{A_{diode}}$$ input: $A_{diode} = \begin{cases} 7.85\times10^{11}\ nm\ (vis) \\ 8.2\times10^{11}\ nm\ (IR) \end{cases}$

$$\Sigma_e = \frac{I}{q A_{diode}} \quad \left[\frac{e^-}{s\cdot nm^2}\right]$$

→ conversion from lab spectra to Subaru distance

$f_{uns}(\lambda)$ = spectrum measured in lab

$$Q = \left(\frac{d_{lab}}{d_{PFS}}\right)^2 \frac{I}{q A_{diode}} \left(\int f_{uns}(\lambda)\, QE_{diode}(\lambda)\, d\lambda\right)^{-1}$$

$d_{lab} = 2.2606\ m$ $QE_{diode}(\lambda)$ = ThorLabs

$d_{PFS} = 4m$

→ expected flux @ Subaru

$$S(\lambda) = \frac{Q}{\pi} f_{uns}(\lambda) \quad \left[\frac{e^-}{s\cdot nm^2\cdot nm\cdot sr}\right]$$

→ Then the observed flux through PFS

$$f_{obs}(\lambda) = S(\lambda) \times \Omega_{fiber} \times A_{mirror} \times QE_{PFS}(\lambda) \times \varepsilon$$

$\Omega_{fiber} = 5.47\times10^{-6}$ rad for 1.1" fiber

$A_{mirror} = \pi\left(\frac{D_{mirror}}{2}\right)^2$ for $D_{mirror} = 8m$

$\varepsilon = 0.9$

$QE_{PFS}(\lambda)$ ← from wiki

→ line flux through fiber per pixel

$$F_{obs} = \frac{\int_{line} f_{obs}(\lambda)\, d\lambda}{A_{fiber,pix}}$$ $A_{fiber,pix} = 13$ pix