$$\sigma \quad = \quad \text{reaction cross section } (\text{cm}^2)$$

$$\text{number density of protons} \quad = \quad \frac{\rho}{m_p}$$

$$L \quad = \quad \frac{1}{(\text{number density})\,(\text{cross section})}$$

$$= \quad \frac{m_p}{\rho\sigma}$$

$$\begin{aligned} \sigma(\nu, \mathrm{p}^+) \quad &\sim \quad 10^{-50}\,\mathrm{m}^2 \\ \sigma(\gamma, \mathrm{p}^+) \quad &\sim \quad 10^{-29}\,\mathrm{m}^2 \end{aligned}$$

$$^{37}\mathrm{Cl} + \nu \quad \rightarrow \quad ^{37}\mathrm{Ar} + e^-$$

$$^{71}\mathrm{Ga} + \nu \quad \rightarrow \quad ^{71}\mathrm{Ge} + e^-$$

$$\begin{aligned} \nu_e + n \quad &= \quad p^+ + e^- + \gamma \\ \nu_\mu + n \quad &= \quad p^+ + \mu^- + \gamma \end{aligned}$$