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

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

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

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

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

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

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

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

$$\mathrm{p}^+ + \mathrm{e}^- \quad \rightarrow \quad \mathrm{n} + \nu_\mathrm{e}$$

$$\begin{aligned} \sigma(\nu_e, \mathrm{e}^- \rightarrow \nu_e, \mathrm{e}^-) \quad &= \quad 9.33 \times 10^{-48}\,\mathrm{m}^2\,[E/10\ \mathrm{MeV}] \\ \sigma(\bar{\nu}_e, \mathrm{e}^- \rightarrow \bar{\nu}_e, \mathrm{e}^-) \quad &= \quad 3.88 \times 10^{-48}\,\mathrm{m}^2\,[E/10\ \mathrm{MeV}] \\ \sigma(\bar{\nu}_e, \mathrm{p}^+ \rightarrow \mathrm{e}^+, \mathrm{n}) \quad &= \quad 9.77 \times 10^{-46}\,\mathrm{m}^2\,[E/10\ \mathrm{MeV}]^2 \end{aligned}$$

$$\mathrm{GPE} \quad = \quad -\frac{3}{5}\,\frac{GM^2}{R}$$