$\lambda_{max}^{Sun} \simeq 500\,nm$

Photons γ, $E_\gamma = hf = \frac{hc}{\lambda}$

$= \frac{1200\,nm \cdot eV}{\lambda}$

green light $\Rightarrow E_\gamma \simeq 2.4\,eV \simeq 4 \cdot 10^{-19}\,J$

$1300\,\frac{W}{m^2} = \frac{J}{m^2 \cdot s} = \frac{1300}{4 \cdot 10^{-19}} \simeq 3 \cdot 10^{21}\,\frac{\gamma}{m^2 s}$

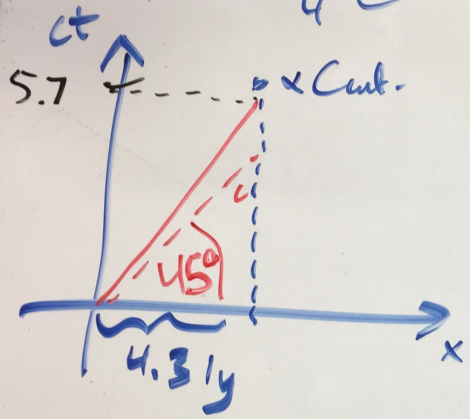
$\frac{\#\gamma_{total}}{s} = 3 \cdot 10^{21} \cdot 4\pi \left(1.5 \cdot 10^{11}\,m\right)^2 \simeq 6 \cdot 10^{42}\,\frac{\gamma}{s}$

$\simeq 3.8 \cdot 10^{26}\,W$

Closest star: α Centauri $\simeq$ 4.3 light years

1 Light year $\simeq 10^{16}$ m

$V = \frac{3}{4}c$



$t = \frac{4.3\,\text{ly}}{\frac{3}{4}c} \simeq 5.7\,\text{yr}$

$\gamma = \frac{1}{\sqrt{1 - v^2/c^2}} = \frac{1}{\sqrt{1 - (3/4)^2}} \simeq 1.5$

$\tau_{\text{astronaut}} = 3.8\,\text{yr} = \frac{t}{\gamma}$

$\Delta x_{\text{astronaut}} = \frac{4.3\,\text{ly}}{\gamma} = 2.89\,\text{ly}$

alternatively: $\Delta x_E \simeq 4.3\,\text{ly}$ $\quad c\Delta t_E = 5.7\,\text{ly}$

invariant $\Delta s^2 = c^2 \Delta t_E^2 - \Delta x_E^2 = (3.8\,\text{ly})^2$

(linear, 3-)momentum astronaut $p = \Gamma M_A \cdot v = 1.5 \cdot 100\,\text{kg} \cdot \frac{3}{4}c$ $\quad M_A = 100\,\text{kg}$

Rel. energy$_A$ $= \sqrt{m^2c^4 + p^2c^2} = \Gamma \cdot M_A \cdot c^2$