RJP-350

$$\frac{dP}{d\Omega} = \left(\frac{3}{16\pi}\right) N_e \sigma_e F_i (1+\cos^2\chi)\, dV$$

$N_e = 3\times10^{12}\ m^{-3}$

$\sigma_e = 6.65\times10^{-29}\ m^{-2}$

$F_i = 5.0\ \text{watts}/m^2$

$dV = 2.0\times10^{-5}\ m^3$

Scattering dV located at $x=10, y=14, z=12$. So the flux is in direction $\vec{R} = 10\hat{i} + 14\hat{j} + 12\hat{k}$. The value of $dP/d\Omega$ is wanted along $\hat{i}$. The angle χ then is

$$\cos\chi = \frac{\vec{R}\cdot\hat{i}}{|R|\,|B|} = \frac{10}{(10^2+14^2+12^2)^{1/2}\cdot 1} = \frac{10}{\sqrt{440}} = \frac{10}{20.98}$$

$$\cos\chi = 0.477 \qquad \chi = 61.51^\circ$$

$$\frac{dP}{d\Omega} = \left(\frac{3}{16\pi}\right)\left(3\times10^{12}\right)\left(6.65\times10^{-29}\right)(5)(1+0.228)\left(2.0\times10^{-5}\right)$$

$$= (.0597)(19.95\times10^{-17})(5)(0.772)(2\times10^{-5})$$

$$= (1.191\times10^{-17})(7.72\times10^{-5})$$

$$\frac{dP}{d\Omega} = 9.195\times10^{-22}\ \text{watts/sterad}$$