

Answer on Question 55057, Physics / Astronomy | Astrophysics

Question:

The same feed is used with a 1 megawatt transmitter at 2.3GHz for planetary radar. What is the on-axis power gain G_{\max} of this radar system?

Answer:

$$G_{\max} = \frac{4\pi A_e}{\lambda^2}$$

With $\lambda = \frac{c}{\nu} = 13 \text{ cm}$, and $A_e = 2.47 \times 10^8 \text{ cm}^{-2}$ from the table:

$$G_{\max} = \frac{4\pi \times 2.47 \times 10^7}{13^2} = 1.8 \times 10^7$$

Answer: $G_{\max} = 1.3 \times 10^7$