

2023 Ph H1 Q17

Section:

Particles and Waves

Topic:

Wave-Particle Duality

Question Summary

Which graph shows the relationship between frequency f and wavelength λ of photons of electromagnetic radiation?

Worked Solution

A — Inverse relationship ($f \propto 1/\lambda$)

Final Answer

For electromagnetic waves in vacuum: $c = f\lambda$.

Therefore $f \propto 1/\lambda$ (an inverse relationship).

The correct graph is a hyperbola showing f decreasing as λ increases.

Revision Tips

- Use $c = f\lambda$ for all electromagnetic waves.
- Inverse proportionality: doubling λ halves f .
- Look for the hyperbolic graph, not linear.