

Physical Optics

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November 21, 2011

1 Light as a Wave

Light is a wave :3

$$\text{Ampere's Law: } \oint B \cdot dl = \mu \left[I + \epsilon \frac{d(E \cdot A)}{dt} \right]$$

$$\text{Faraday's Law: } \oint E \cdot dl = - \frac{d(B \cdot A)}{dt}$$

An electromagnetic wave that obeys Faraday's and Ampere's law must have:

1. A magnetic field component related to it by $E = cB$
2. A velocity of $c = \frac{1}{\sqrt{\epsilon\mu}}$

Proof:

TODO: Rewrite her proof to show that $E=cB$

2 Wave Motion

Given the basic requirement that $\psi = \psi(x, t) = \psi(x') = \psi(x \pm vt)$ where $x' = x \pm vt$, we can derive the general differential wave equation, $\frac{\partial^2 \psi}{\partial x^2} = \frac{1}{v^2} \frac{\partial^2 \psi}{\partial t^2}$

TODO: Write proof, rewrite section