

The speed of light in a medium is slower than in empty space:

Speed of Light

$$v = \frac{1}{\sqrt{\mu\epsilon}} < \frac{1}{\sqrt{\mu_0\epsilon_0}}$$

Index of Refraction

$$n \equiv \frac{c}{v} = \frac{\sqrt{\mu\epsilon}}{\sqrt{\mu_0\epsilon_0}} \approx \sqrt{\frac{\epsilon}{\epsilon_0}} \approx \sqrt{K} \quad \kappa \text{ is the dielectric constant}$$

Examples for Visible Light

$$n_{air} = 1.0$$

$$n_{glass} = 1.5$$

$$n_{diamond} = 2.4$$

$$v_{\text{medium}} = c / n_{\text{medium}}$$