## Exercise 5.2.3 Attenuation of Light

Starting from

$$
E_{\mathbf{x}}=\exp -\stackrel{\omega \cdot \kappa \cdot x}{ } \cdot \exp \left[i \cdot\left(k_{\mathbf{x}} \cdot x-\omega \cdot t\right)\right]
$$

C

Decreasing Plane wave amplitude

Give maximal values for $\boldsymbol{\kappa}$ (damping constant, attenuation index, extinction coefficient) if a penetration depth of $\mathbf{1 m}, \mathbf{1 0 0} \mathbf{~ m ~} \mathbf{1 0} \mathbf{0} \mathbf{~ m}$ is specified for the light intensity.

- Calculate what that would mean in terms of only $\epsilon^{\prime \prime}$ or only $\epsilon^{\prime \prime}$.

Discuss the results with respect to the complex index of refractions of $\mathbf{S i}$ and the dielectric function of $\mathbf{G a A s}$ as given in this link for frequencies above and below the band gap (after you located the band gap by straight thinking).

## Link to the solution

