

Phase Matching at Interfaces



Frequency content is preserved so $f = \text{constant}$.

Wavelength changes so

$$\lambda_0 = c/f \text{ and } \lambda = c/nf$$

where n is the index of refraction.

If D is the spacing between crests at the interface,

$$\lambda_0 = D \cdot \sin \theta_0 \text{ and } \lambda = D \sin \theta.$$

Eliminating D gives:

$$\sin \theta_0 / \lambda_0 = \sin \theta / \lambda \text{ or } \sin \theta_0 = n \cdot \sin \theta$$