

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

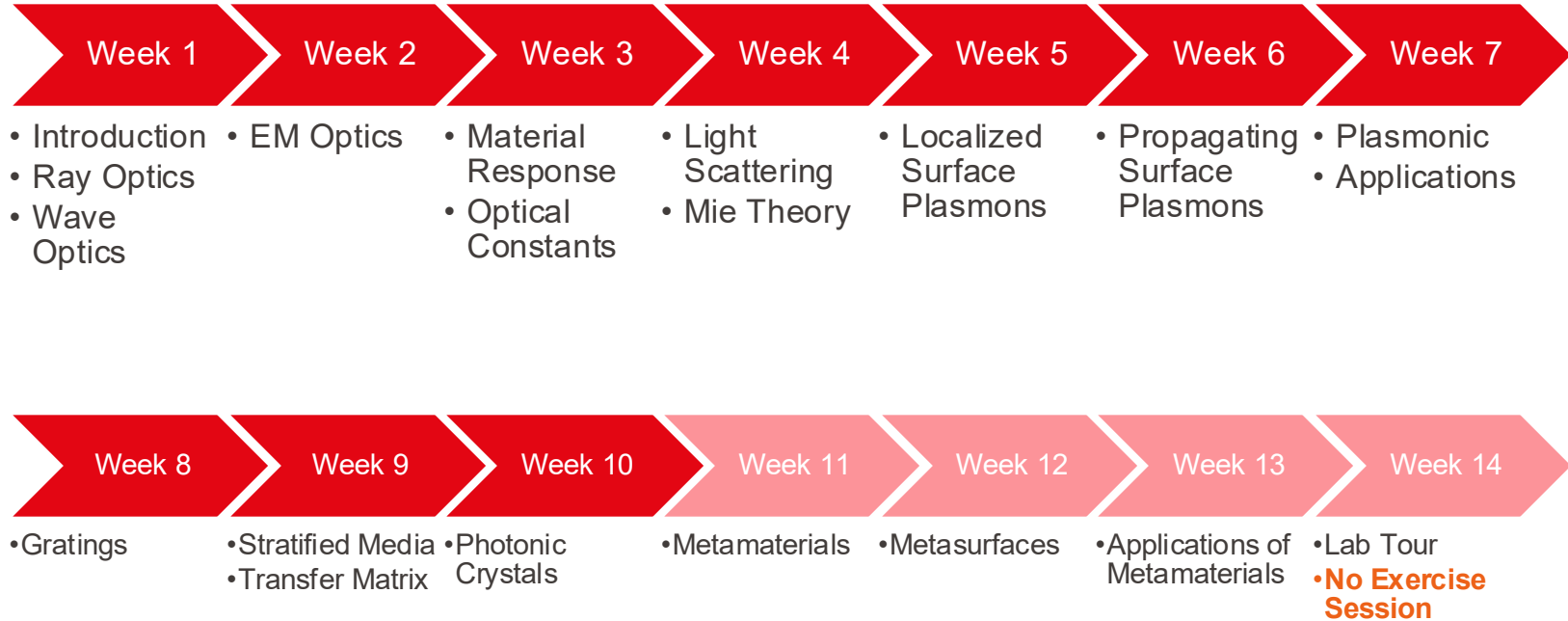
$$\nabla \times \mathbf{B} = \mu_0 \left(\mathbf{J} + \epsilon_0 \frac{\partial \mathbf{E}}{\partial t} \right)$$

Week 10

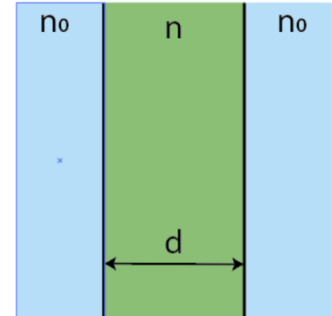
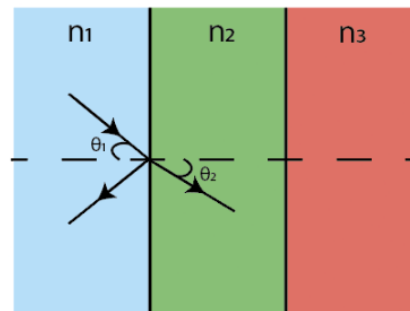
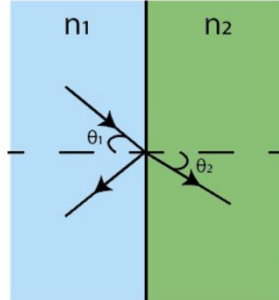
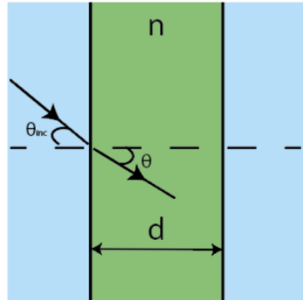
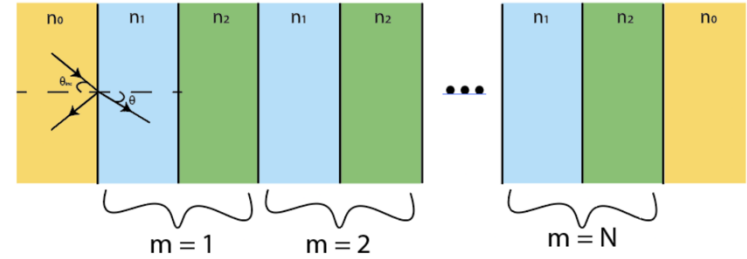
(Photonic Crystals)

Stavros Athanasiou

Lausanne, 18 Nov 2025

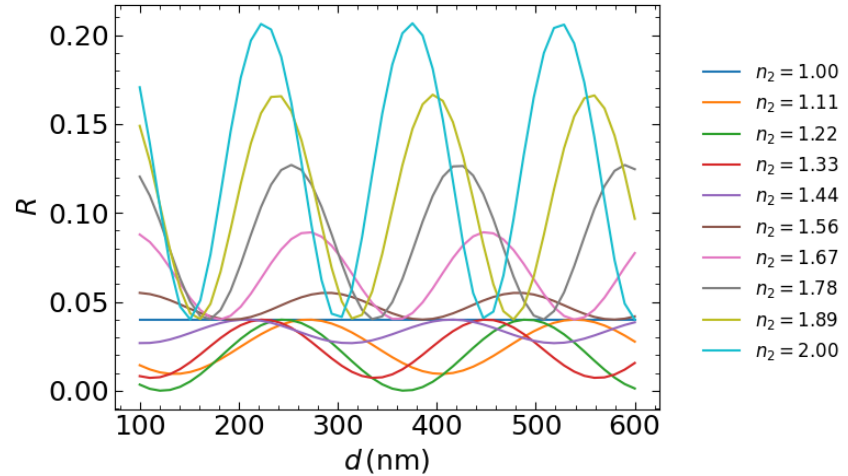
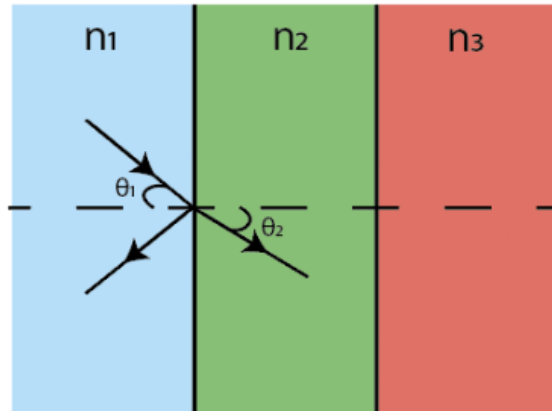


1. Derivation and Implementation of the Transfer Matrix
2. Two-Interface Layered Structure
3. Dielectric Bragg Reflector
4. Fabry-Perot Etalon-Mirror



Anti-reflective Coating

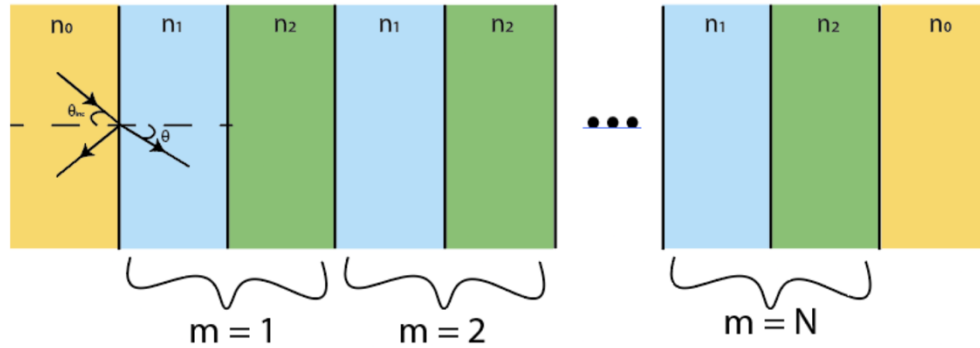
Consider the following structure:



$$d_m = \frac{\lambda}{4n_2} (2m + 1), \quad m = 0, 1, 2, \dots \quad n_2 = \sqrt{n_1 n_3}.$$

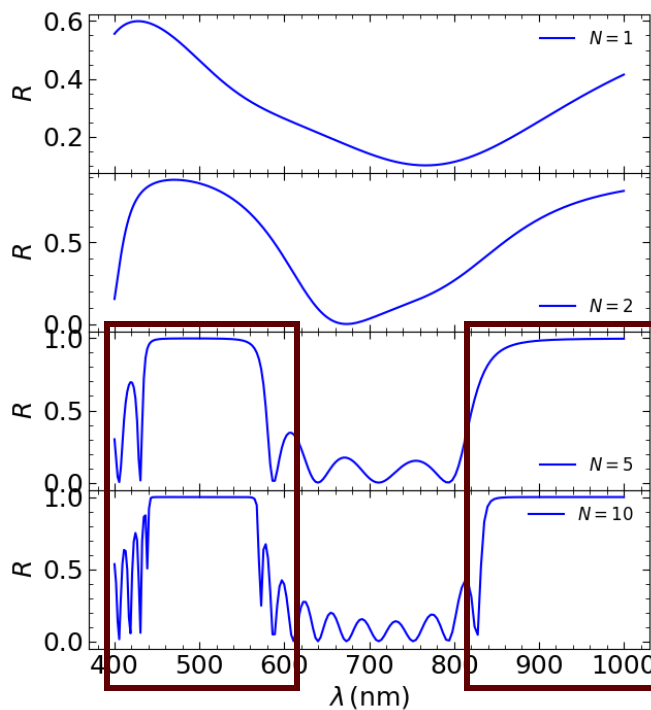
Dielectric Bragg Reflector

Consider the following multi-layered structure



Dielectric Bragg Reflector

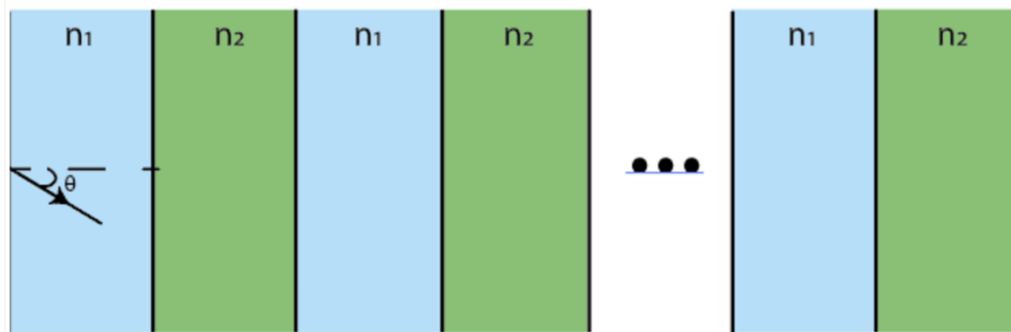
Consider the following multi-layered structure



Increasing N

This Week: Photonic Crystals

A periodic dielectric structure.



$$M_{tot} = M_2 M_{p_2} M_1 M_{p_1}$$

(For a unit cell)

=> Diagonalize to get the dispersion bands.

(See Exercise 10.1)

