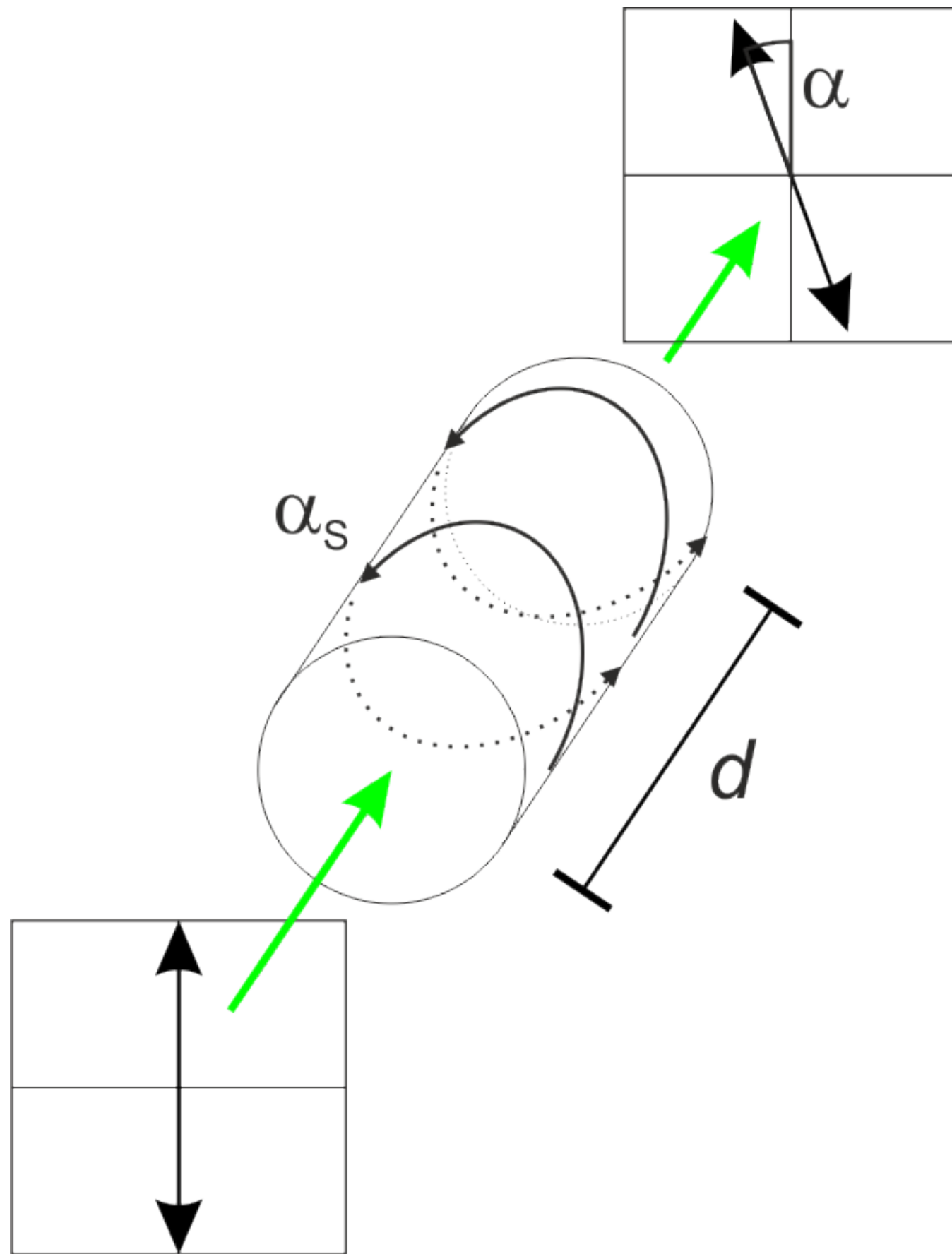


Experimental Physics 3 - Em-Waves, Optics, Quantum mechanics

Lecture 18

Anisotropic Materials

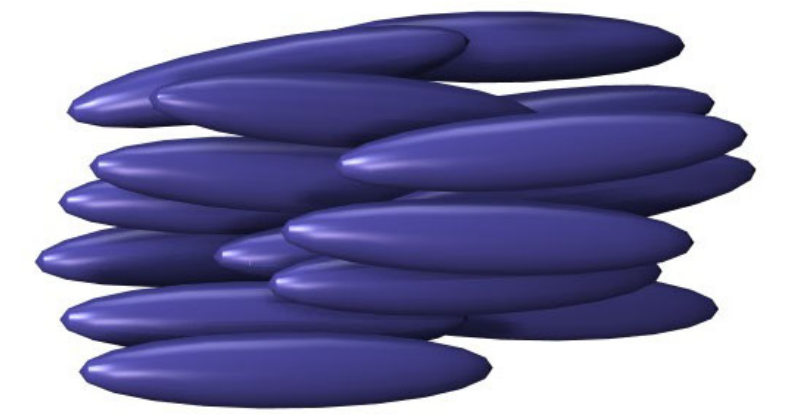
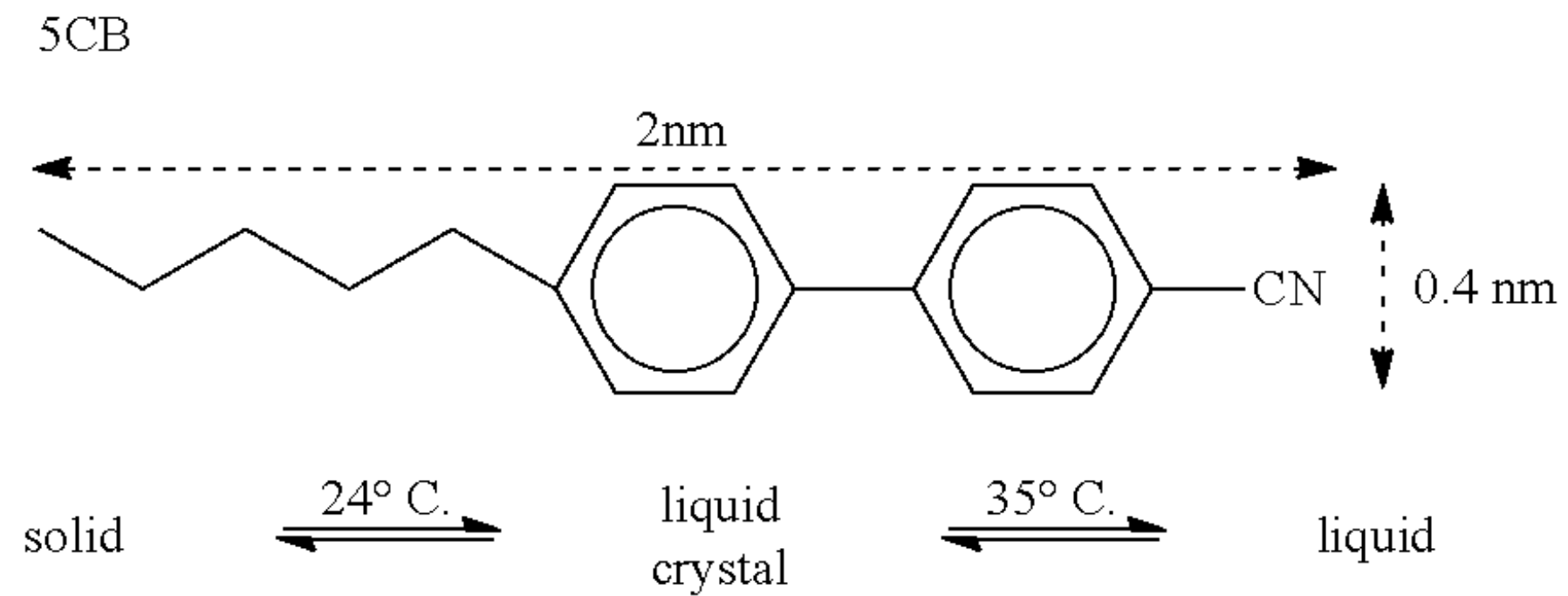
Optically Active Materials



$$\alpha = \alpha_s \cdot d$$

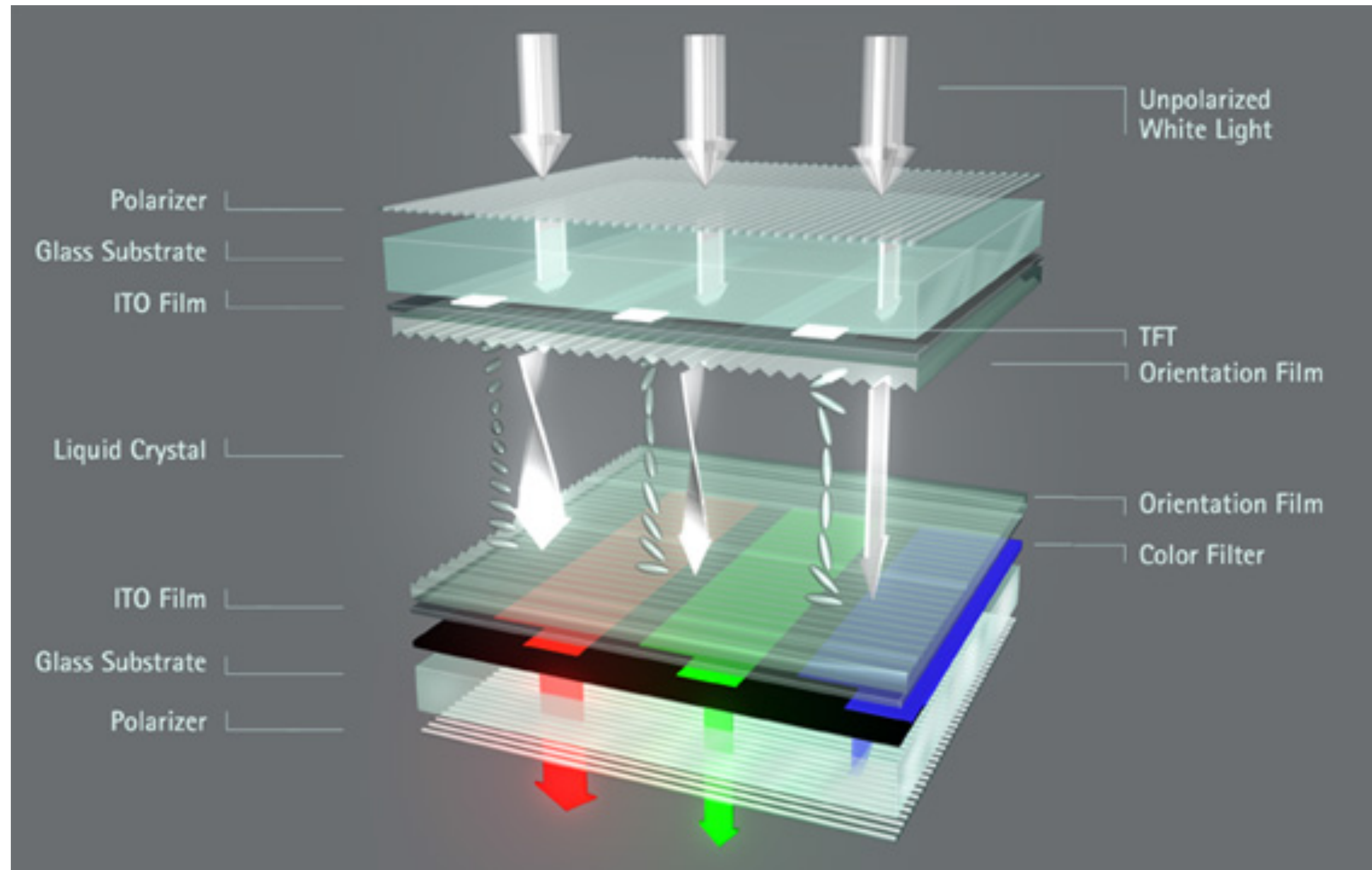
Liquid crystals:

- random positions
- aligned orientations



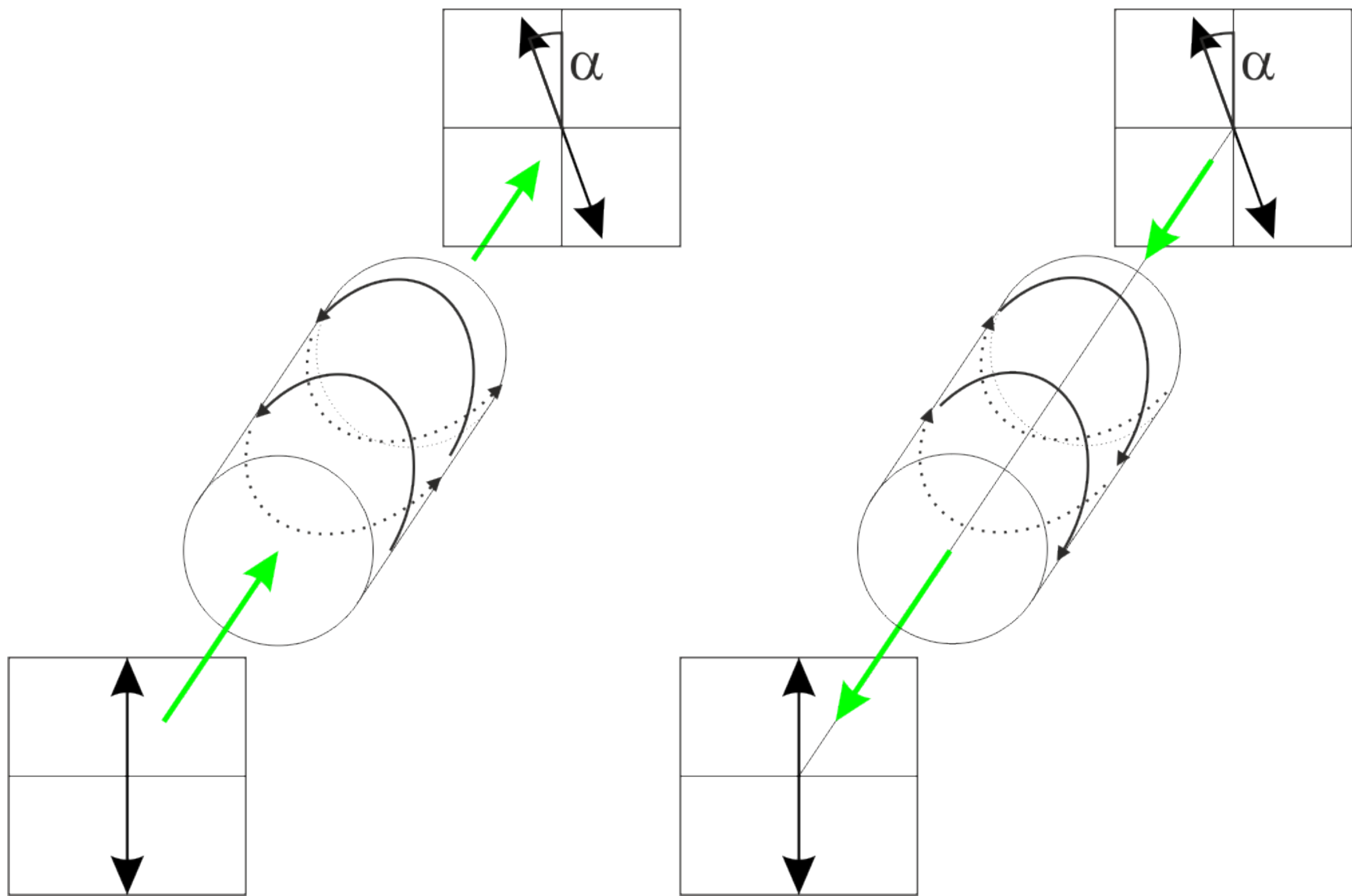
• liquid crystal

Optically Active Materials - Liquid Crystal Display



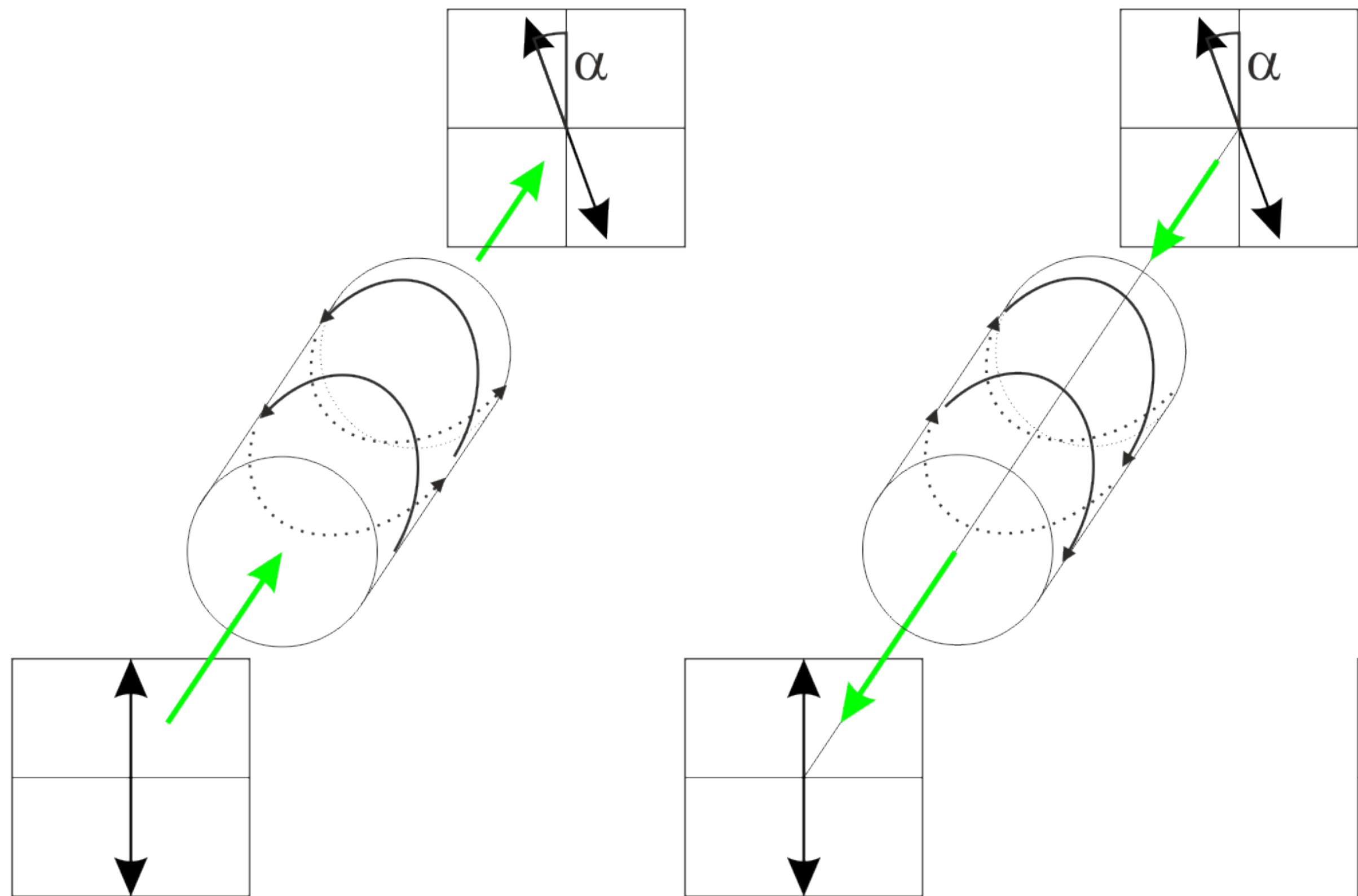
Optically Active Materials

Optically active media

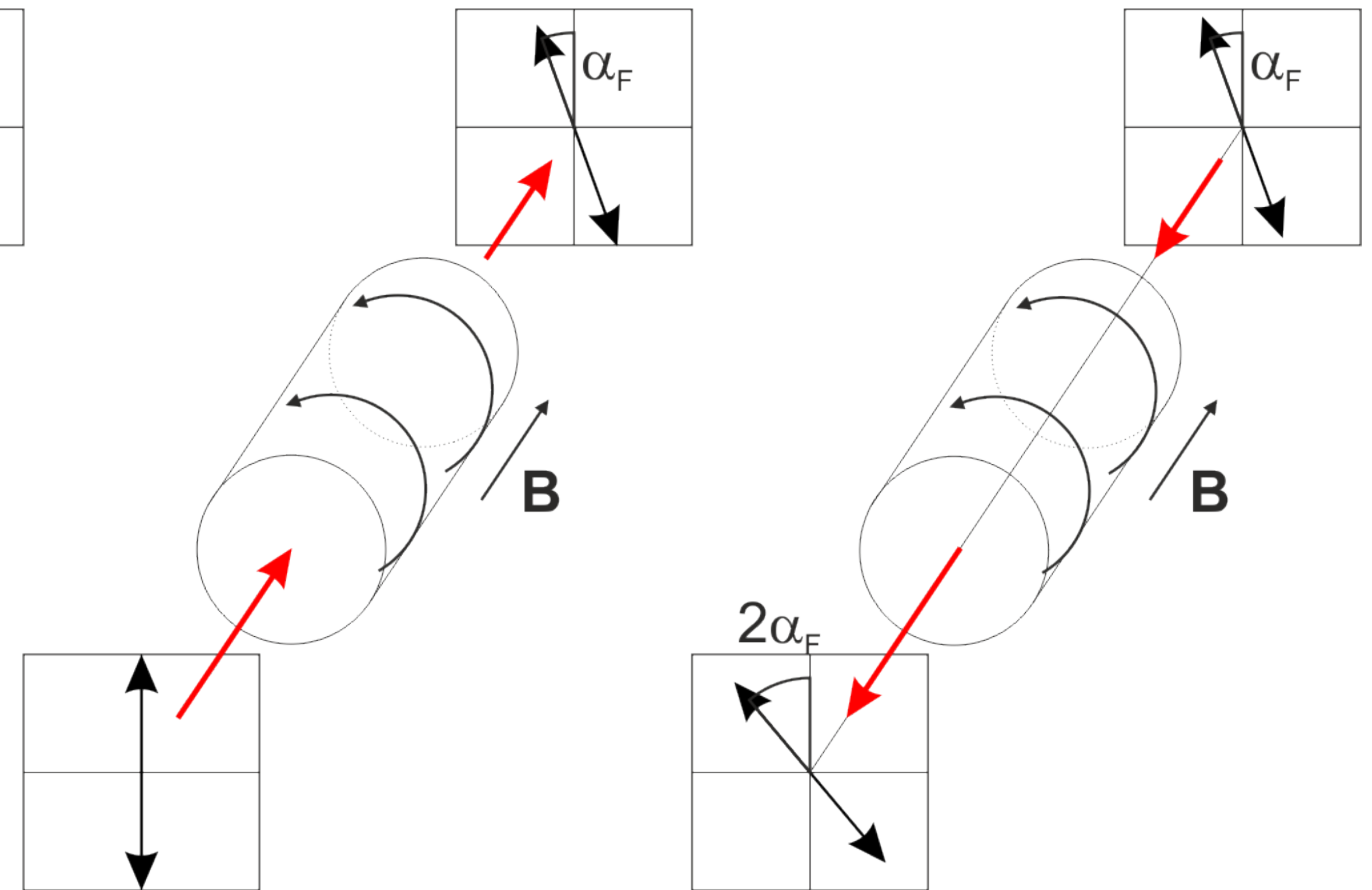


Optically Active Materials and Faraday Effect

Optically active media

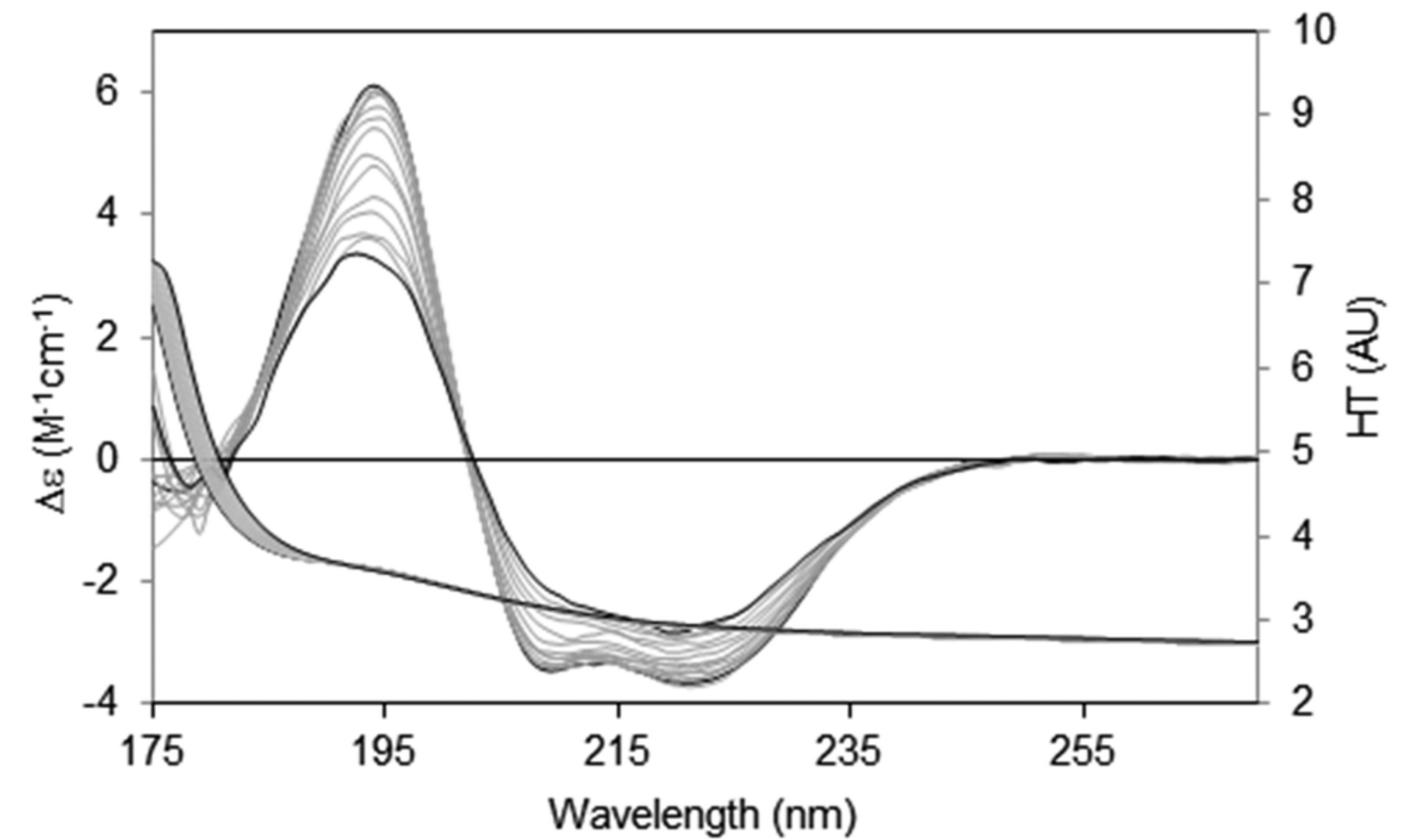
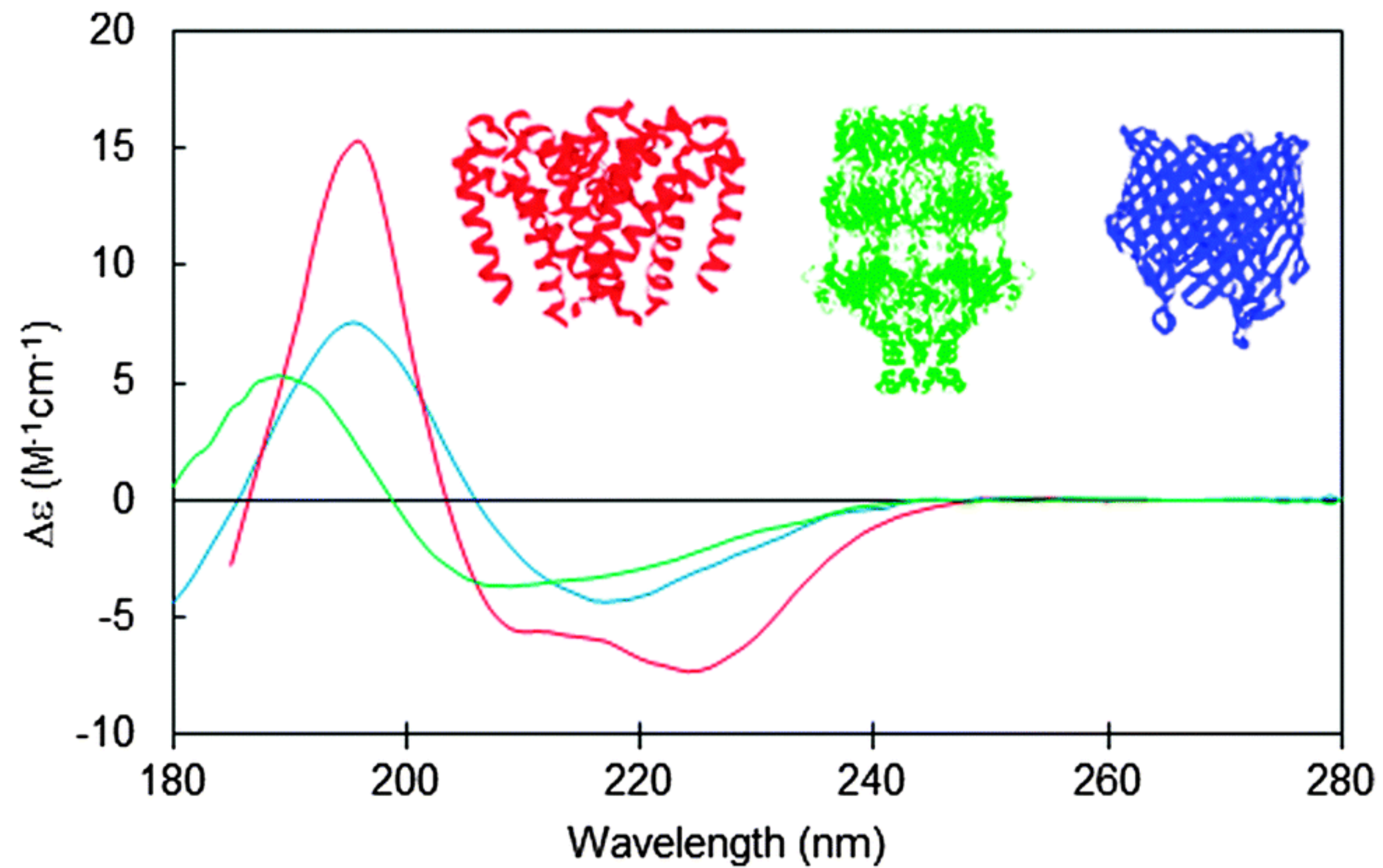


Faraday effect



$2\alpha_F$

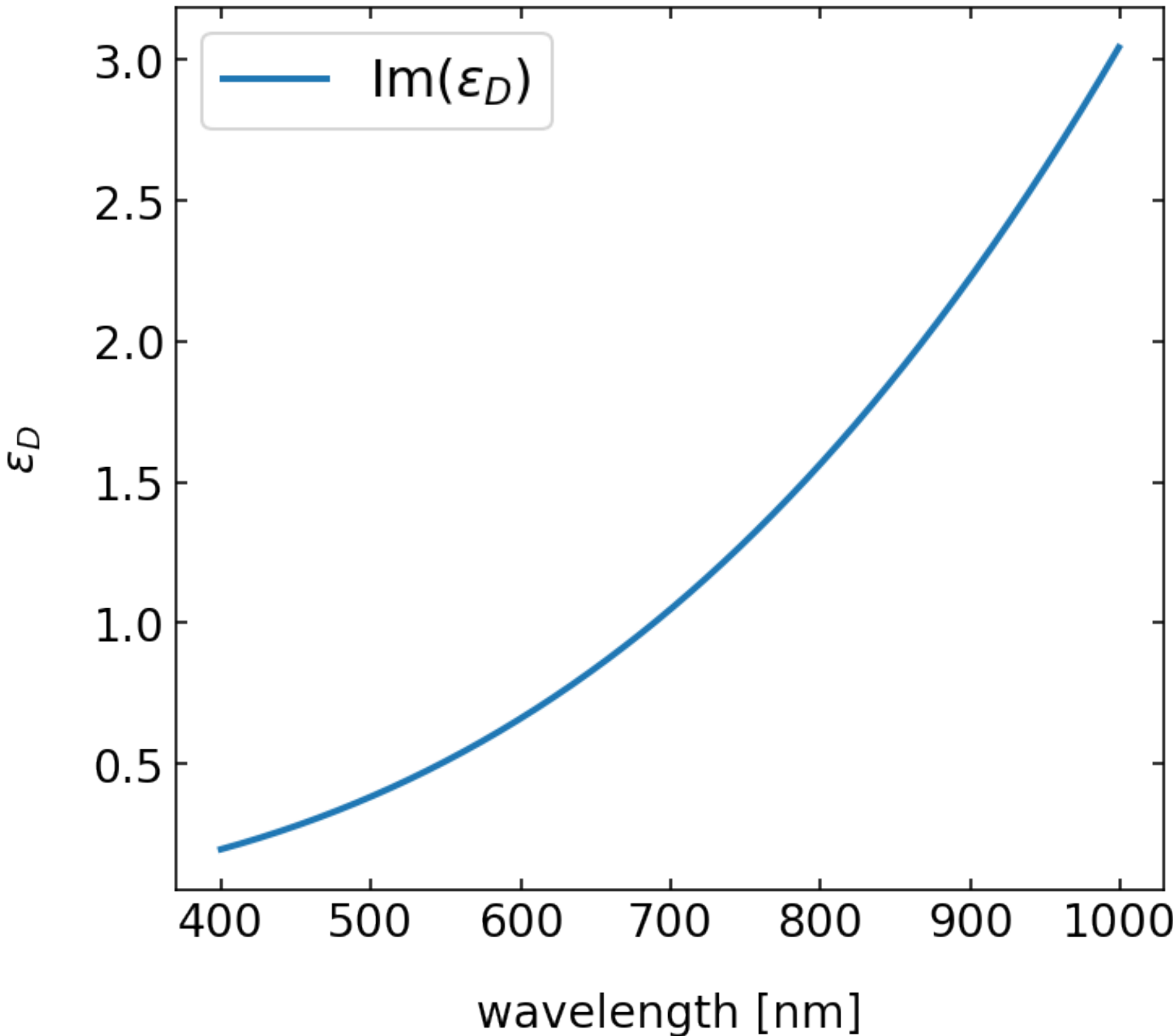
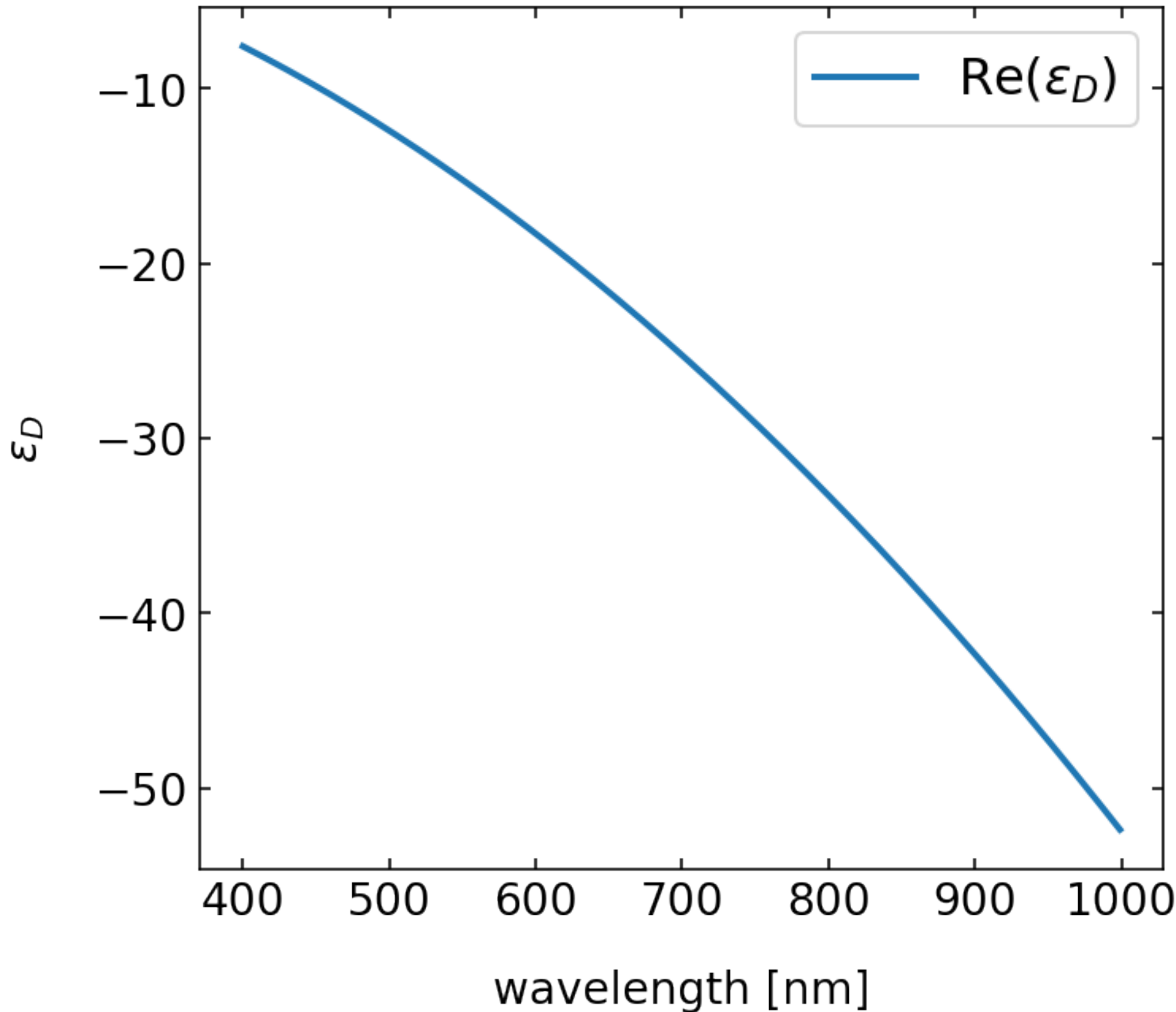
Optically Active Materials - Circular Dichroism



Electromagnetic Waves in Conducting Materials

Metals - Dielectric Function

Dielectric function of Gold



Metals - Lycurgus Cup



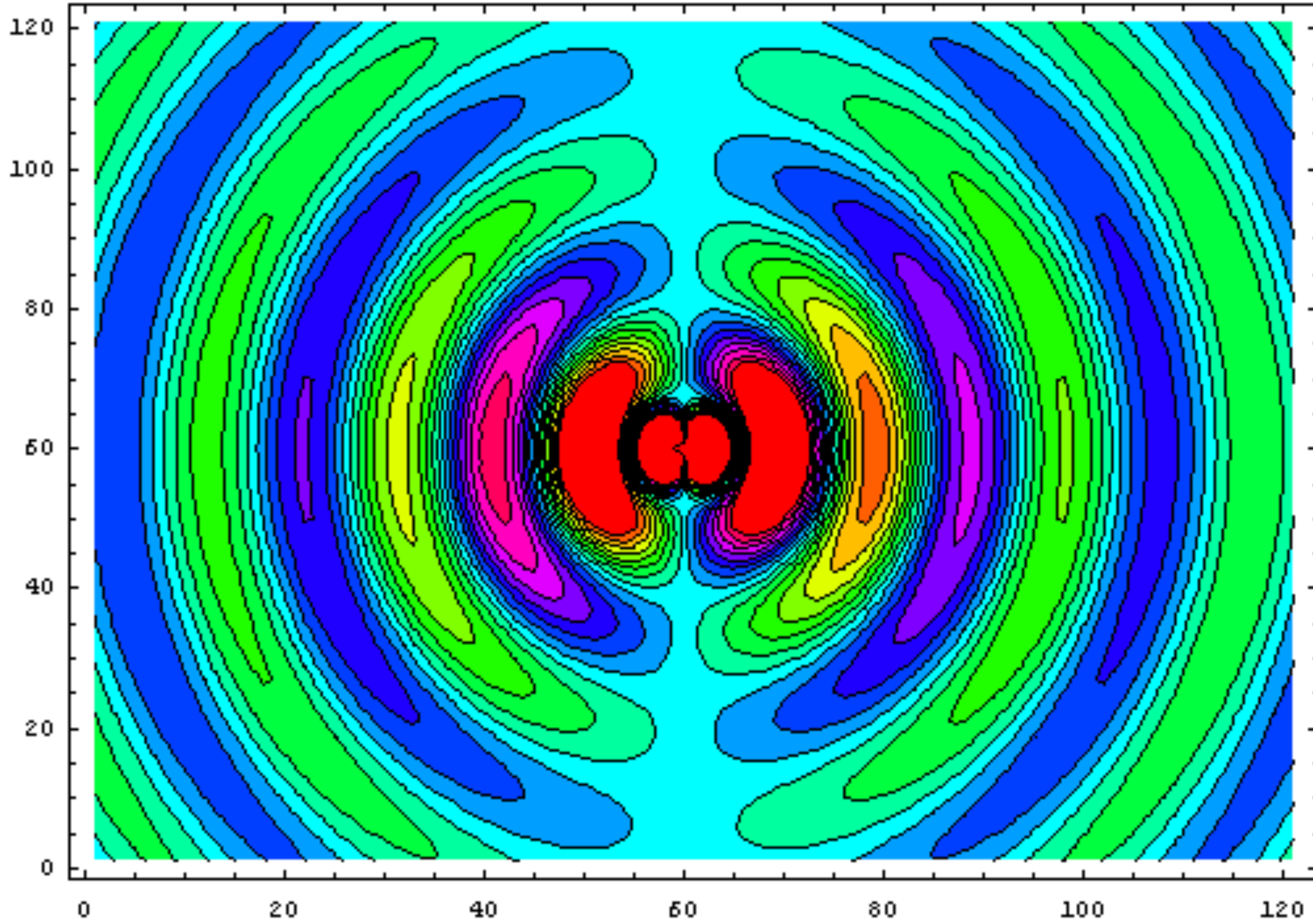
- 65 nm gold nanoparticles
- Green light is reflected
- Red light remains after scattering

Metals - Lycurgus Cup

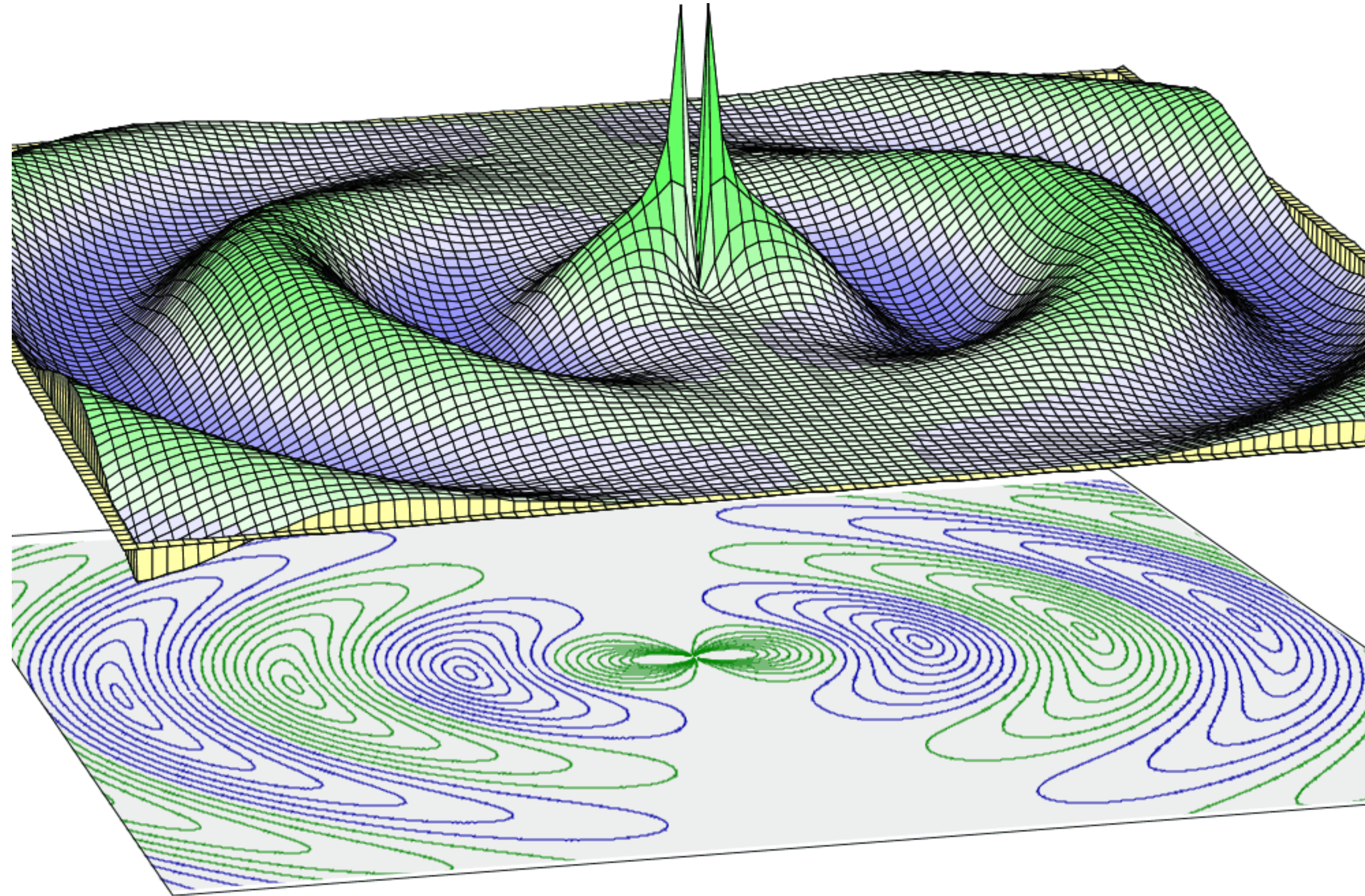


Radiation and Scattering of Electromagnetic Waves

Dipole Radiation



Dipole Radiation



Rayleigh Scattering

Paris Spot light



Chicago sunset



Polarization of the Rayleigh Scattering

