

CHAPTER OVERVIEW

8: Radiation, Scattering, Interference, and Diffraction

This chapter continues the discussion of electromagnetic wave propagation, now focusing on the results of wave incidence on various objects of more complex shapes. Depending on the shape, the result of this interaction is called either “scattering”, or “diffraction”, or “interference”. However, as the reader will see, the boundaries between these effects are blurry, and their mathematical description may be conveniently based on a single key calculation – the electric dipole radiation of a spherical wave by a localized source. Naturally, I will start the chapter from this calculation, deriving it from an even more general result – the “retarded-potential” solution of the Maxwell equations.

[8.1: Retarded Potentials](#)

[8.2: Electric Dipole Radiation](#)

[8.3: Wave Scattering](#)

[8.4: Interference and Diffraction](#)

[8.5: The Huygens Principle](#)

[8.6: Fresnel and Fraunhofer Diffraction Patterns](#)

[8.7: Geometrical Optics Placeholder](#)

[8.8: Fraunhofer Diffraction from More Complex Scatterers](#)

[8.9: Magnetic Dipole and Electric Quadrupole Radiation](#)

[8.10: Exercise Problems](#)

Thumbnail: Sinusoidal traveling plane wave entering a region of lower wave velocity at an angle, illustrating the decrease in wavelength and change of direction (refraction) that results. (CC BY-SA 3.0 Unported; Richard F. Lyon via Wikipedia)

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