

# Example Antenna Types

## Slot Antennas

Developed by Kathryn L. Smith, PhD





## Sources

*The material presented herein is from the following sources:*

***“Elements of Electromagnetics,” by Matthew N.O Sadiku, 5<sup>th</sup> ed. (2010)***

***“Engineering Electromagnetics,” by Nathan Ida, 3<sup>rd</sup> ed. (2015)***

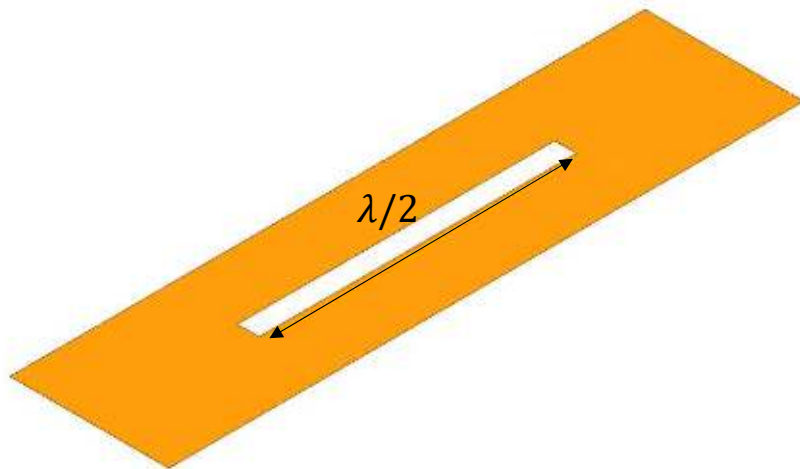
***“Microwave Engineering,” by David Pozar, 4<sup>th</sup> ed. (2012)***

***“Antenna Theory,” by Constantine A. Balanis, 4<sup>th</sup> ed. (2016)***

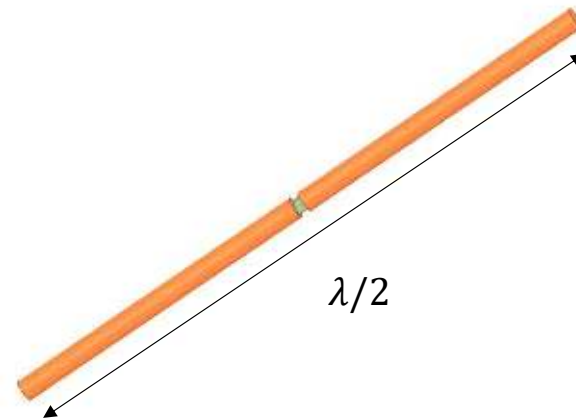
***“Antenna Engineering Handbook,” by John L. Volakis, 4<sup>th</sup> ed. (2007)***

## Slot Antennas

Slot antennas consist of a rectangular half-wavelength-long “slot” in an otherwise planar conductor. Operation, by Babinet’s Principle, is analogous to that of a half-wave dipole antenna.



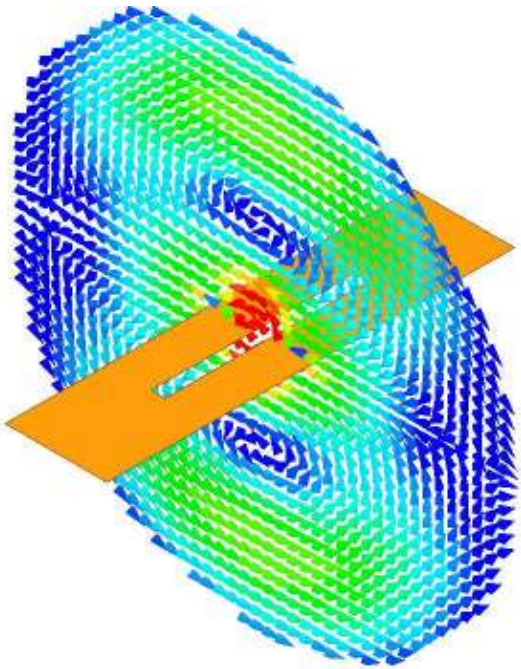
Slot Antenna



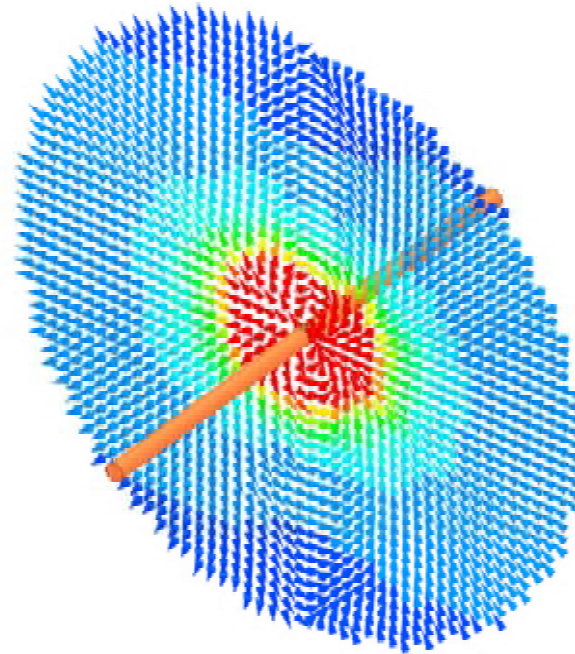
Dipole Antenna

## Slot Antennas

The radiated fields are also roughly analogous to those of a half-wave dipole antenna, but with the polarizations of the electric and magnetic fields approximately transposed.



Electric Field around Slot Antenna

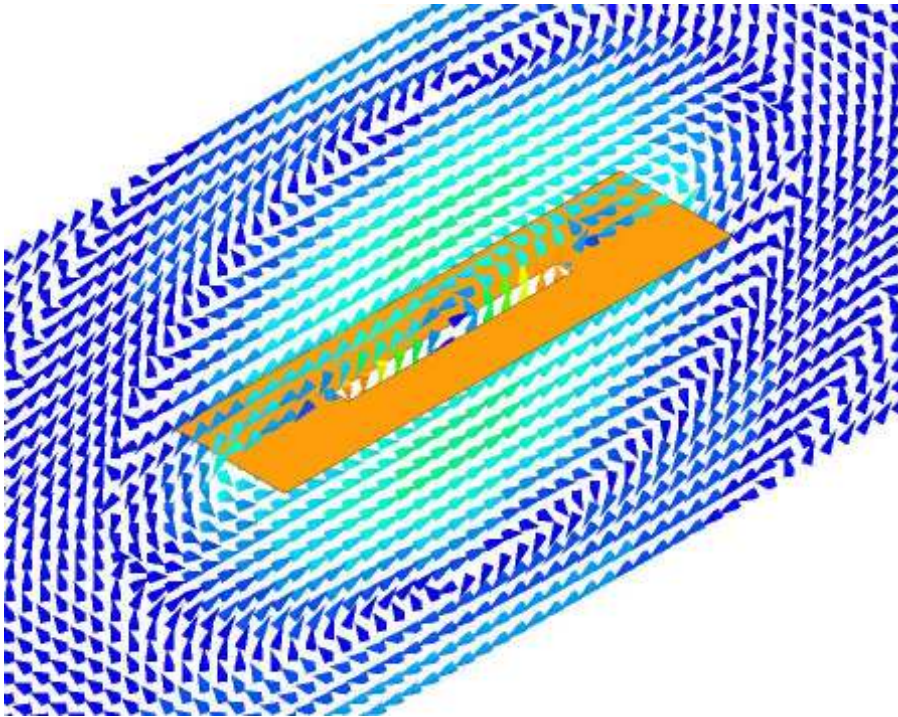


Magnetic Field around Dipole Antenna

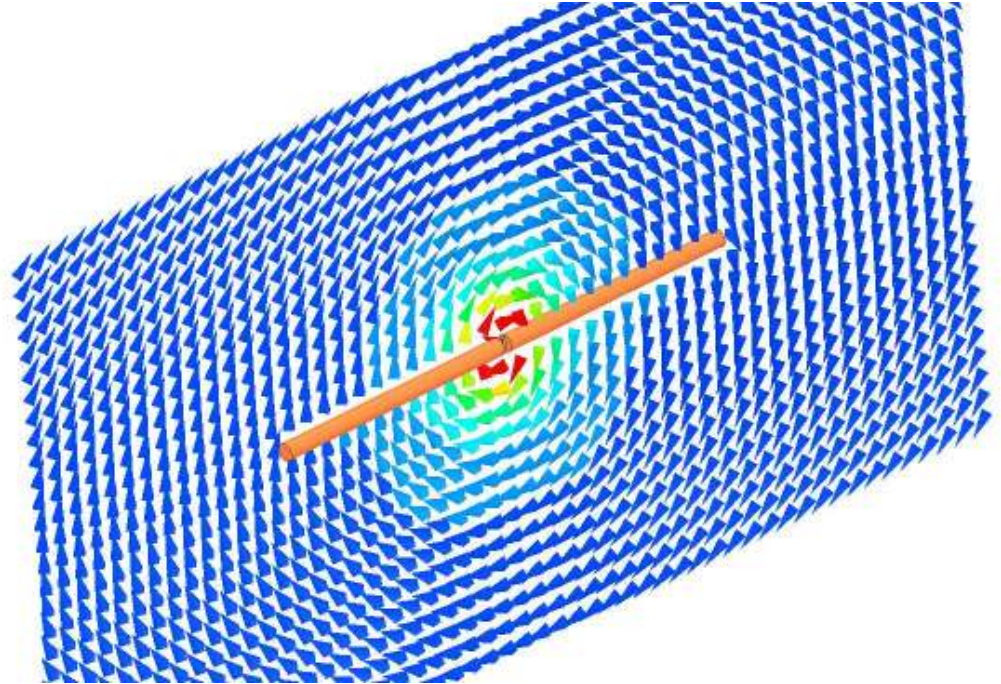


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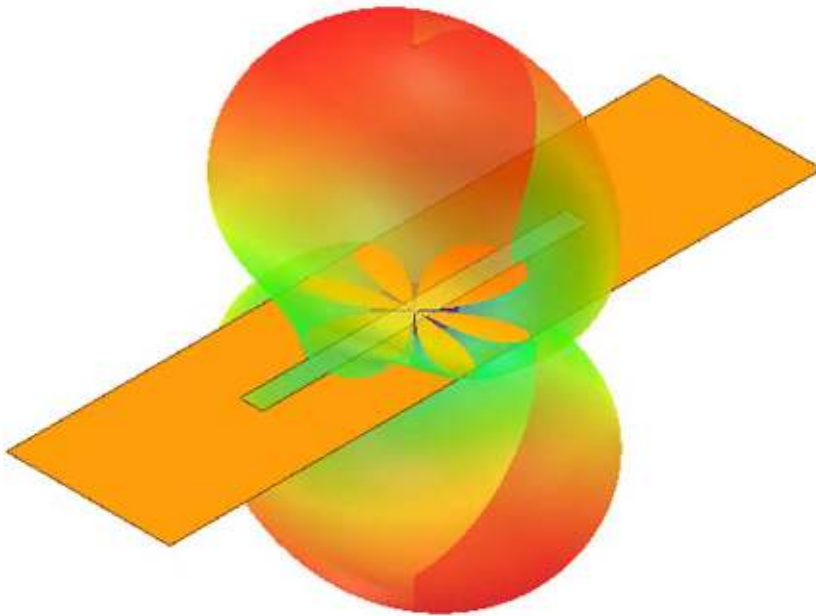
Magnetic Field around Slot Antenna



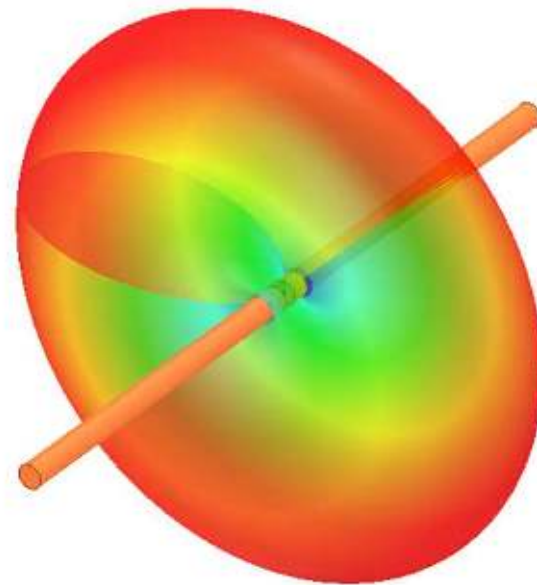
Electric Field around Dipole Antenna

## Slot Antennas

The radiation pattern of a slot antenna approximates that of a dipole antenna, but with slight asymmetry introduced by the truncation of the ground plane. Slot antennas have a **bandwidth** that is **variable** with the width of the slot, and are **linearly polarized**, with the electric field oriented perpendicularly to the length of the slot.



Slot Antenna Radiation Pattern



Dipole Antenna Radiation Pattern

 **Ansys**

