



ECC 203 : Electromagnetics and Radiating Systems

Introduction

Gowrish B.

Asst. Professor, ECE Dept., IIT Roorkee

gowrish.b@ece.iitr.ac.in

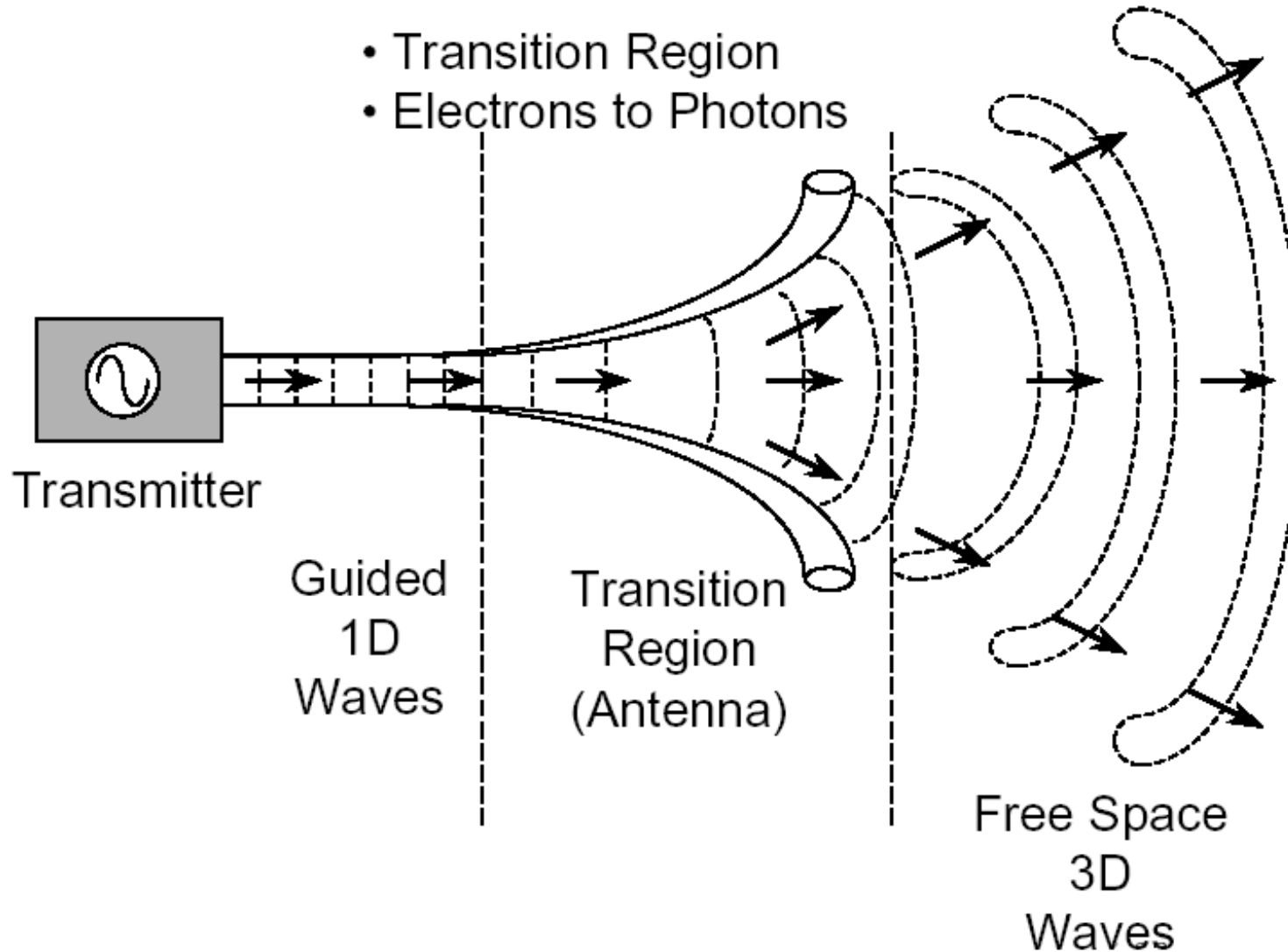
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Antennas

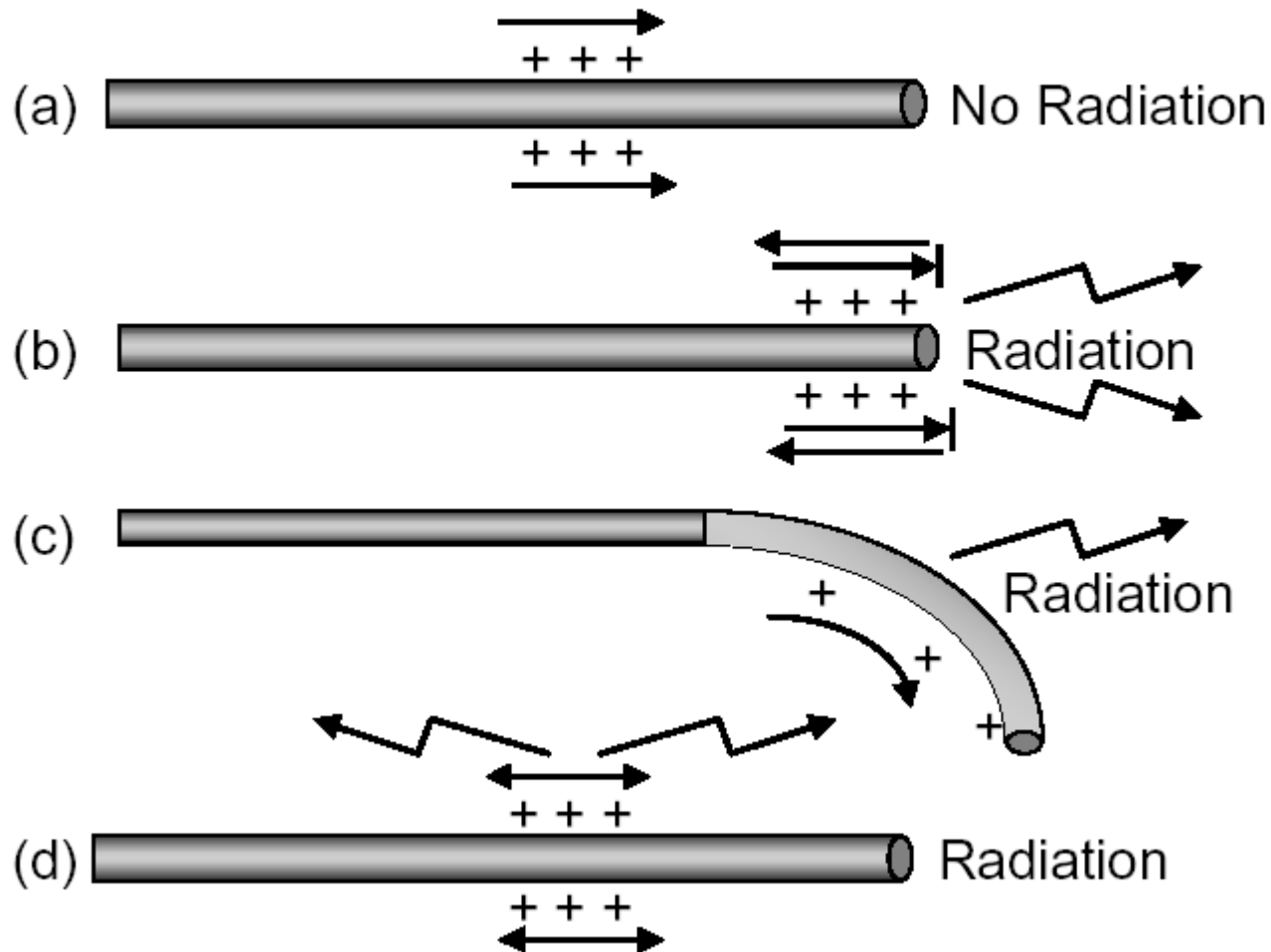
Antennas can be thought of as a **Transducer / Transition**, that converts radio waves (EM Waves in free space) into electrical currents and voltages (EM waves in guided medium) and vice versa.

What is an Antenna ?




Conditions for Radiation

- Electron Acceleration



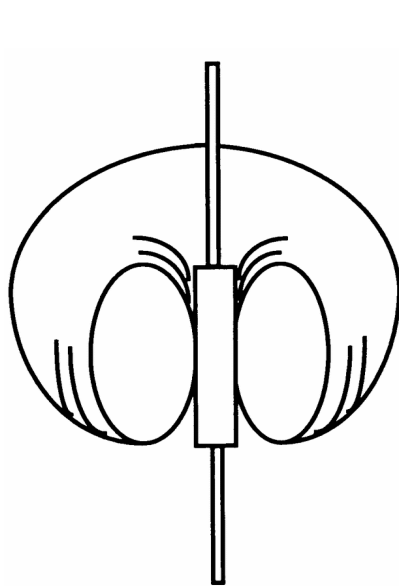
Familiarization with different antenna types

A faint, light gray watermark of the Lion Capital of Ashoka is visible in the background. It depicts a four-headed lion standing on a pedestal, facing different directions.

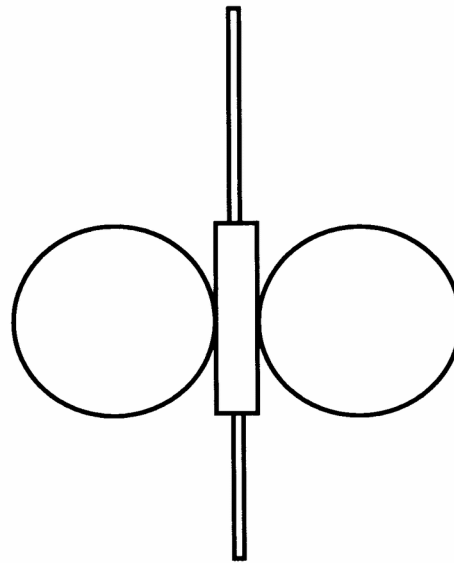
Isotropic Antenna

- **Characteristics**
 - Completely non-directional antenna
 - Radiates and receives equally well in all directions
 - Radiation pattern is spherical
- **Exists only as a mathematical concept**
- Used as a reference

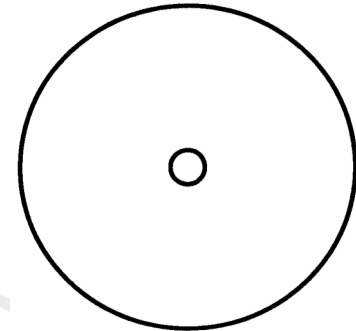
Half-wavelength Dipole Antenna



3-D view

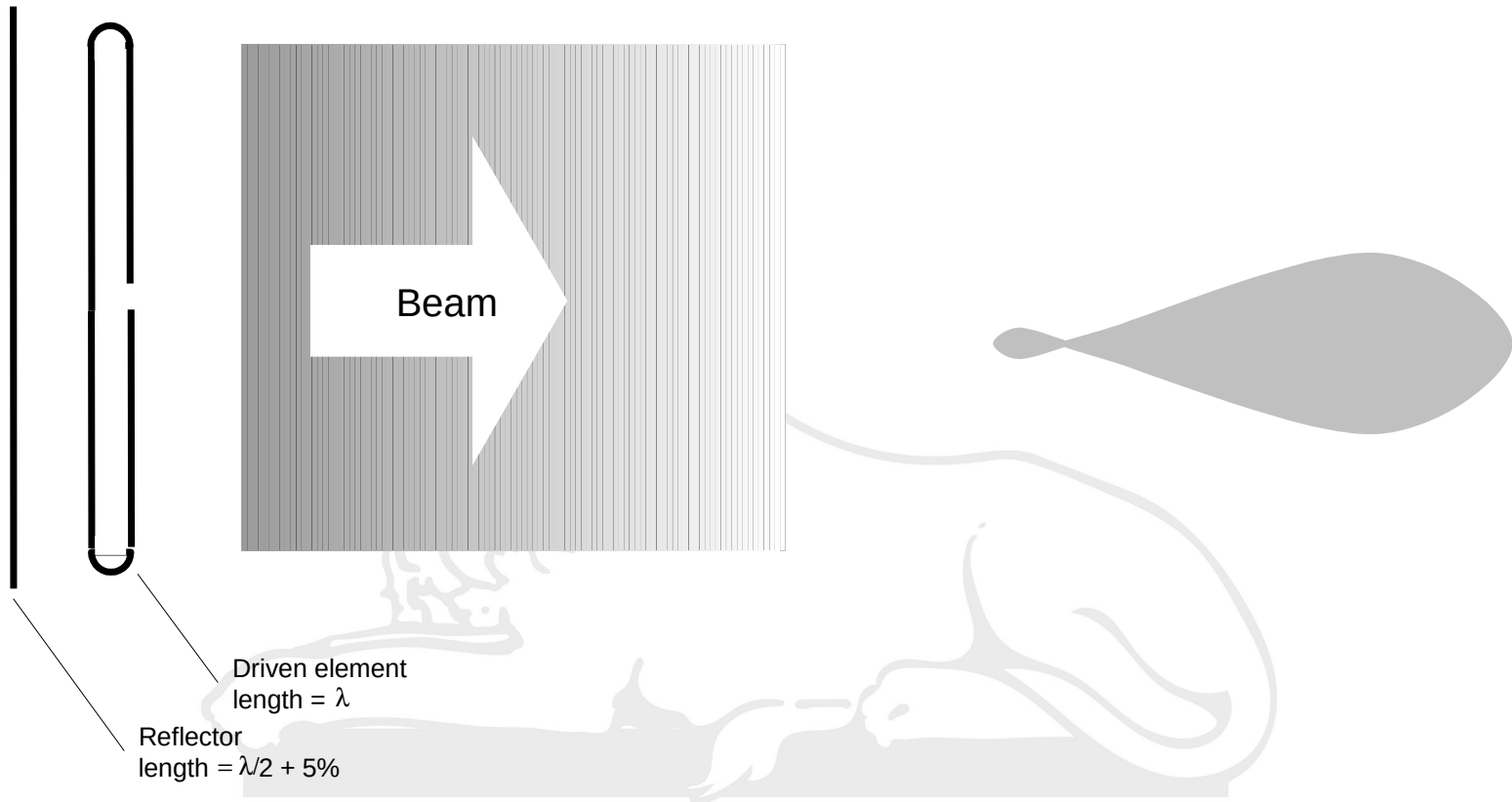


Vertical section



Horizontal section

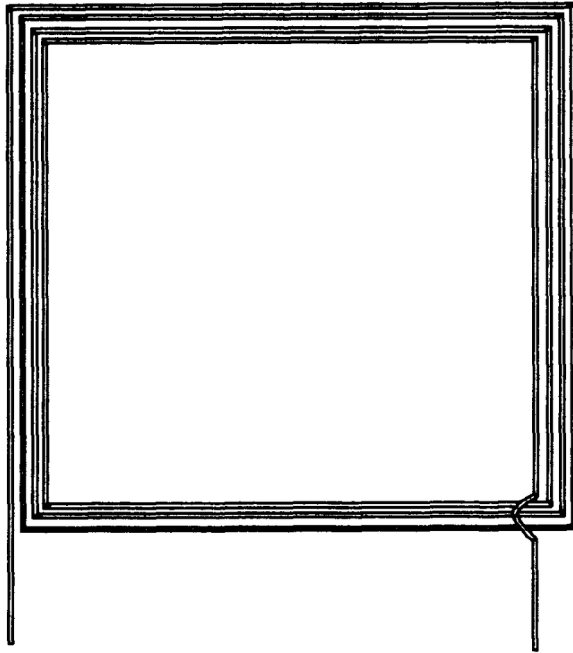
Folded Dipole Antenna



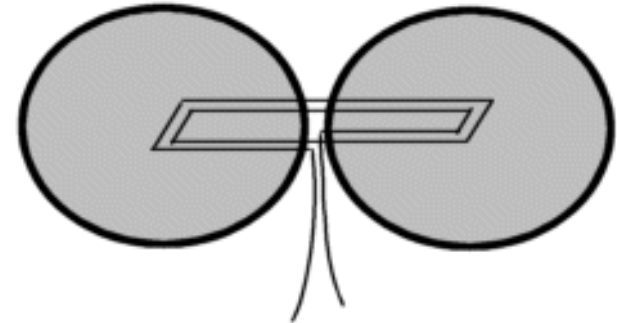
Folded dipole antenna

Radiation pattern

Loop Antenna



Loop antenna

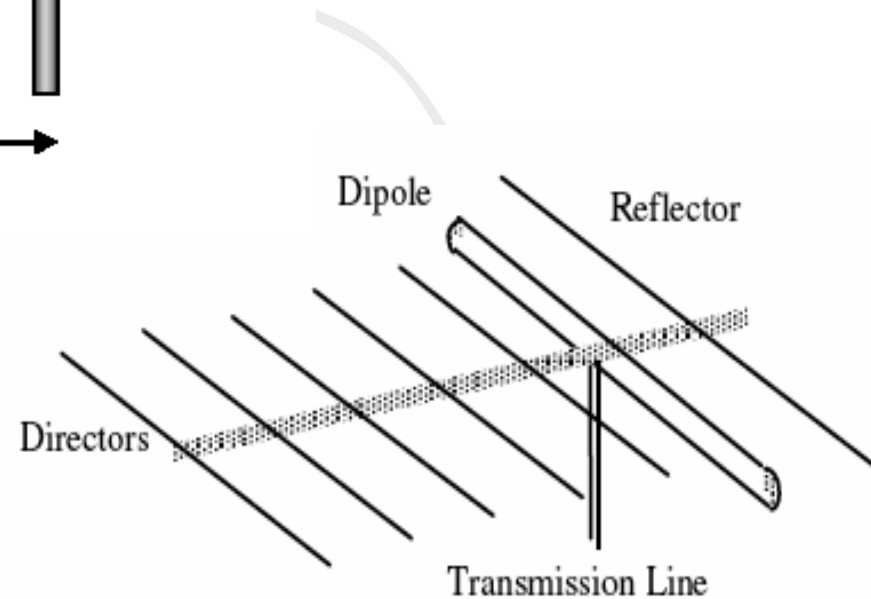
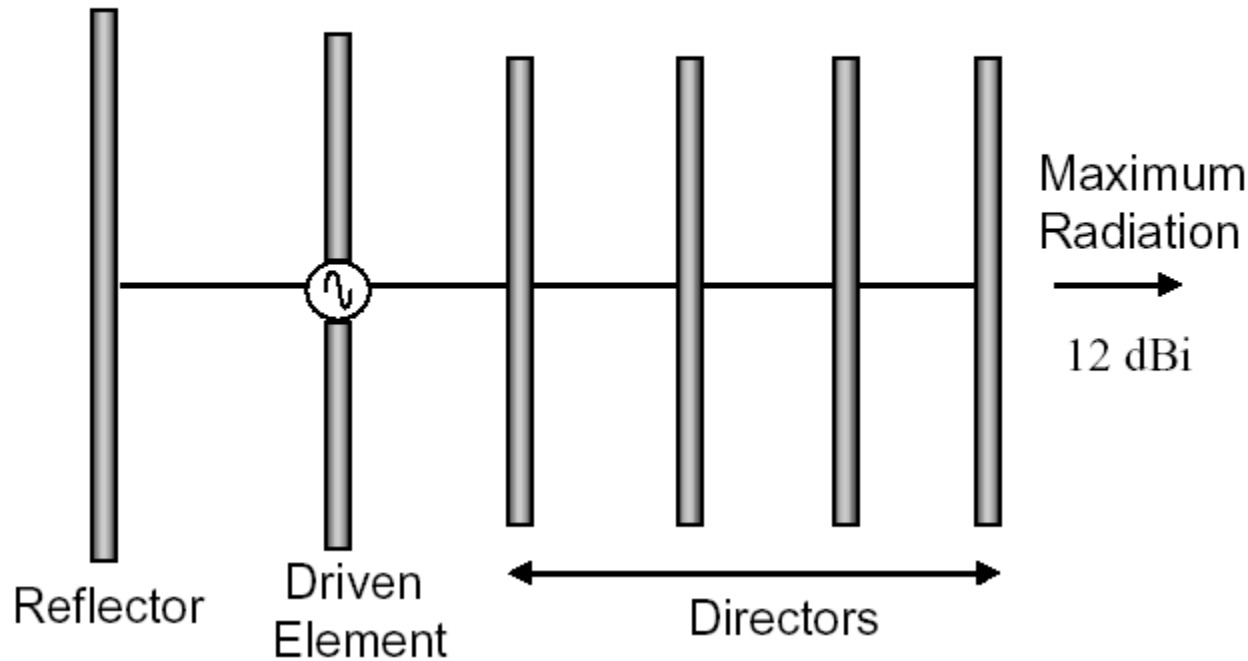


Radiation pattern in
horizontal plane

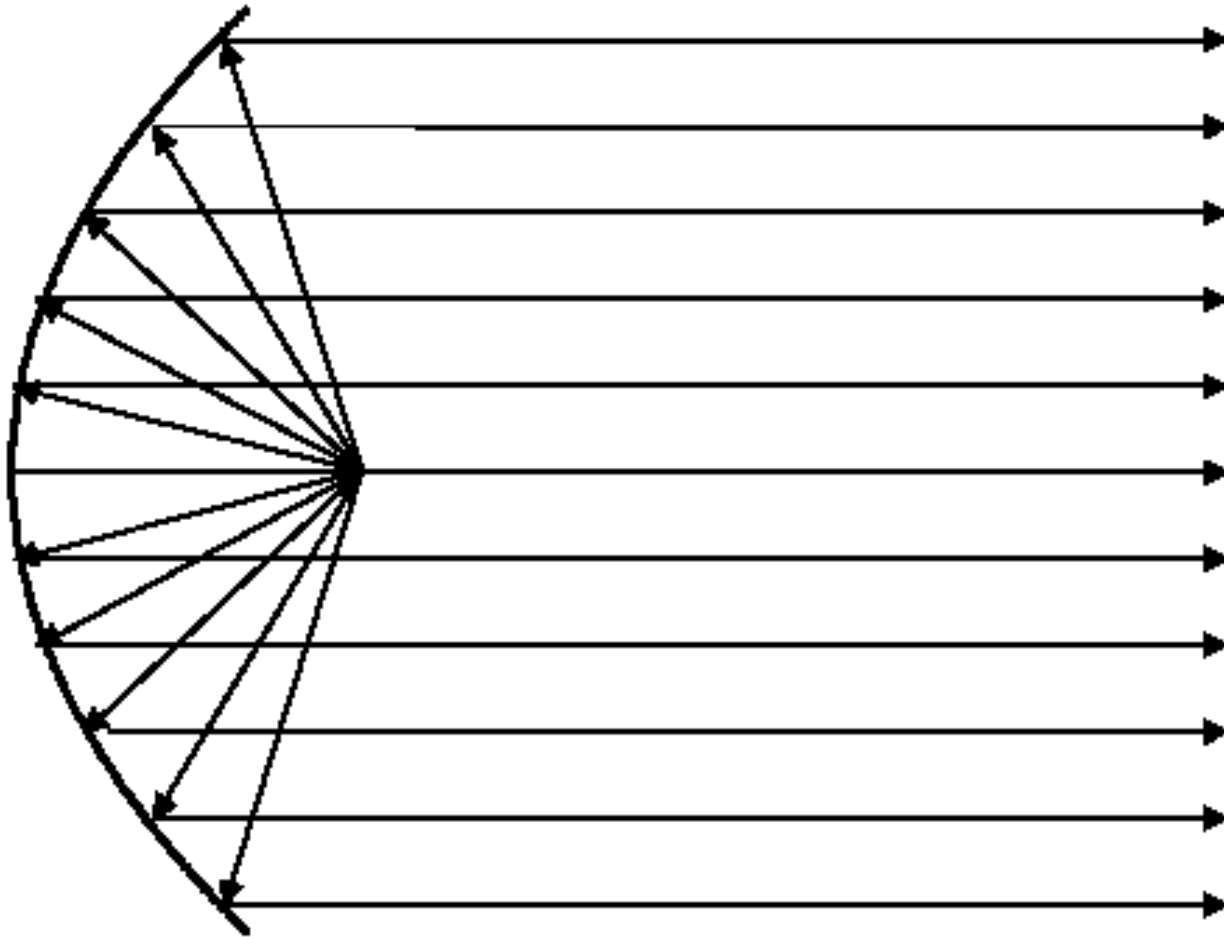
Yagi-Uda Antenna



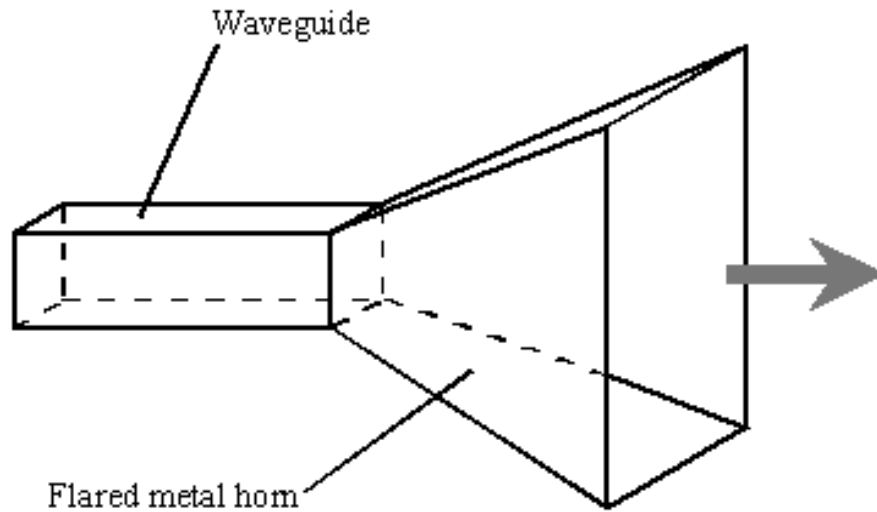
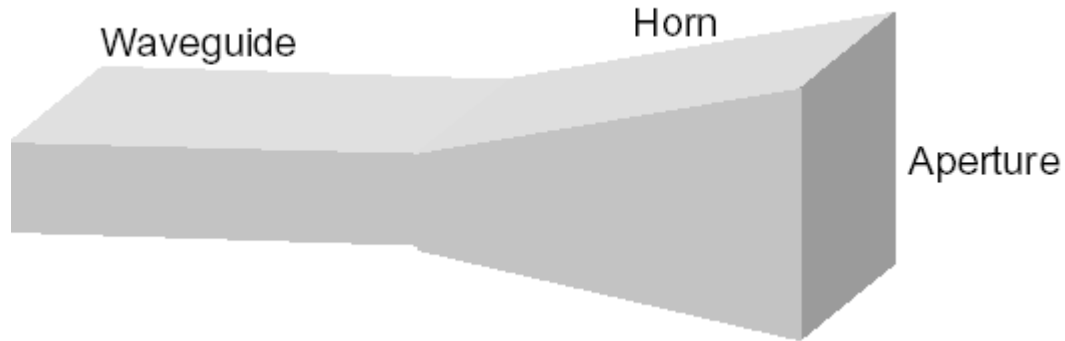
- Parasitic Elements



Parabolic Antenna

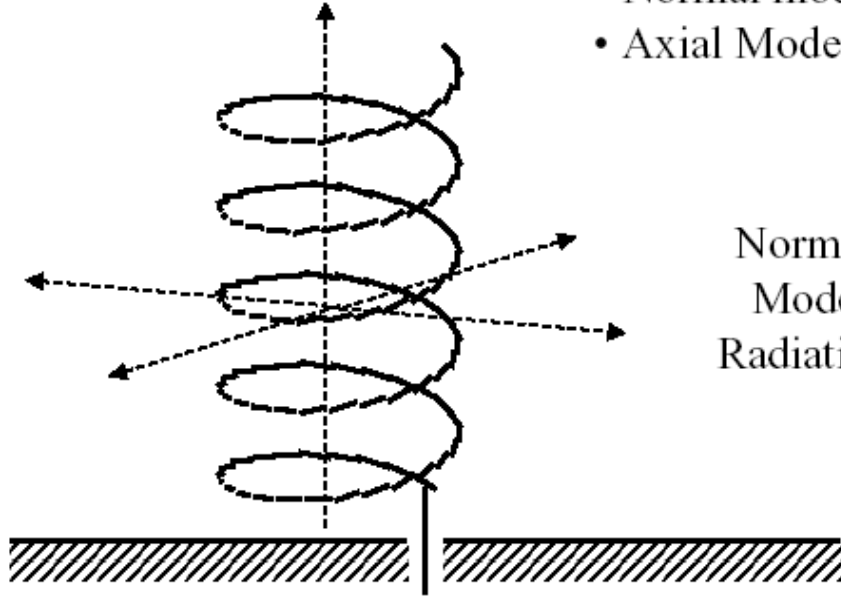


Horn Antenna



Helical Antenna

Axial Mode Radiation

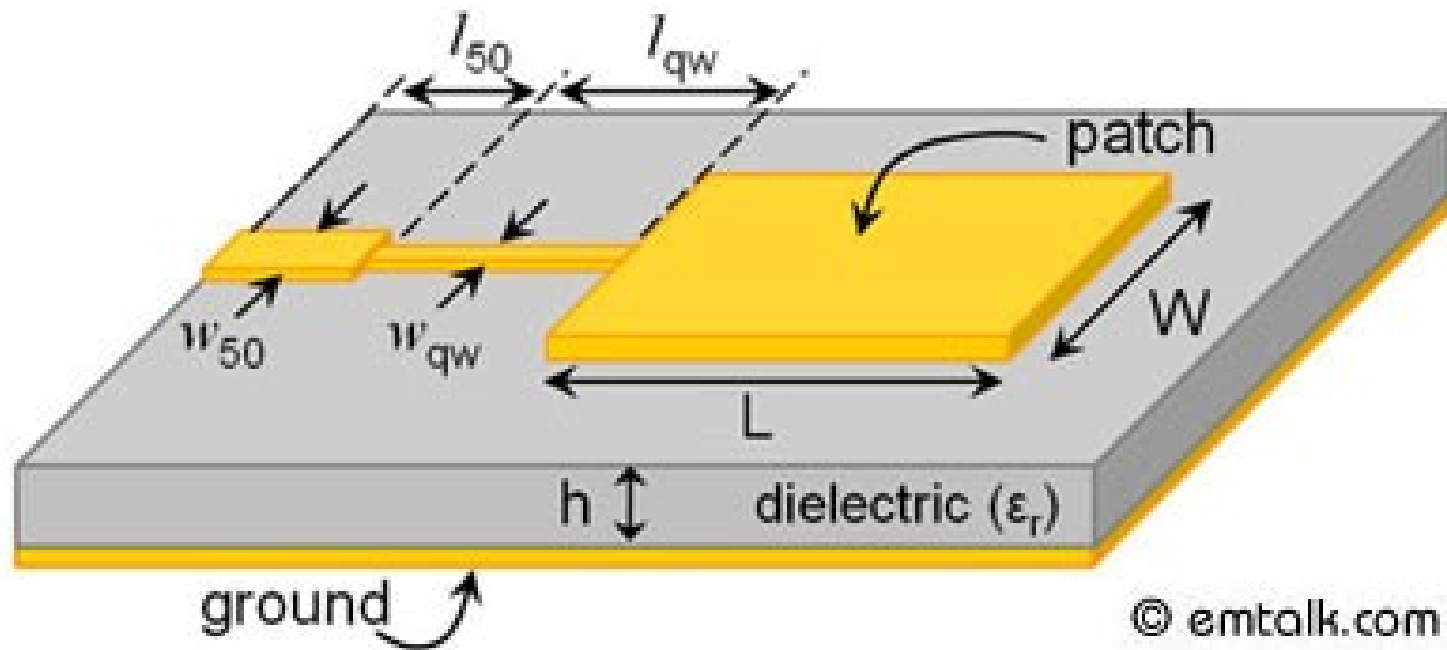


- Normal mode - Array of Loops
- Axial Mode - CP Yagi

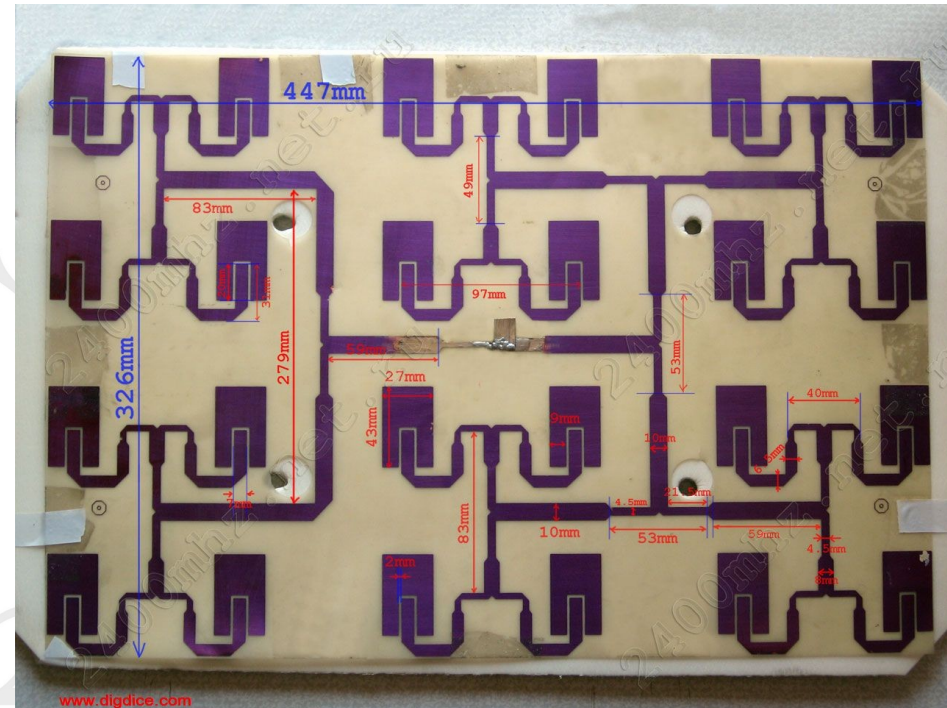
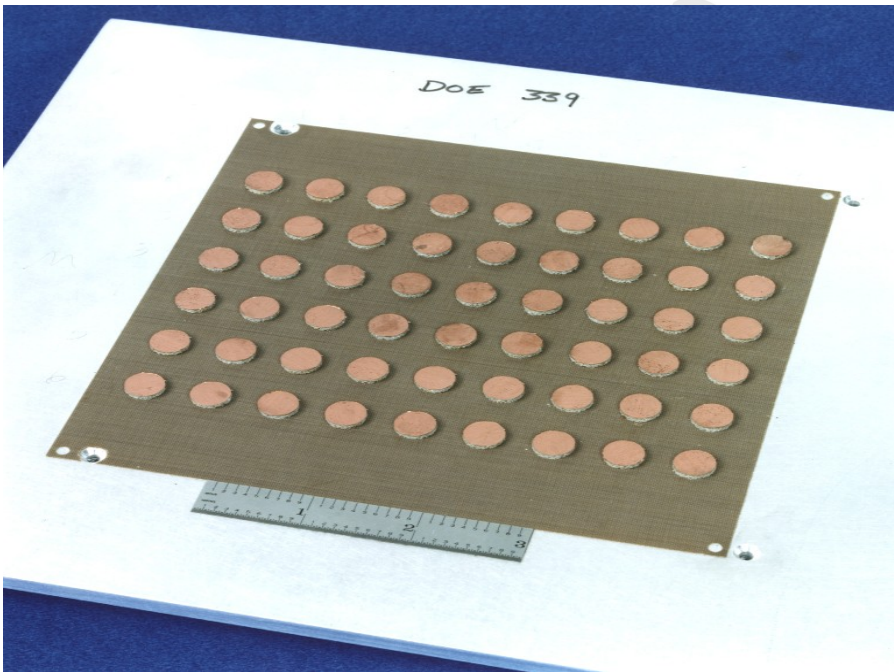
Normal
Mode
Radiation



Patch Antenna



Antenna Arrays



Course Contents

- References
- **Balanis, C.A., “Antenna Theory and Design”, 4th Ed., Wiley.**
- Kraus, J.D. and Fleisch, D.A., “Electromagnetics with Applications”, McGraw-Hill.
- Stutzman, W.L. and Thiele, H.A., “Antenna Theory and Design”, 2nd Ed., John Wiley & Sons.
- Elliot, R.S., “Antenna Theory and Design”, Revised edition, Wiley- IEEE Press.

Online Course Material:

Youtube Channel : Gowrish Basavarajappa

https://www.youtube.com/@gowrish_basavarajappa

**Thank
You**

**Question
s?**