

Summary

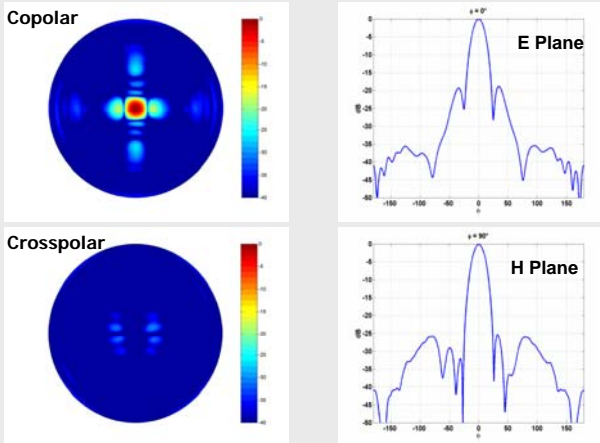
Facilities and equipment at UPC allow the design, fabrication, and characterization of radiating structures. Input impedance and radiation pattern measurements, antenna diagnostics, and evaluation of the impact of radiation system on the system performance are carried out.

Spherical Near Field Antenna Characterization



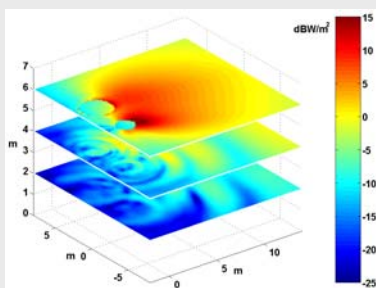
- Accurate measurement of the radiation patterns of antennas is carried out in a large anechoic chamber ($10 \times 7.5 \times 7.5 \text{ m}^3$).

3D Radiation Pattern Measurement



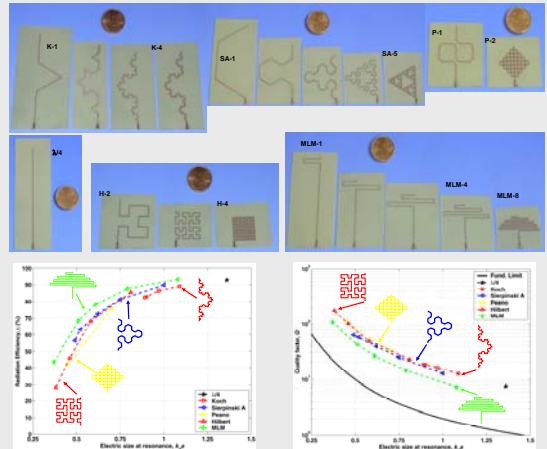
- From the spherical modes of the antenna the 3D radiation pattern of the antenna and cuts at desired planes can be computed.

Field to Field Transformation



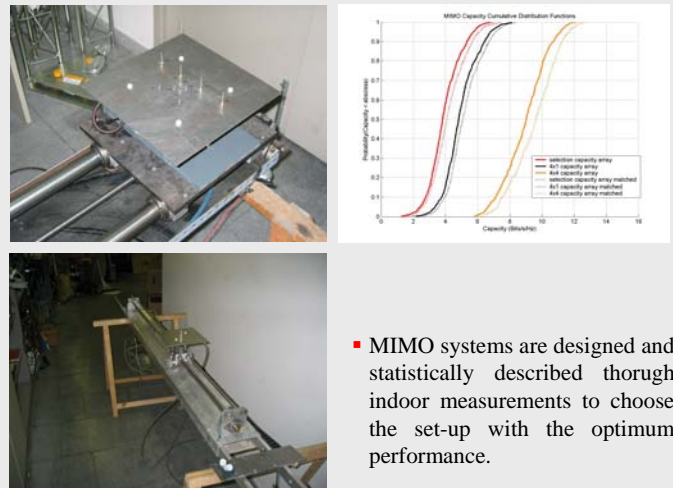
- Radiated power density in the vicinity of the antenna can also be computed from the knowledge of the spherical modes of the antenna.

Small Antennas Characterization



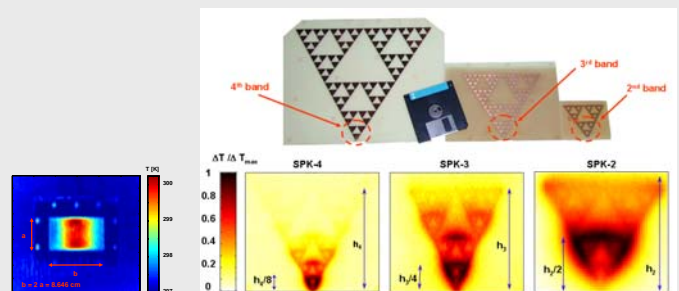
- Electrically small antennas ($ka < 1$) can be fabricated and characterized in terms of input impedance and quality factor.
- Quality factor determination requires the measurement of the radiation resistance of the antennas. Wheeler cap method is used to evaluate this radiation resistance.

Capacity Assessment of MIMO Systems



- MIMO systems are designed and statistically described through indoor measurements to choose the set-up with the optimum performance.

Novel Measurement Techniques for Small Antennas



- IR Thermography:** A fraction of the energy of electromagnetic waves impinging on a lossy material is absorbed and transformed into heat. The temperature increase of the lossy material can be measured using an Infrared camera.
- Calorimetric Techniques** can be used for the measurement of radiation efficiency and radiation resistance of antennas.
- MST (Modulated Scattering Technique)** could be used for the determination of the radiation pattern of antennas.