Research highlights

Ashwani Sharma, AMR Lab, EE Department, IIT Ropar

1.Antenna characterization facility (Anechoic chamber Fig. 1) established in AMR lab will be running shortly to measure the radiation patterns of antennas from 800-40 GHz.

2.Research on Wireless power transmission: magnetic coupling based WPT for applications such as Electric vehicles, consumer electronics, medical devices etc.[Fig. 2, 3, 4, 5] are investigated Efficient antenna designs are developed in the lab to mitigate misalignment problem which is a major challenge in WPT systems.

3.Research on Efficient antenna design and customization: For IoT and 5G applications [Fig. 6, 7] and futuristic wireless communication systems antennas are designed by concentrating on features like miniaturization, high range, focused beam, and customized pattern formation. Mini base-stations are targeted in the design [Fig. 6]. RF power transmission for IoT devices are also investigated to power up small sensors wirelessly. Customized RFID Tags are designed for novel applications like inventory management etc.[Fig. 8].

A. Sharma, A. Bharadwaj, and V. Srivastava. "An Analytical Framework to Design Planar Array Antennas to Mitigate Lateral Misalignment in the Wireless Power Transfer Systems" Accepted in IEEE Transaction on Antennas and Propagation, 2021.

Vivek Srivastava and A. Sharma. "Optimized 3D Polarized H-field Forming for Orientation-Insensitive Wireless Power Transfer Systems" Accepted in IEEE Transaction on Antennas and Propagation, 2021.

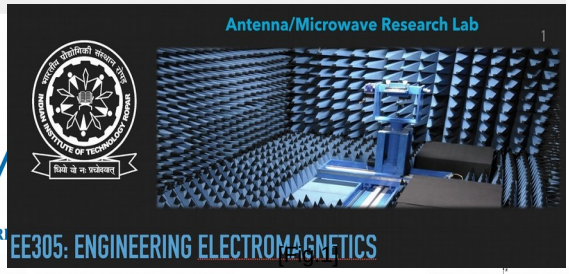
M. Kumar, A. Sharma, and I. J. G. Zuazola, "All-in-One UHF RFID Tag Antenna for Retail Garments Using Nonuniform Meandered Lines," Progress In Electromagnetics Research Letters, Vol. 94, 133-139, 2020.

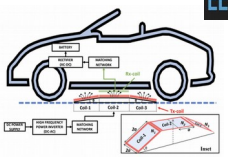
A. Bhardwaj, V. Srivastava, and A. Sharma. "A Novel Trapezoidal Multi-Coil Antenna for Wireless Charging of Electric Vehicles" in 15th IEEE ICIIS, 2020 (Best Paper Award).

V. Srivastava, A. Bharadwaj, and A. Sharma. "A Magnetic Resonance Coupling Based Touchless Pad for Human-Computer Interfacing" in 15th IEEE ICIIS, 2020 (Best Paper Award).

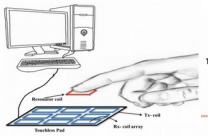
S. Agarwal and A. Sharma, "A Miniaturized Wideband Antenna for Vehicular Communication, WiMAX, and WLAN Applications," 2020 International Conference on Radar, Antenna, Microwave, Electronics, and Telecommunications (ICRAMET), Tangerang, 2020, pp. 151-154.

M. Kumar, S. Agarwal and A. Sharma, "A Multi-application Compact Ultra Wideband Vivaldi Antenna for IoT, 5G, ITS, and RFID," 2019 IEEE Indian Conference on Antennas and Propagation (InCAP), Ahmedabad, India, 2019, pp. 1-3.

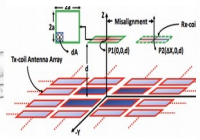




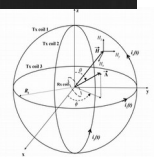
[Fig.2]



[Fig.3]

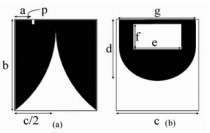


[Fig.4]



[Fig.5]

[Fig.6]



[Fig.7]

[Fig.8]