

Seminar

Institute for Plasma Research

Title: Analysis, Design and Characterization of Metasurfaces for RCS Reduction.

Speaker: Ms. Priyanka Tiwari
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Date: 26th December 2022 (Monday)

Time: 03:00 PM

Venue: Seminar Hall, IPR

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Abstract

In RADAR stealth application, the value of radar cross section (RCS) determines the maximum detection range of potential targets like aircraft, submarines, ships, missiles. Therefore, it is important to reduce RCS of these targets so that they cannot be detected by the enemy's radar, which improves their battlefield viability and penetration ability. In the past, techniques like purpose shaping, passive cancellation, active cancellation, radar absorbing material (RAM) etc., have been developed that focus on the RCS reduction of potential target. So far, Radar Absorbing Material (RAM) is one of the most promising methods to reduce RCS. However, conventional RAM have limitations in terms of larger physical thickness, heavyweight and bulky size, therefore, cannot be recommended for space related stealth application.

The present research work has extensively utilized the unique properties of Metasurfaces to address the major limitations of conventional RAM in terms of various EM characteristics such as reflection coefficients and Polarization independence over a wider bandwidth and for wider angle of incidence as well as having light weight, especially in microwave frequencies. This has been accomplished by using the benefits of loading different geometrical shapes of constituent unit cells in periodic array as a Metasurfaces which exhibits wide bandwidth, wide incidence angle, and polarization independent absorption characteristics as well as it is exceptionally light weight which can be easily wrapped over any geometrical shape. A thorough Electromagnetic analysis, design and experimental characterization is reported.
