



Design of Metamaterial Inspired Structures and its Multiple Applications

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Multi-functionality is a course of action where a single device can be used for various applications by simply changing its operating parameters. Functional reconfigurable integrated structure of antenna and metasurfaces can be used to enhance antenna gain, improve bandwidth and efficiency, reduce backward radiation, convert polarization, as well as steer antenna beams. The current trend in engineering and technology is designing multifunctional devices. It is only possible with materials that can alter their properties according to the application. In stealth and military applications, it is important to reduce vehicles or aircrafts visibility. But in case of these systems, planar antennas are the major contributors to the total RCS. In electromagnetics, antenna gain is an important performance parameter, which combines the antenna directivity and electrical efficiency.

However, high gain planar antennas always contribute towards larger RCS. Antennas are sensitive to electromagnetic wave polarization which is an important aspect of their operation. Antenna polarization is an important factor when designing antennas or even incorporating them into small wireless or mobile communications systems. The RCS is reduced by destructive interference of the scattered waves, through the two sides of the designed metasurface, on the other hand, the radiation characteristics of the antenna are well preserved. Further, a metamaterial inspired meta unit cell is designed to filter out or to reduce the interference of narrow band within UWB system.



Biography of Prof. Qunsheng Cao



Qunsheng Cao is professor of electrical engineering of Nanjing University of Aeronautics and Astronautics (NUAA) in China. Dr. Cao's current research interests are in the computational electromagnetics, meta-material, frequency selective surface, antenna design, and signal integrity for high-speed circuits. Dr. Cao has published more than 290 academic papers in refereed international journals and conference proceedings.