

Research on the Design and Application of Radiation/Stealth Integration of Electromagnetic metamaterial



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ABSTRACT

The invited speech will introduce the design concept of radiation/scattering integrated metasurface from the perspective of time-domain stealth based on the idea of electromagnetic metamaterial and try to solve the problem of antenna stealth. Through electrically reconfigurable technology, a switchable reflector is used in a structure to achieve full broadband (including both in and out of the working band of the antenna) and low RCS stealth (RCS reduction greater than 10dB) or antenna high gain radiation function. Due to the fact that the radiation/scattering integrated metasurface itself can serve as a radiator (antenna) and has an electromagnetic stealth function, it can be placed on the surface of the aircraft without being buried in the aircraft's body. In addition, the stealth frequency band of the radiation/scattering integrated metasurface includes the full frequency range of the antenna working band and the out-of-band, which can solve the problem of the inability to achieve stealth for threat radar waves of the same frequency and polarization in the antenna frequency domain stealth, as well as the scattering problem caused by the increase of mode terms outside the standing wave bandwidth of the antenna feed source in the airspace stealth. The proposed radiation/scattering integrated metasurface has important reference value, especially for the design requirements of radar antennas to achieve low scattering RCS in an ultra-wide frequency band to cope with radar detection for different purposes.

BIO



Qunsheng Cao is a professor at the College of Electronic and Information Engineering, Nanjing University of Aeronautics and Astronautics (NUAA), China. Dr. Cao's current research interests are high-performance computational electromagnetics, metamaterials, frequency selective surface, antenna, and redome design, and signal integrity of high-speed circuits.