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## Multifunctional sandwich structure designed for broadband reflection reduction

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**Abstract:** A light-weight sandwich structure is designed in this paper to achieve the broadband reflection reduction based on scattering cancellation. The multifunctional sandwich structure is composed of checkerboard metasurface (MS), foam core and carbon fabric/epoxy composite reflector. The checkerboard MS can redirect the incident waves away from the specular direction to achieve the reflection reduction. In addition, the carbon fabric/epoxy composite has the dual role as the reflection layer of incident waves and load bearing face material of whole structure. A series of simulation and optimization results indicate that the whole structure obtains reflection reduction with the reflectivity less than -10 dB in the frequency of 6.7-19.8 GHz under normal incidence, and the reflectivity less than -15 dB in 9.8-14.0 GHz. The proposed structure is lightweight and the density is 0.58 g/cm<sup>3</sup>. By fabricating the sample, electromagnetic property has been well demonstrated experimentally.

**Keywords:** Sandwich structure; reflection reduction; lightweight; checkerboard MS

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