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Title:Design and experimental verification of band-pass frequency selective surface based on metamaterial effective medium theory
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Abstract:By adjusting the effective permittivity of the unit cell, a new method of constructing metamaterial band-pass frequency selective surface was proposed. The effective permittivity of continuous conducting wires is negative below the plasma frequency and thus a stop-band occurs. By combining the continuous conducting wires with cut wires, we realized a one-dimensional frequency selective surface. Both the theory analysis and simulation results demonstrated the facility and feasibility of the method. We also designed a wide-angle and polarization-independent frequency selective surface based on this method. Two samples were fabricated to validate the proposed method; the experiment results were fairly consistent with the simulation results. The proposed method eliminates the complicated calculation and excessive parameter optimization process. It paves a new way of designing frequency selective surfaces and is of important reference values for fabricating THz frequency selective surface as well as multi-band, tunable and miniaturized frequency selective surfaces.
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