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Title:Controlling Gigahertz and Terahertz Surface ElectromagneticWaves with Metamaterial Resonators
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Abstract:We computationally and experimentally investigate the use of metamaterial resonators as bandpass filters and other components that enable control of guided surface electromagnetic waves. The guided surface electromagnetic wave propagates on a planar Goubau line, launched via a coplanar waveguide coupler with 50ω impedance. Experimental samples targeted for either microwave or terahertz frequencies are measured and shown to be in excellent agreement with simulations. Metamaterial elements are designed to absorb energy only of the planar Goubau line and yield narrow-band resonances with relatively high quality factors. Two independent configurations of coupled metamaterial elements are demonstrated that modify the otherwise flat transmission spectrum of the planar Goubau line. By physically shunting the capacitive gaps of the coupled metamaterial elements, we demonstrate the potential for a large dynamic range in transmissivity, suggesting the use of this configuration for highbandwidth terahertz communications.
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