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Title:Experimental demonstration of subwavelength domino plasmon devices for compact high-frequency circuit
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Abstract:In optical frequency, surface plasmons of metal provide us a prominent way to build compact photonic devices or circuits with nondiffraction limit. It is attributed by their extraordinary electromagnetic confining effect. But in the counterpart of lower frequencies, plasmonics behavior of metal is screened by eddy current induced in a certain skin depth. To amend this, spoof plasmons engineered by artificial structures have been introduced to mimic surface plasmons in these frequencies. But it is less useful for practical application due to their weak field confinement as manifested by large field decaying length in the upper dielectric space. Recently, a new type of engineered plasmons, domino plasmon was theoretically proposed to produce unusual field confinement and waveguiding capabilities that make them very attractive for ultra-compact device applications [Opt. Exp. 18, 754-764 (2010)]. In this work, we implemented these ideas and built three waveguiding devices based on domino plasmons. Their strong capabilities to produce versatile and ultracompact devices with multiple electromagnetic functions have been experimentally verified in microwaves. And that can be extended to THz regime to pave the way for a new class of integrated wave circuits.
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