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Abstract:We theoretically consider infrared-driven hyperbolic metamaterials able to spatially filter terahertz (THz) radiation. The metamaterial is a slab made of alternating semiconductor and dielectric layers whose homogenized uniaxial response, at THz frequencies, shows principal permittivities of different signs. The gap provided by metamaterial hyperbolic dispersion allows the slab to stop spatial frequencies within a bandwidth tunable by changing the infrared radiation intensity. We numerically prove the device functionality by resorting to full wave simulation coupled to the dynamics of charge carries photoexcited by infrared radiation in semiconductor layers.
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