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Reconfigurable Gradient Index using VO₂ Memory Metamaterials MICHAEL GOLDFLAM, University of California San Diego, TOM DRISCOLL, UCSD and Duke University, BRIAN CHAPLER, OMAR KHATIB, University of California San Diego, NAN JOKERST, SABARNI PALIT, DAVID SMITH, Duke University, BONGJUN KIM, ETRI, GIWAN SEO, University of Science and Technology, HYUN-TAK KIM, ETRI and UST in Korea, MASSIMILIANO DI VENTRA, DIMITRI BASOV, University of California San Diego — We have demonstrated tuning of a metamaterial device that incorporates a form of spatial gradient control. Electrical tuning of the metamaterial was achieved through a vanadium dioxide layer which interacts with an array of split ring resonators. Through design of the device and contact geometry, we achieved a spatial gradient in the magnitude of permittivity, writeable using a single transient electrical pulse. This induced gradient in our device was observed on spatial scales on the order of one wavelength at 1 THz. Thus we have demonstrated the viability of elements for use in future devices with potential applications in beamforming and communications.¹ Various contact geometries are currently being investigated with the goal of implementing finer control over gradients and expanding on the possible applications of such devices.

¹M. D. Goldflam, *et. al.*, Appl. Phys. Lett. 99, 044103 (2011).

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