

Guiding Electromagnetic Energy below the Diffraction Limit with Dielectric Particle Arrays

Junjie Du,^{1;2} Shiyang Liu,^{1;2} Zhifang Lin,¹ Jian Zi,¹ and S. T. Chui²

1 Surface Physics Laboratory, Department of Physics, Fudan University, Shanghai 200433, China

2 Bartol Research Institute, University of Delaware, Newark, DE 19716, USA

We demonstrate that electromagnetic energy can be efficiently guided along a single chain, around a corner, and split at forked structures below the diffraction limit with the use of appropriate dielectric particle arrays. The fields are confined to a region with the transverse width less than half of the guided wavelength. Our results give an explicit demonstration for the first time that the dielectric based subwavelength photonic circuit is achievable, providing an alternative to the surface-plasmon-based metallic counterpart.