Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Image magnification in transformation optics devices based on tapered waveguides[1] WILLIAM ZIMMERMAN, CHRISTOPHER JENSEN, VERA SMOLYANINOVA, Towson Univ, IGOR SMOLYANINOV, University of Maryland — Recent progress in metamaterial and transformation optics (TO) research gave rise to such fascinating devices as perfect lenses, invisibility cloaks, and numerous other unusual electromagnetic devices. However, the metamaterials have problems with low-loss broadband performance and complexity of fabrication, especially in the visible frequency range. Our TO devices allow us to circumvent these difficulties by using lithographically defined metal/dielectric waveguides to emulate metamaterial properties [1]. Adiabatic variations of the waveguide shape enable control of the effective refractive index experienced by light propagating inside the waveguide. The achieved image magnification is consistent with numerical simulations. We have studied wavelength and polarization dependent performance of the waveguides. Our experimental designs appear to be broadband, which has been verified in the 480-633 nm range. These novel optical devices considerably extend our ability to control light on sub-micrometer scales. [1]. V.N. Smolyaninova, et al., Phys. Rev. B 87, 075406 (2013)

[1]This research was supported by the NSF grant DMR-1104676

William Zimmerman
Towson Univ

Date submitted: 05 Nov 2015 Electronic form version 1.4