Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Metagratings for Diffraction Based, Compact, Holographic Imaging SANDEEP INAMPUDI, VIKTOR A. PODOLSKIY, University of Massachusetts Lowell, MULTISCALE ELECTROMAGNETICS GROUP TEAM — Recent developments in semiconductor technology brought to life a new generation of highly-compact visible-frequency cameras. Unfortunately, straight forward extension of this progress to low-frequency domains (such as mid-IR imaging) is impossible since the pixel size at these frequencies is limited by free-space diffraction limit. Here we present an approach to realize highly-compact imaging systems at lower frequencies. Our approach takes advantage of high refractive index of materials commonly utilized in semiconductor detectors of mid-IR radiation, accompanied by metagratings, structures with engineered diffraction properties, to achieve a 10-fold reduction in the pixel size. In contrast to conventional refraction-based imaging, the approach essentially produces a digital hologram – a 2D projection of the 3D optical field, enabling a post-imaging "refocusing" of the picture. The perspectives of numerical recovery of the optical field and the stability of such recovery are discussed.

Sandeep Inampudi
University of Massachusetts Lowell

Date submitted: 17 Nov 2012 Electronic form version 1.4