Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Aperiodic nanostructured optical devices fabricated with a femtosecond laser TIMOTHY GERKE, JEREMY BROWN, University of Colorado at Boulder, WENJIAN CAI, KLA Tencor, ARIEL LIBERTUN, RAFAEL PIESTUN, University of Colorado at Boulder — Periodic three-dimensional (3D) structures have increasingly caught the attention of the scientific community. Aperiodic 3D structures, however, have remained relatively unexplored. We present structural and optical characterization of 3D aperiodic nanostructures created by scanning focused femtosecond (fs) laser pulses to produce permanent refractive index changes inside glass. We created polarization-sensitive devices using the effect of fs-laser-induced birefringence in fused silica. In this regime, the laser-created plasma gives origin to subwavelength structures that generate anisotropy by the effect of form birefringence. We demonstrated polarization-selective computer-generated holograms using this effect in three dimensions. These holograms form different reconstructions for different illuminating polarization states

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Date submitted: 20 Nov 2006 Electronic form version 1.4