

Abstract Submitted  
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**The resolution limits of voxelated liquid crystal networks and elastomers** BENJAMIN KOWALSKI, TIMOTHY WHITE, Materials and Manufacturing Directorate, Air Force Research Lab, Wright-Patterson AFB — Arbitrary director patterning within liquid crystal network films has assimilated functional materials responses in a monolith. Examples include complex 3D shape deformations and nonlinear mechanical responses. Fast, cheap, and rapidly reconfigurable patterning techniques are needed to fully realize the opportunity space. Here we demonstrate one-shot photopatterning at display resolution, using an off-the-shelf twisted-nematic spatial light modulator and simple projection optics. At high resolution, the inscribed director profile is dominated by elastic-mediated orientational relaxation, imposing a fundamental limit on achievable voxel size. A simple model for this effect is experimentally validated, and implications for device design are discussed.

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