

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Holographic Generation of Laguerre-Gaussian Beams with Aberration Control Using a Digital Micromirror Device¹ KAIYUE WANG, COLIN PARKER, Georgia Inst of Tech — Inspired by recent application of the digital micromirror device (DMD) for creating arbitrary beam shapes, we developed our own control system to test advanced beam manipulation for future use in versatile optical lattices and tweezers for ultracold atoms. To measure and eliminate aberrations in the light path, we designed a test sequence that, within each run, can analyze the interference pattern by the two patches generated on the DMD, hence acquiring the relative phase and amplitude information in the patch positions. We implemented an algorithm that fits the 2D interference pattern while maintaining tolerance for mechanical instabilities, providing convenient diagnostics compared to a single intensity measurement at a fixed position. The holographic pattern is generated together with compensation for aberrations and can be proved as valid by the shape-maintaining properties at different propagation distances of Laguerre-Gaussian beams.

¹We acknowledge support and funding from the Air Force Office of Scientific Research, Young Investigator Program, through Grant No. FA9550-18-1-0047 and the NSF REU program (Award no. 1560165)

Kaiyue Wang
Georgia Inst of Tech

Date submitted: 31 Jan 2020

Electronic form version 1.4