Poster Presentation P25

ADAPTIVE OPTICS FOR DYNAMIC OPTICAL TRAPS

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Holographic Optical Tweezers were first demonstrated by Fournier, *et al*[1], using a commercial hologram. A complete recipe for making *tailored*, planar arrays of optical traps using Diffractive Optical Elements (DOE) was laid out in the IWU – Univ. of Chicago collaboration, "Computer-Generated Holographic Optical Tweezer Arrays."[2] While this original "HOT" recipe dealt with two-dimensional arrays, several generalizations have been demonstrated which extend the basic method to three-dimensions[3, 4]. That said, three-dimensional studies remain in their infancy. Furthermore, even for lower-dimensional arrays, both errors in the DOE and aberrations in the optical system can compromise trap performance. We will report on our progress in using a Programmable Phase Modulator (an optically addressable DOE) to provide a reconfigurable, self-calibrating DOE, and to correct for aberrations. Our approach involves modifying the "HOT" algorithm in order to provide a feedback mechanism between the input optical array and output optical array.

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