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Laser beam shaping by manipulating spatial coherence

Milo W Hyde IV
Air Force Institute of Technology, USA

Existing in a state between coherent (e.g., lasers) and incoherent (e.g., incandescent) light sources, partially-coherent beams (PCBs) can be highly directional like a laser while also being resistant to scintillation or speckle. These characteristics make these beams attractive for use in applications such as free-space optical communications, directed energy, manufacturing, particle manipulation, medicine, and video projection. Considering their many potential uses, the study and especially synthesis of PCBs has become a very popular research subject. One of the most interesting developments to arise out of this work is the ability to precisely control beam shape by manipulating spatial coherence. The Air Force Institute of Technology working with New Mexico State University has been heavily involved in this research. We have developed several novel techniques to synthesize PCBs which yield beams of any desired shape. This presentation reviews this recent work in beam shaping using spatial coherence and discusses future research.

Biography

Milo W Hyde IV received his BS degree in Computer Engineering from the Georgia Institute of Technology, Atlanta, GA, in 2001, and the MS and PhD degrees in Electrical Engineering from the Air Force Institute of Technology, Dayton, OH, in 2006 and 2010, respectively. He is currently an Associate Professor with the Department of Electrical and Computer Engineering, Air Force Institute of Technology. His current research interests include electromagnetic material characterization, guided-wave theory, scattering, and optics. He is a Senior Member of IEEE and a member of SPIE and OSA.

milo.hyde@afit.edu

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