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Encoding information using Laguerre Gaussian modes over free space turbulence media

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ABSTRACT:

We experimentally demonstrate an efficient information transmission technique using Laguerre Gaussian (LG) modes. This technique is based on multiplexing and demultiplexing multiple LG modes with different azimuthal and radial components. At the reception, the initially sent modes encoding the information are extracted with high fidelity using a complete decomposition allowing to identify a particular mode from a set of modes within a unique iteration. Importantly, we investigate the effects of the atmospheric turbulence on the proposed communication system. We believe that the proposed technique is promising for high-bit-rate spatial division multiplexing in optical fiber and free space communication systems.