



Contribution ID: 314

Type: Oral Presentation

Investigating mode diversity with combinations of Hermite-Gaussian and Orbital Angular Momentum modes

Wednesday, 5 July 2023 16:00 (20 minutes)

Free space optical communication has the potential to mitigate the existing digital divide. However, it is highly susceptible to atmospheric turbulence, especially when used with mode division multiplexing. Turbulence decreases the received power of the transmitted laser beam, thus inducing errors. By simultaneously transmitting and/or receiving two modes, the received power could be improved. This method, known as mode diversity, has been shown to improve error rates in systems. Previous studies have primarily focused on Orbital Angular Momentum (OAM) modes, but other mode combinations, such as two Hermite-Gaussian (HG) modes or even a combination of an OAM mode and an HG mode, could also be utilized. In this work, we investigate the received power of a system using mode diversity with various mode combinations, including two OAM modes, two HG modes, and an HG and OAM mode, in the presence of real atmospheric turbulence.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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Session Classification: Photonics

Track Classification: Track C - Photonics