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On the interaction of structured light fields and the atmosphere

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It is well understood that structured light becomes distorted after propagating through the atmosphere. These distortions are the result of random refractive index fluctuations, themselves a product of atmospheric turbulence. In particular, these distortions have been realised as modal crosstalk in beams carrying orbital angular momentum. Such beams are ubiquitously used in free space optical communication applications. Commonly, the atmosphere is treated as a phase-only effect that induces this modal scattering. However, this approach offers little insight as it does not focus on the gain or loss of OAM that the beam experiences from interacting with the atmosphere. We ask the question: from where did the OAM come? We develop an alternate, novel model to provide generalised explanations to the sometimes-contested effects of atmospheric turbulence on light.

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

Yes

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

Msc

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