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Combatting decoherence in OAM states due to turbulence JOSE RAUL GONZALEZ ALONSO, TODD BRUN, University of Southern California — Photons have always been the information carriers of choice in quantum information, with many protocols taking advantage of the polarization degrees of freedom to encode quantum information. Exploiting the photon's orbital angular momentum (OAM) can provide distinctive advantages. The main one is an increased alphabet size for information transmission. Since the Hilbert space of OAM states is infinite dimensional, it can be used to encode more than one bit (or qubit) per photon. However, this potential can only be realized if suitable quantum information can be encoded in the OAM photon states, and if it can be protected from the decohering effect of atmospheric turbulence. In this work, we will numerically simulate the effects of turbulence (using the Kolmogorov model) on photons with a certain value of OAM and how to protect them from the decoherence caused by the atmospheric turbulence.

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