

USC Viterbi School of Engineering

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Boost the Communication Data Rates Using Waves Carrying Orbital-Angular-Momentum

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Y. Yan, G. Xie et al, Nature Communications 2014

G. Xie, et al., Optics Letters 2015

Challenge 2: Misalignment





direction for OAM generation direction for beam steering



The two phase change are compatible with each other, which allows the generation of a steered OAM beam.

G. Xie, et al., Scientific Reports 2016

Discussion

- OAM modes form the 1-dimensional orthogonal basis in azimuthal direction. Adding in radial modes could provide a complete 2-dimensional orthogonal basis set, thus enables more available modes and higher system throughput.
- OAM modes diverges faster than a convention Gaussian beam. Therefore, a partially receiving scheme needs to be considered for long-distance link.
- Besides OAM modes, there are other orthogonal spatial modes (e.g. Hermite-Gaussian modes). As opposed to the other types of modal groups, OAM has circular symmetry. This characteristic makes the beams conveniently matched to many components and subsystems for ease of implementation.

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