

Quantum Optics in Vectorial Modes

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In quantum optics it is important to understand the structure of optical modes that are used both in fundamental experiments and quantum information processing technology. Whereas complex modes in the spatial and spectral domain are being studied intensively, vectorial modes, i.e. modes with complex spatial and polarization structure have been investigated only lately in quantum optics.

I will review our work along these lines, especially in the continuous variable domain. Another topic that has been discussed lately is related to the notion of classical entanglement.

I will show the connection of the properties of vectorial modes and classical entanglement and elaborate on the consequences for experiments from quantum optics and quantum information processing to classical optics like sensing and metrology.