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純量與向量結構光及其與層狀二硫化鉬交互作用之研究

Scalar and Vector Structured Light Beams: its generation and interaction with layered 2D MoS_2

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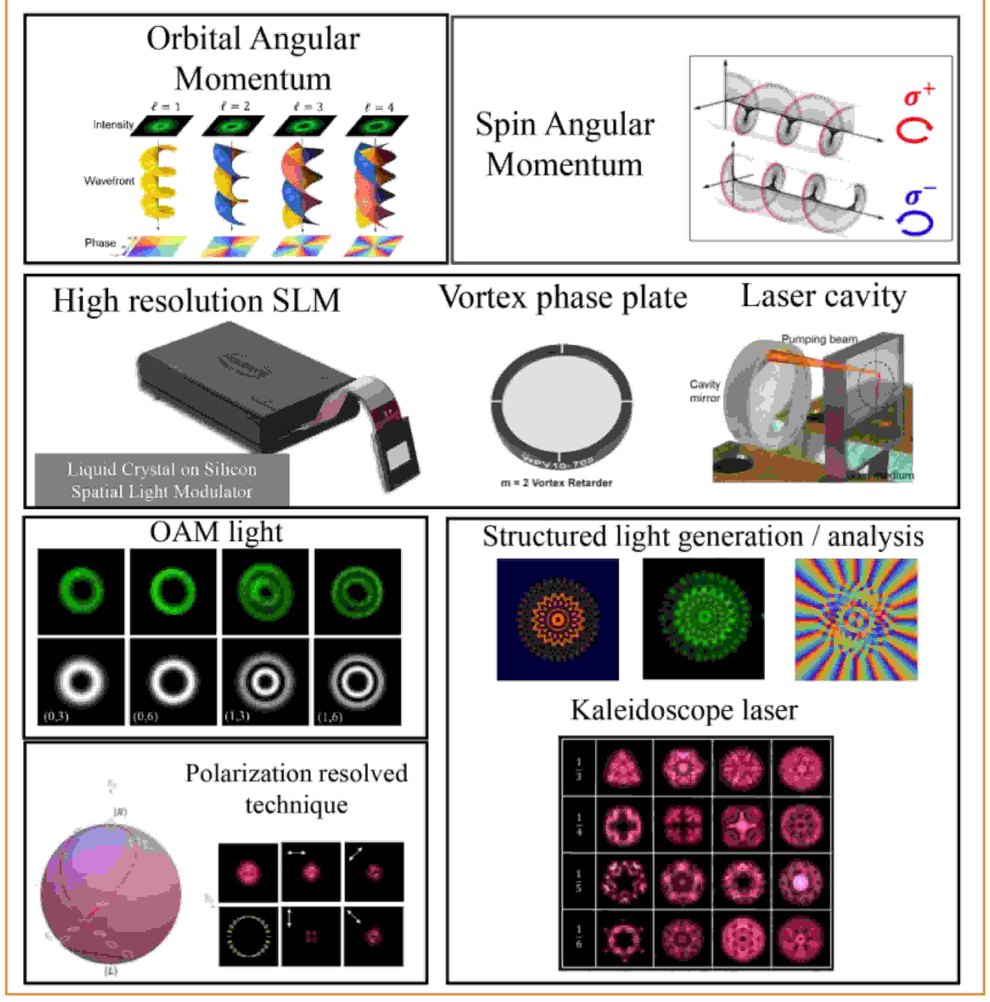
研究重點

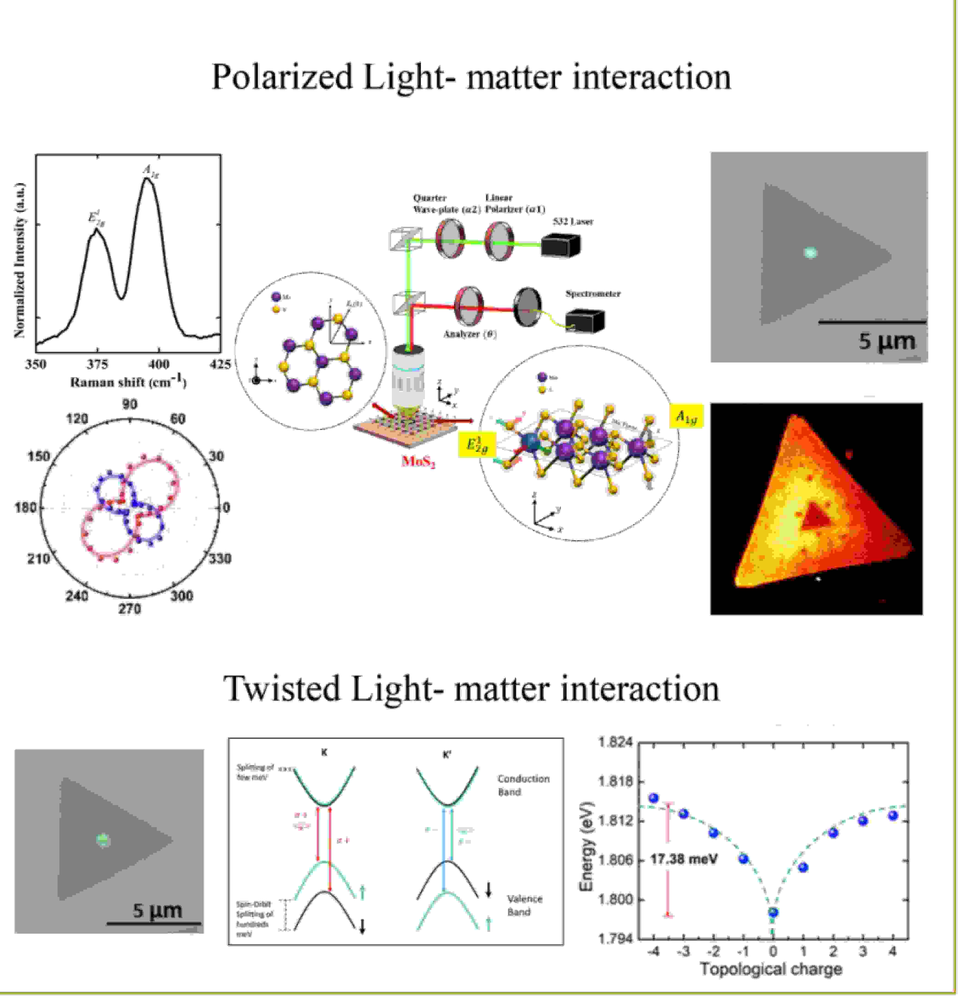
Our work can be divided into two parts. The first part involves the use of the spatial light modulator (SLM) with computer-generated holograms (CGHs), and a hemi-cylindrical cavity to directly generate scalar twisted and structured beams that possess the orbital angular momentum (OAM), spiral wavefront (phase) and optical vortex (singularity). The crucial properties of the generated beams extend its potential applications to various research fields, such as optical manipulation, optical communication, and optical cryptography. Moreover, inserting an interferometer and a mode converter on the existing setup generates both scalar and vector structured light. The second part of the study, on the other hand, utilizes the scalar and vector structured light beam to interact with layered Molybdenum Disulfide (MoS_2). The resulting phonon behavior in the material is analyzed using polarized Raman spectroscopy, and the exciton behavior in the layered material is also observed via the optical spectra induced by the light-matter interaction. These results introduce a probable increase of the degree of freedom in various material science applications.

研究成果

Scalar and vector structured lights



Light-matter interaction



研究生活與心得

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