



Twisted light multiplexer and demultiplexer

BACKGROUND

Twisted light, based on an unbounded set of orbital angular momentum (OAM) modes, has recently been exploited for spatial mode multiplexing in optical communications systems, significantly increasing optical communications data capacity (up to Petabit/s transmission rate).

However, current OAM experiments operate on table-based systems, relying on a bulky, expensive, slow spatial light modulator (SLM) for the free-space twisted light manipulation.

This has inevitably hindered the deployment of OAM multiplexing in optical communications. Recent advances in metasurface technology have allowed the use of ultrathin optical elements to achieve complete control of the amplitude, phase, and polarization of light waves.

OUR SOLUTION

Our OAM light modulator integrates an ultrahigh-capacity OAM-multiplexing metasurface with ultrafast-laser-inscribed photonic waveguides, leading to the world's first all-on-chip OAM light modulator that uses waveguide inputs and outputs to generate and detect OAM modes.

This compact, broadband and ultrahigh-capacity OAM device will allow the parallel generation (multiplexing) and detection (demultiplexing) of a large number of OAM modes, paving the way to deploy OAM multiplexing technology for future communication systems.

APPLICATIONS

- ✓ Free-space communications
- ✓ Fibre-optic communications
- ✓ Research lab settings

BENEFITS

The OAM light modulator can be used for both free-space and fibre-optic communications.

Can be used as a compact OAM light source or detector.

Tunable combinations of OAM modes for generation and simultaneous detection of up to 100 OAM modes.

Substitute for a spatial light modulator in OAM optical systems.

INVENTORS

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INTELLECTUAL PROPERTY POSITION

Australian Provisional Patent filed

PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

WOULD YOU LIKE TO KNOW MORE?

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