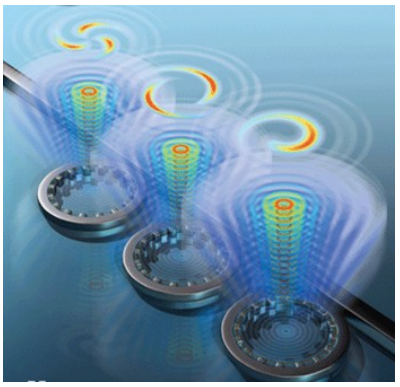
Collaboration/Licensing Opportunity

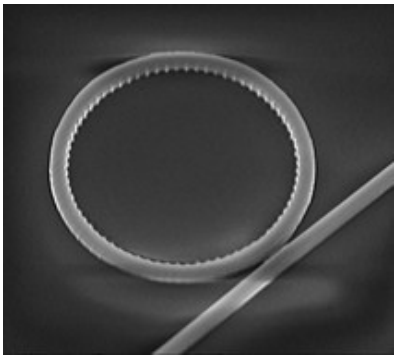
Twisted Light Source

Ref 1796

A compact source of laser light with a specific orbital angular momentum state



The orbital angular momentum (OAM) of light represents a relatively new optical degree of freedom. The simplest form of OAM is an optical vortex, which is a beam of light whose phase varies in a corkscrew-like manner along the beam's direction of propagation. The OAM carried in such a field enables it to trap and rotate colloid particles and living cells as a so called "optical spanner" for use in biophysics, micromechanics or microfluidics. OAM also has the potential to be used in super-high optical data storage, imaging and metrology, or in communications.



The Bristol invention is a novel way of generating light with OAM in a low cost and very compact form that enables integration on a chip. Large arrays of emitters, with different OAM states, can for the first time be fabricated with potential applications in chip to chip interconnect technology and more complex optical manipulation schemes in biophysics. The emitter can be tuned on the chip to emit specific OAM states, and also has the potential to work in reverse to detect specific OAM states.

Key Benefits

- Very compact: 3 orders of magnitude smaller than standard methods of generating OAM.
- Low cost to manufacture – uses standard waveguide processing techniques
- Allows arrays of 1000's to be fabricated – opens up new applications
- Potential to be used with single photons for quantum information applications
- Very fast reconfigurability: speeds of nano-second or faster possible.

Applications

- Chip to chip interconnects using arrays
- Microfluidic and micromanipulation of particles
- Quantum communications with single photons.

IP Status

Patent pending

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