Hollow Core Optical Waveguiding Enabled By Zero-Index Materials

Tech ID: 32900 / UC Case 2022-957-0

CONTACT

Ben Chu
ben.chu@uci.edu
tel: .

OTHER INFORMATION

CATEGORIZED AS

- » **Optics and Photonics**
  - » All Optics and Photonics
- » **Communications**
  - » Optical

RELATED CASES

2022-957-0

BRIEF DESCRIPTION

Researchers at UC Irvine have developed a novel optical fiber technology that uses newly developed “zero-refractive index” material as a guiding medium, overcoming the significant limitations of conventional optical fiber where light properties are limited by glass core material. This novel technology will dramatically improve optical communication transmission speed and power by orders of magnitude.

SUGGESTED USES

This novel optical fiber technology has potential applications in optical fiber communication as well as in laser spectroscopy and optical fiber sensing/imaging.

FEATURES/BENEFITS

·Compared to the widely-used conventional solid core fiber, this hollow core fiber transmits light faster and guides light with much higher power.

·Compared to existing hollow-core fiber designs, this architecture is simpler and easier to fabricate.

·Significant improvements in laser power: high power fiber laser with radiation >1000GW/cm2 for advanced in-fiber laser applications

·Current state-of-the-art’s power range: ~10 GW/cm2

TECHNOLOGY DESCRIPTION

Due to their ability to efficiently transmit data across longer distances, optical fibers are widely utilized in high-speed data transmission applications, such as in high-speed internet. Conventional optical fibers function by transmitting light via reflection between a solid glass core, light carrying material, and cladding. Despite the prevalent usage of these conventional solid core optical fibers, the speed, power, and transmission of light in these fibers are critically limited by the glass materials of the core, cladding, and the guiding mechanism.

Researchers at UC Irvine have developed a novel air-guided optical fiber light technology that employs newly developed “zero-refractive index” material as a guiding mechanism. This novel optical fiber technology will improve next-generation optical communication by orders of magnitude in transmission speeds for long-distance communication and time-sensitive short haul communication such as data center interconnects, high-performance computing, and high-frequency trading. In addition, this technology will lead to the development of record high power fiber laser with radiation >1000 GW/cm2 for advanced in-fiber laser applications such as laser surgery/spectroscopy, laser cutting/welding, and military applications, novel gas-filled/discharge laser (not feasible in glass-based fiber), and in-fiber molecular/gas sensing and laser break-down spectroscopy that require high peak power for plasma creation.

STATE OF DEVELOPMENT

Experimental stage/prototype in development

PATENT STATUS

Patent Pending

UCI Beall
Applied Innovation

5270 California Avenue / Irvine,CA
92697-7700 / Tel: 949.824.2683