



Bright, Tunable, Continuous Wave Coherent Terahertz Source

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an intense, narrow-band, tunable source of terahertz radiation.

Overview

Terahertz (THz) radiation holds tremendous potential for applications ranging from medical imaging technology to security and public safety. So far, the use of THz radiation beams has been limited by a lack of powerful, compact sources and detectors. Additionally, the materials used to generate the beams often absorb much of the THz they produce. THz beams have only been useful for shallow penetration of materials.

The Invention

UW-Madison researchers have developed an intense, narrow-band, tunable source of terahertz radiation. Two THz beams are produced by two pump beams via difference frequency mixing (DFM) in a second order non-linear optical material.

By encasing the optical material between two layers of dielectric cladding material, the researchers were able to dramatically decrease the amount of THz absorbed. The dielectric materials don't absorb much THz, and provide a waveguide structure that helps confine the beam. This makes it possible for the first time to efficiently couple the exiting THz radiation to a flexible guiding structure, much like a fiber optic cable.

Applications

- Terahertz radiation may be useful in many applications, including time-domain spectroscopy, communications, medical imaging, homeland security, airport security, environmental monitoring, astronomy and monitoring for toxic agents

Key Benefits

- Functions continuously and autonomously
- Provides high radiation output in a compact form
- May be operated in continuous-wave or pulsed mode
- May resonate uniquely with biological molecules, allowing early detection of bioaerosols such as bacteria, spores, viruses and pathogens
- May be less biologically harmful than X-rays
- THz sources provide highly sensitive and selective imaging.

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For More Information About the Inventors

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Tech Fields

- [Analytical Instrumentation, Methods & Materials : Spectroscopy](#)
- [Medical Imaging : Other diagnostic imaging](#)

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846

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