Analytical Instrumentation, Methods & Materials

Method of Producing Short-Wavelength Quantum-Entangled Light Beams

View U.S. Patent No. 7,518,784 in PDF format.

WARF: P07323US

Inventors: Mark Saffman, Oo-Kaw Lim

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new approach to generating quantum-entangled light beams.

Overview

Quantum-entanglement is a phenomenon in which the quantum states of two objects become correlated and remain correlated, even when the objects are physically separated from each other. Quantum-entangled light consists of pairs of photon streams in which measuring either photon stream alters its entangled twin, even if it is hundreds of kilometers away.

High frequency quantum-entangled light can be used in high-resolution microscopy, ellipsometry (an optical technique for studying thin films' dielectric properties) and other applications. However, current methods of producing quantum-entangled beams require high frequency input light—double or equal to the desired frequency of the entangled light.

The Invention

UW-Madison researchers have developed a new approach to generating quantum-entangled light beams using second harmonic generation to provide entanglement at short wavelengths. The science is in its infancy, but as it develops, entanglement generated at shorter wavelengths may be important for applications in quantum measurements, quantum-enhanced lithography and ultra-secure quantum communication. Entangled light could also lead to more sensitive medical diagnoses, more powerful computer chips and scalable quantum computing.

Applications

- High resolution microscopy
- Ultra-secure quantum communication
- Medical diagnoses
- Quantum computing

Key Benefits

- Only known means of producing entangled light of a shorter wavelength than input light
- Potential for higher-resolution optics due to shorter wavelengths of light
- Second harmonic generation provides a simplified experimental method of generating quantum-entangled light.

Additional Information

For More Information About This Technology

- Mark Saffman

We use cookies on this site to enhance your experience and improve our marketing efforts. By continuing to browse without changing your browser settings to block or delete cookies, you agree to the storing of cookies and related technologies on your device. See our privacy policy

OK

Tech Fields

- Analytical Instrumentation, Methods & Materials : Microscopy
- Analytical Instrumentation, Methods & Materials : Optics
- Information Technology : Networking & telecommunications

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842

We use cookies on this site to enhance your experience and improve our marketing efforts. By continuing to browse without changing your browser settings to block or delete cookies, you agree to the storing of cookies and related technologies on your device. See our privacy policy

OK