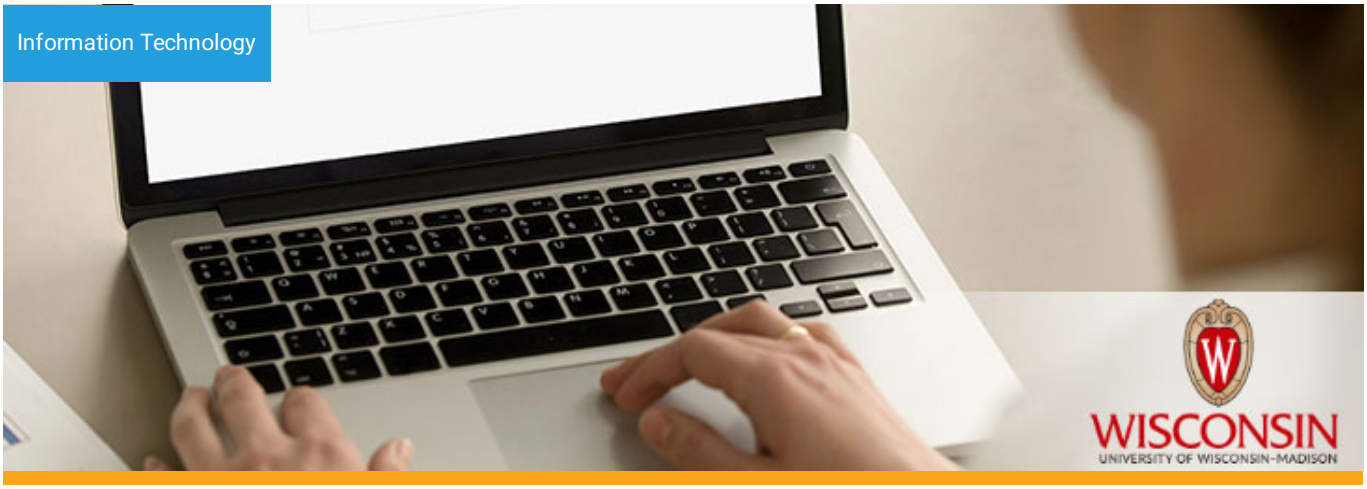
Information Technology



New 2-D Optical Trap Array for Quantum Computing, Sensors

View U.S. Patent No. 9,355,750 in PDF format.

WARF: P140422US01

Inventors: Mark Saffman, Martin Lichtman

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for controlling atomic particles using projected light fields.

Overview

In the field of quantum computing, the performance of quantum bits ('qubits') has advanced rapidly in recent years. In contrast to classical two-state binary systems (0 or 1), each qubit can be a superposition, or combination, of many states.

For example, in some applications, qubits can be individual atoms that are trapped and then controlled using lasers. By manipulating qubits in this fashion, multiple calculations can be performed effectively at the same time, meaning much faster computing and the ability to solve complex problems associated with cryptography, search, simulations and so on.

There is ongoing interest in making optical confinement techniques more stable and scalable, and reducing crosstalk among trapped particles.

The Invention

UW–Madison researchers have developed a new approach for trapping and controlling atomic particles using projected light. Specifically, the new method generates optically induced traps that are more effective and efficient.

The projected light fields may include linear segments of light arranged on a two-dimensional planar grid, which can be used to form optical trap arrays that define the locations of the atomic particles in three dimensions. This configuration helps arrange the atoms in individual and optically defined sites.

Applications

- Quantum computer hardware, simulation, atomic clocks and sensors

Key Benefits

- Improves the performance of quantum computers and sensors
- Traps are more stable, effective and efficient.
- Requires less power to trap each particle
- Deeper traps
- Does not rely on interference effects, unlike other optical lattice designs
- Less susceptible to source phase noise
- More robust

Additional Information

For More Information About the Inventors

- Mark Saffman
- Martin Lichtman

Related Technologies

- WARF reference number P07323US describes a method for generating quantum-entangled light beams.

Tech Fields

- Information Technology : Computing methods, software & machine learning
- Information Technology : Hardware

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