LICENSING OPPORTUNITY: HEISENBERG SCALER

DESCRIPTION

Problem

Entanglement is a valuable resource for quantum technology. In metrology, entangled probes are capable of more accurate measurements than unentangled probes. In addition to using entangled probes to measure parameters of interest, using entanglement to estimate many parameters at once, or a function of those parameters, has recently been an area of interest due to potential applications in tasks such as nanoscale nuclear magnetic resonance imaging. Our protocol and Heisenberg scaler offer reduced noise over performing the same procedure without using entanglement.

Invention

We have created a protocol and Heisenberg scaler that uses quantum entanglement in a network of quantum sensors to optimally measure any smooth function of the fields at the sensors. The method applies even when the fields at the sensors are of different kinds, such as one sensor measuring the electric field and another sensor measuring temperature. The method also applies to arrays of interferometers and to measuring functions of parameters, some of which are measured by qubit sensors, while others are measured by interferometers.

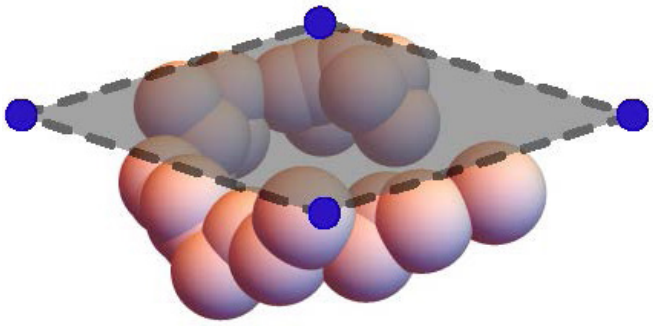
BENEFITS

Potential Commercial Applications

There are a huge number of potential applications from geodesy and geophysics (like earthquake or volcano eruption prediction) to biology and medicine (the sensors can all be separated by small distances and measure temperature, magnetic fields, or electric fields inside a human body).

Competitive Advantage

Superior in measuring properties of inhomogeneous fields or, more generally, functions that depend on more than one measurable quantity.



4 entangled sensors (blue circles) are used to measure properties of a large molecule.

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