Original Research Paper

The Optimal Medium in Which the 'Celalettin-Field Quantum Observation Tunnel' Operates: The Polarised Electron Cloud's Emergence from the Laboratory Based Rubidium-87 to Helium-3; Invizicloud

Metin Celalettin and Horace King

College of Engineering and Science, Victoria University, Australia

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Corresponding Author:
Horace King
College of Engineering and Science, Victoria University, Australia
Eamil: Horace.King@vu.edu.au

Abstract: This study discusses the previously mentioned Polarized Electron Cloud, its progression to 'INVIZICLOUD' as in the real word Rubidium-87 can only be used in the lab, whereas the molecule that is INVIZICLOUD© is made of is Helium-3 mixed with an atomic inert alkaline. It is the medium in which the 'Celalettin-Field Quantum Observation Tunnel' (CFQOT) operates. When a quantum qubit enters INVIZICLOUD© it is proposed that any qubit's ability to function quantum mechanically will cease. The theory, analysis and proposed experiment are proposed in this study.

Keywords: Celalettin-Field Quantum Observation Tunnel, Quantum Entanglement, Quantum Observation

Introduction

The CFQOT is a speculative structure produced in an ensemble of an Orbital Angular Momentum polarized atomic medium, whereby an incoming with enough energy photon, depolarizes either the outer 's' shell electrons is dislodges it as it burrows through the ensemble, creating a tunnel. The depolarized particles when viewed as a single quantum system can theoretically be used to acquire information on the incoming photon. This can be through either imaging, or monitoring the density of the medium or the like which in effect, measures it, meeting Heisenberg's Uncertainty principle's violation. However the information at that point has already been acquired once the photon has entered the medium. The medium of which is a reverse engineered gas designed to work the same way the photodiode detection devices work in the double slit experiment.

This study finds that Helium 3 is not only inert, but has an intrinsic nuclear spin of 1/2 and can be hyperpolarized by spin-exchange optical pumping where the angular momentum of the gas ensemble is transferred through collisions, aligning the nuclear spins with the electromagnet providing for a constant spine polarized ensemble that shows any signs of photoelectric interaction. A photon has a nuclear spin of 1 and when the qubit enters INVIZICLOUD©, it can potentially provide the necessary means for non-equilibrium spin-exchange through optical pumping circularly polarized Helium-3 atoms in the ensemble, tuned to the photon's wavelength, making for the most suitable atom outside the lab.

Discussion

INVIZICLOUD© is the medium in which the 'Celalettin-Field Quantum Observation Tunnel' (CFQOT) operates. It is the gaseous medium in which evidence of a photon interaction are visible through atomic imaging techniques where photocurrents are produced. Depolarization occurs to make way for the quantum entangled photon, releasing energy into other electrons in the ensemble as per hyperpolarization by spin-exchange optical pumping (Salerno *et al*., 2002). The electron hole produced will try to steal a free electron (Gachet *et al*., 2010; Salerno *et al*., 2002).

As the quantum entangled photon boars through INVIZICLOUD©, a CFQOT is theoretically left behind. During the time it takes the electromagnet to repolarize the depolarize particles making up the CFQOT, information has been acquired on the quantum entangled photon is its size, due to the size and diameter of the bored CFQOT and the change in density of INVIZICLOUD©.

At Fig. 1, the 'ingredients' making up INVIZICLOUD© will determine how effective the CFQOT is in causing quantum observation. At Fig. 2, Rubidium-87 is theoretically possible to act as an INVIZICLOUD©, however there is an enormous

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amount of space in between the outer 's' shell electrons and the nucleus, meaning a lot less atoms can be housed in the same amount of space if it were Helium-3, plus Rubidium-87 outer 's' shell electrons are solely relying on the strength of the electromagnet for polarization rather than the crucial attribute of spin exchange optical pumping which means a much lower strength electromagnet can be used, meaning the atoms won't accumulate all at the side of the chamber that the electromagnet is on, dramatically decreasing the amount of medium available to detect a CFQOT.

Helium-3 on the other hand, is different in the sense that not only does it have a full outer shell, but those two electrons are going to naturally be in the most appropriate positions due to their charge, which is at opposite ends of the nucleus. However, again, the most important attribute of Helium-3, is the hyperpolarized using non-equilibrium means for spin-exchange optical pumping (Walker and Happer, 1997). Non-equilibrium means would potentially enable any apparatus to construct an ever self-OAM polarizing ensemble. This is achieved by Coulomb Forces:

$$F = \frac{1}{4\pi\varepsilon_0}\frac{qQ}{r^2} = k_0\frac{qQ}{r^2} \tag{1}$$

Where:

$$\varepsilon_0 \approx \frac{10^{-9}}{36\pi}C^2N^{-1}m^{-2} \approx 8.854187817\times10^{-12}C^2N^{-1}m^{-2} \tag{2}$$

$$k_0 \approx \frac{1}{4\pi\varepsilon_0} \approx 8.987551787\times10^9 Nm^2C^{-2} \tag{3}$$

r is the distance between the two charges q and Q Newtons.

Where for this reason, Helium-3 along with a stable alkaline is chosen as INVIZICLOUD©

In Fig. 2, there is a Helium-3 atom and a Rubidium-87 atom which can both be exposed to the electromagnet. Helium-3 can provide the same polarity requirements except slightly different in that the atom as a whole is able to build the CFQOT rather than Rubidium-87's outer 's' shell electron (Salerno *et al*., 2002). Therefore when Helium-3 is exposed to the electromagnet, it would provide significantly more 'medium' for the same number of atoms in which to build the CFQOT as there are two protons, making the entire atom the detector rather than only the electron on the outer 's' shell.

Given the CFQOT enabling equations:

The γ_{sig} as the wave equation	'existing with (∃)'	$\nabla^2\Psi + \frac{8\pi^2 m}{h^2}(E-V)\Psi = 0$
Mathieu differential equation	'existing with (∃)'	$\frac{d^2y}{dx^2} + [a - 2q\cos(2x)]y = 0$
Lagrangian plasma QED equation	'existing with (∃)'	$\mathcal{L}_{sQED}$
Lorentz quantum parameter causing OAM polarization (Spin-Spin Coupling)	'existing with (∃)'	χ
Time it takes the electromagnet to re-polarize the depolarized atoms	'over'	t

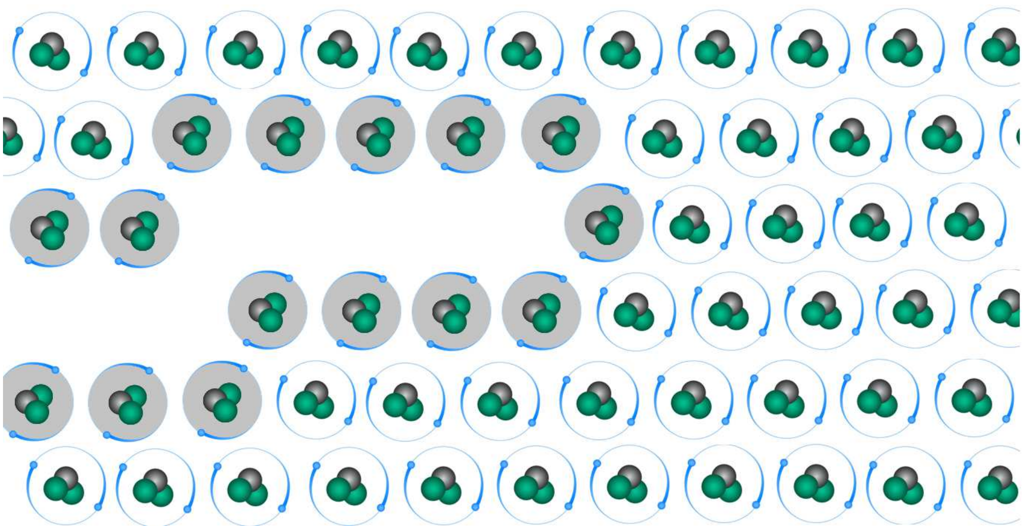

Fig. 1: 'Celalettin-Field Quantum Observation Tunnel' (Helium-3 atoms in grey have been depolarized)

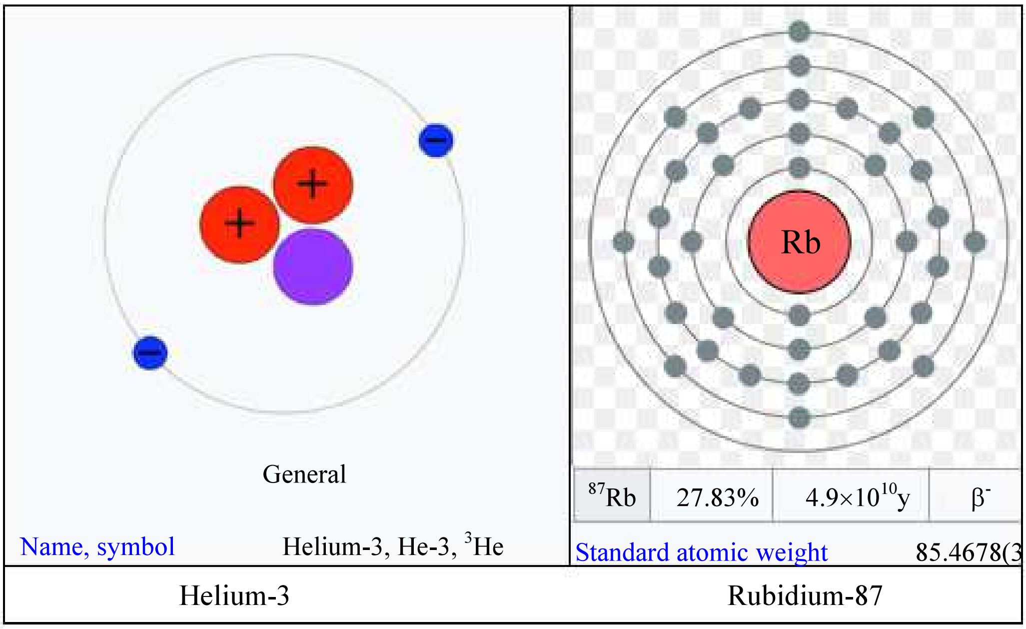

Fig. 2: Atomic Helium-3 and Rubidium-87 isotopes

Given the Boltzmann equation for a plasma to accommodate the density of the environment in which the photon-electron interactions will occur in the presence of an electric field:

$$n_e(\phi_2) = n_e(\phi_1)e^{e(\phi_2-\phi_1)/k_BT_e} \quad (4)$$

Where:
n_e = Electron number density
T_e = Temperature of the plasma
k_B = Boltzmann constant
φ = Work function

As part of the Lagrangian Formulation of Strong-Field QED in a Plasma, the electron number density increases rapidly which explicitly correlates to the effectiveness of INVIZICLOUD© to cause quantum observation, as it is the entire Helium-3 atom working rather than only the electron on the outer 's' shell of a Rubidium-87 atom (Steck, 2001).

As electron radius (r_e) is given by:

$$r_e = \frac{1}{4\pi\varepsilon_0}\frac{e^2}{m_ec^2} \quad (5)$$

$$r_e = 2.8\times10^{-15}m \quad (6)$$

Where:
e = Electric charge
m = Mass
ε_0 = Permittivity of free space

Rubidium-87: We can assume that $2.8*10^{-15}$m of "medium" per 4.94 Ångström + the space in between atoms. Helium-3: We can approximate that the amount of 'medium' is 1 Ångström + the space in between atoms, the entire diameter of a Helium atom. The way to investigate is using the Compton scattering equation, given:

$$\lambda' - \lambda = \frac{h}{m_ec}(1-\cos\theta), \quad (7)$$

Where:
λ = The initial wavelength
λ' = The wavelength after scattering
h = The Planck constant
m_e = The electron rest mass
c = The speed of light
θ = The scattering angle

Spin-Exchange Optical Pumping Helium-3

Helium-3 nuclei has an intrinsic nuclear spin of 1⁄2 and can be hyperpolarized by spin-exchange optical pumping (Salerno *et al*., 2002; Walker and Happer, 1997). During this process, circularly polarized infrared laser light excite electrons in a sealed glass vessel. The angular momentum is transferred through collisions, aligning the nuclear spins with the electromagnet (Walker and Happer, 1997). A photon has a nuclear spin of 1 and when the qubit enters the INVIZICLOUD©, depending on its power, it could provide the necessary means for non-equilibrium spin-exchange optical pumping, circularly polarizing affected Helium-3 atoms, tuned to the

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photon's wavelength. This would be an additional attribute to the previous means described by Compton scattering making Helium-3 the element and isotope of desire beyond a doubt (Dehlinger and Mitchell, 2002).

Proposed experiments have been designed to test the validity of the 'Celalettin-Field Quantum Observation Tunnel' which in time will be tested. As well as the Electron hole theory where phase changes (physics) are perhaps something that can be applied to quantum mechanics except like chemistry phases, the laws that govern the changes need to be a focus.

Proposed Experiment

At Fig. 3 and leveraging off 'Entangled photon apparatus for the undergraduate laboratory' which describes an almost identical source of entangled photons (Dehlinger and Mitchell, 2002). Quantum entangled photon pairs would be generated from a pump beam at 1mm diameter, 5 mW, 200 nm, using an InGaN laser diode (Nichia Model NLHV500C) using a type-I spontaneous parametric down conversion in a two-crystal geometry with two nonlinear beta barium borate crystals. One of the entangled particles would be directed straight into a first SPCM-AQR-13 silicon avalanche photodiode detector, while the entangled partner pair directed through a chamber filled with an optically dense ensemble of atomic Rubidium-87.

The atomic Rubidium-87 would be OAM polarized with a non-homogenous, vertical magnetic field, effectively polarizing the random OAM's of their outer 's' electrons, before continuing into a second SPCM-AQR-13 photodiode detector.

Data on the number of coincidences would be collected through the photodiode detectors. The data would show that either the second detector is detecting photons from the initial pump beam, meaning that quantum observation has not occurred, or that there will be next to zero detections signifying that INVIZICLOUD© has acted as a quantum observer. A camera could be considered to record fluctuations in INVIZICLOUD© density as the γ_{sig} tunnels through.

The laser diode would beam a 200 nm pump through a collimating lens and a blue filter, before a beam aperture, laser polarizer and quartz plate. The mirror would direct the beam through the beta barium borate down conversion crystals where quantum entanglement is achieved.

A rail will direct one entangled photon through a first polarizer, Idris diaphragm, red filter, focussing lens and then through a cage assembly before hitting the first detector. The second rail would direct the beam through another polarizer Idris diaphragm, red filter, focussing lens and through a cage assembly then directing the beam through the Rubidium-87 chamber fitted with a non-homogenous vertical magnetic field before hitting the second detector.

The two detectors will count the number of coincidences and the data will be used for analytics, using a very simple frequency counts methodology to avoid any human manipulation of the data such as an advanced regression statistical analysis. Rather than count the number of photons emitted from the laser, the pump will run for a period of time for a number of experiments to assess the consistency of the results. It is proposed that the number of detections at the second detector will be next to zero.

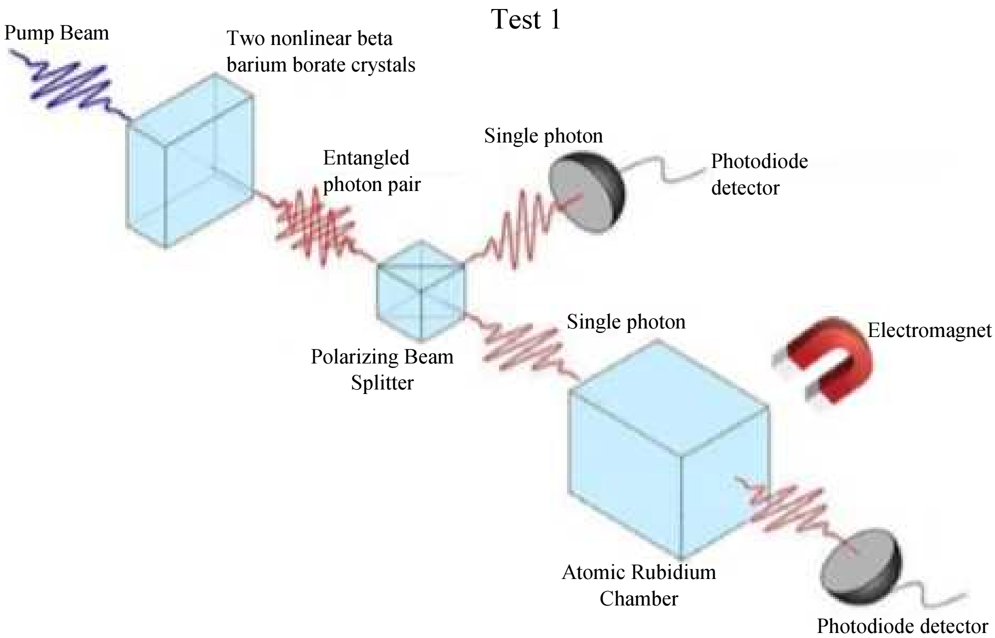

Fig. 3: Condition 1: Electromagnet present; CFQOT is OAM polarized

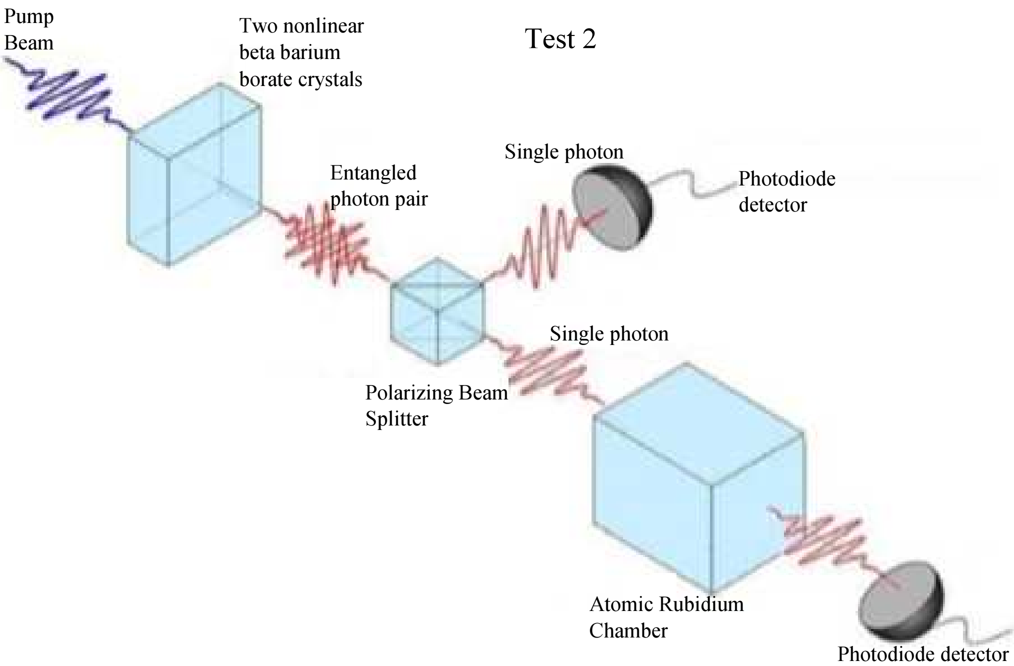

Fig. 4: Condition 2: Electromagnet not present; CFQOT is OAM unpolarized

At Fig. 4, the electromagnet has been removed, meaning the INVIZICLOUD© is not OAM polarized and is therefore simply an ensemble of non-polarised electrons. This is to test whether it is the CFQOT through the INVIZICLOUD© that causes quantum decoherence or not. All other features and conditions will be identical with Test 1.

Quantum entangled photon pairs would be generated identically to Test 1. One of the entangled particles would be directed into a first SPCM-AQR-13 silicon avalanche photodiode detector, while the entangled partner pair is directed through a chamber filled with a non- INVIZICLOUD©. The results of both tests would be compared and considered.

Conclusion

The purpose of this research has been to determine the atomic medium that is most appropriate for a CFQOT. The CFQOT operates similarly to the photodiode detector used in the double slit experiment and is 'the other' way we can detect the presence of photon using a second type of detection device. The most suitable medium to make up the atomic CFQOT medium, namely 'INVIZICLOUD©' is Helium-3, as is has the inert properties of Helium. However most importantly it can be hyperpolarized by spin-exchange optical pumping where circularly polarized infrared laser light can excite electrons in a sealed vessel. The angular momentum is transferred through collisions, aligning the nuclear spins with the electromagnet, meaning the electromagnet can be much weaker than when Rubidium-87 is used and will prevent all the atoms accumulating on the side of the chamber next to the electromagnet. An experiment with a test and a control test is also designed to test the validity of the CFQOT.

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Author's Contributions

All authors equally contributed in this work.

Ethics

This article is original and contains unpublished material. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.

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