Quantum Supremacy

Versus IoT Conspiracy in Smart Cities

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Abstract—**It seems world organizations, because of Covid-19 disaster, are oriented considerably into smart cities quarantine capabilities, digital electronics interactions and digital economics. In this paper, we've tried to challenge IoT 5G systems in smart cities from both cultural and technological viewpoints. Although we should not be pessimist about critical situations we're encountering in realization of smart cities, But we must be realist about serious dangers and high price of invasion of privacy in IoT systems. They could probably play major roles as command centers for organized international systematic crimes which will threaten human citizens. We should prepare ourselves technologically for this kind of conspiracy and how to solve this cultural problem. In this study Quantum Photonic Computers (QPC) are basically suggested as alternatives to defeat misusing of IoT -5G networks. It's directly related to our national security, specifically for non-anglophone nations. QPC, will work differently in comparison with classical digital computers. They work much more similar to human brain. Because physical properties of materials have been taken into account. We've used time-domain statistical dynamic Montecarlo method for our simulations of Photons' quantum switch behaviors. Errors in our estimations, compared with experiments, always are much less than or at most five percent. In contrast with classic computers that works symbolically, QPC will act physically according to quantum properties of real materials. In contrast with Digital computers that are human oriented, Quantum computers are nature oriented. For this nature friendly reason of QPC, they'll act as good alternatives in future 6G networks to avoid misusing 5G IoT revenues.**

Keywords—*quantum photonics, internet of things(IoT) conspiracy, smart cities, security, privacy, artificial intelligence(AI), neo-slavery, intuition physics, bohmian mechanics, causality, hidden variables, short range interatomic forces (SRIF), nano-refraction(NR)*

I. INTRODUCTION

Human brain works according to three major elements: sentiment, logic and wisdom. The first two elements exist both in human and animals creatures. But third one, related directly to what we call it thinking process. It's obvious that our thinking is deeply affected by sentiment and logic. But wisdom, is in higher hierarchy. Of course we have not an engineering absolute definition about wisdom. Because we do not know it definitely. Wisdom potentially exists in our minds, but not necessarily actually! In our decision making, many times we, bypass wisdom and behave like a logic machine. Like a robot. But this is not thinking process. Technologists in the field of Artificial Intelligence (AI), have dreamed for more than half a century of autonomous thinking machine. There's no hope for making it using digital classical computers. They will never replace human mind in thinking [1]. According to wisdom, human mind has an intuitive intelligence cognition and consciousness that digital machine deduction system can not match. We should abandon some dogmas both in physics and computer technology: "Duality" in physics and "Classical digital hardware" both have failed when being applied in thinking process. No matter how many billions of dollars , world governments, invest in them with intense persuasions of pseudo-scientists. They may persuade many people to switch-off their wisdom capabilities and behave such a logic machine. This action is peudo-science or induced science! Governments may control easily such persons definitely by IoT 5G networks. But it's impossible to control persons with their wisdom capabilities that are actually switched-on! They always may find new quantum ways using their own creativities. This is Quantum Supremacy which belongs to people who really think and use ethics in decision making.

Supra-national organizations like Five Eyes, have powerful potential temptations to control our planet earth [2] and even announce war against nature. This temptation made them to fall in trap of some pseudo-advisors that insist on violation of nature laws by using AI capabilities. It's in contrast with our national security considerations.

Pseudo-experts are misusing symbolic classical computers even against nature. Unfortunately, they have convinced many international organizations for using AI for controlling all of people in the world. It does not work perfectly. AI machine is basically a logic instrument using Boolean Algebra in it's hardware. As mentioned before, thinking is not basically a logic specialty. We can not substitute it with learning, deep learning and deduction artificial systems.

We can not substitute world Creator with world management system! This ill management threaten the earth and should be reconsidered. Or else world super powers will be defeated soon by mother of nature. She knows well how to behave with those kinds of creatures!

This paper consists of a mixed cultural-technological debates and discussions for quantum physics supremacy against misusing IoT 5G symbolic systems. In section II, we'll discuss why digital computer can not think and is unable to navigate smart cities from human hierarchy. In subsection II-A, We'll introduce a probable scenario for misusing digital IoT 5G networks against humanity and ethics. The cultural section II will be terminated in subsection II-B, where we'll discuss how smart cities will be converted into spy cities. In section III, nature oriented quantum computer will be introduced. Comparison between digital CPU and Quantum CPU, What's a quantum CPU and what are quantum memories and input/output devices, all will be discussed in subsections of III-A,B,C. We'll also have a conclusion section.

II. DIGITAL CLASSIC MACHINE CAN NOT THINK

Although we should not be pessimist about situations we're encountering in realization of perfect smart cities, but we must be realist about some probable threats and dangers that exist in such cities.

For a moment, imagine a smart city be controlled by black hackers and be a command center for criminals. It's obvious that 5G internet will be dominant in smart cities. Late physicist professor Stephen Hawking alarmed in an interview before his death in March 2018: "….internet has speeded the communication research but a high price of invasion of privacy. Internet has brought a lot of benefits but it has drawbacks dangerous such as pornography and some… messages. The internet has become the command center for criminals and terrorists. With sacrificing freedom and privacy. Development of full Artificial intelligence could spell end of the human race…" [3]. See fig.1.

Fig.1 Stephen Hawking alarmed in an interview with BBC: "…Internet...With sacrificing freedom and privacy. Development of full Artificial intelligence could spell end of the human race…" [3].

The first step in realization of smart cities is applying AI and internet of things (IoT) for controlling the city. Unfortunately pseudo-scientists have exaggerated about AI – IoT capabilities. They have dreamed for tens of years of autonomous thinking machine. Their guidelines as major advisors of world governors and managers have convinced earth super powers to spend billions of dollars in this field and making thinking machine. There's no hope that scientists be able to develop digital classic machines, capable of thinking process[1,4]. Fortunately they will never replace human mind in thinking. Since we ourselves are not logic machines: "I'm not a robot!'

Insisting on replacing human management with IoT machines in smart cities is now a serious threat to human race on the earth. This is a big mistake that we assume thinking machine can be made by logic.

A. A Satanic Temptation

During an internet attack by black hackers from abroad, devil persons will take the control of smart city. Citizens will be under the surveillance of them. You can not see them. They're behind the cameras and can see people one by one. They will be able to force or persuade citizens for doing guilty actions, a satanic temptation: "….For he (satan) and his tribe watch you from a position where you can not see them…" [5]. Nobody can complain. Since the answer is: " AI machine decided about and it's decision is logical and perfect!" As a result, a smart city will easily be converted into giant prison for vast amount of it's citizens that are made and used to act as guilty persons. They're used to waste times with lies and rumors in social networks. So, they'll have the merit to be in quarantine and be prisoned and even be dead. Since

they're made to do guilty actions, to spy one another and be suspicious according to duality in smart city. Although these actions are forbidden according to ethics: "… avoid suspicion as much (as possible): for suspicion in some cases is sin: and spy not each other nor speak ill of each other behind their backs…" [6].

According to this satanic scenario, "Truth", will be lost. Only conjecture exists: "… but they have no knowledge there in. They follow nothing but conjecture; and conjecture avails nothing against truth…" [7].

Citizens in such a situation in smart cities are no more than modern slaves and IoT conspiracy serves as neo-slavery.

B. Smart Cities or Spy Cities

When first artificial woman-like robot called "Sophia", revealed in united nation on 2017 [8], several days later, one of Arab countries gave it citizenship. The first robot to receive citizenship of any country! In Nov. 2017, Sophia, as first non human to be given any united nation title: First ever innovation champion! [8]. See fig.2. Sophia uses AI, visual data processing and facial recognition. It imitates human gestures and facial expressions. It's able to answer certain questions and is designed to get smarter over time. Citizenship of "Sophia", means no one is permitted to harm it. Or else he should be condemned in court of justice and punished.

Fig.2 "Sophia" robot in united nations in 2017; the first robot to receive citizenship from an Arab country. [8]

But this scenario is not repeated when one billion of animals were killed in Australia Bushfire last Jan. 2020. No one accepted responsibility. No governmental resignation and court of justice punishment for such a disaster! 186000 square kilometers of forest and animals inside in south east of Australia near Melbourne smart city were burned entirely [9]. See Fig.3. 183 persons were arrested in charge of alleged arson. But main reason were announced only lightning strikes and climate change. No serious punishment announced neither in Australia nor in previous Amazon [10] and California Bushfires in 2018 and 2019 [11].

Fig.3 Billion of native animals like Kangros and Koalas were burned in Australia bush fire near Melbourne smart city. In contrast with Sophia robot, nature animals had not received any citizenship to protect themselves! [9]

Does it mean native animals in forest are vain and useless? No serious reaction against such animal massacre is observed to prevent occurring similar future disasters. Does it mean that some Satan like forces deliberately kill animals and substitute them with AI robots? Native animals in forest are not programmed for spying. Does it mean they are vain creatures? But robots are good instruments for spying targets?

Isn't it announcing war against Nature? Annihilation of nature animals and substitution by artificial robots? What will be the next step? Changing burned forest into smart city or other human oriented centers? This Satan force has the ability for worldwide experts immigrations for settling in smart cities as cheap labors for developing more advanced IoT productions for more powerful global surveillance and spy. This is positive feedback. It can not be stabilized and will not last long. Although no human court of justice do seriously for devil persons any punishment, but mother of nature will react certainly. This is oppression against nature, earth and of course IoT conspiracy against humanity.

Unfortunately, many of such disasters are occurring in the domain of some supra-national intelligence organizations which claims they're civilized [2]. They are annually expanding their surveillance capabilities with much emphasis placed on monitoring world wide web [2] and of course by using IoT in 5G systems.

What will be the other next steps? Deleting human individual freedom on earth? AI robots survey all the times the people of the world, like jailers and human are their prisoners!

This method of ill world management supported by ill pseudo-advisors, violates ethics and push international organizations like Five-Eyes (FVEY) into perdition and destruction.

Many people will certainly resist against guilty actions and naturally have not merit to be prisoned by robots. ECHELON surveillance system of FVEY at the age of cold war is now converting into global quarantine survey system. Fortunately this action can be prevented using higher advanced technological systems which may be called 6G Quantum Supremacy. It should be part of our nation security. Specifically in non-anglophone countries.

III   Nature Oriented Quantum Computers

We're now in starting point of quantum supremacy to build quantum computers (QC). So, a theoretical roadmap is required. Experimental works in QC is ahead, in comparison with theory. To develop theories in this field, we should reconsider our scientific belief specially in dual nature of light [12,13]. For example it's necessary to justify nano-refraction (NR) phenomenon in nanometer scales. nano-refraction (NR), is a basic concept in developing quantum photonic computers (QPC). NR is quite different from classical macroscopic refraction. It plays major role in photon deflection, when it travels in few atomic layers from the interface between two transparent solids. To describe NR, mathematically, quantum electrodynamics (QED) may help. But QED, only can describe how NR occurs in Hilbert space and does not explain why it happens in Real space? Why atto-second optical pulses are squeezed in kilometers long optical fibers coiled in first reported development of QC in 2020 [14]. So, "duality should be abandoned [1]. Then "causality" and intuition physics will help us. In this section, we introduce quantum photonic (QP) theoretical approach for answering why?

QP is based on Bohmian mechanics [15,16] with intuition physics belief and causality. Almost every time we've tried to have basic criticism versus duality and it's incomplete scenario in quantum mechanics (QM) [17], because of some kinds of dominant dogma about QM, a huge amount of resistance inertia have been encountered! Bohm theory in shadow of QM, has been mostly ignored and even boycotted during last 70 years. QP corpuscular viewpoint about the nature of light, estimates both physically and mathematically with enough quantitative precision, that flight route of photons in first few atomic layers from the interface is not abruptly refracted. As in the case of Snell's refraction law [1,13]. Instead, NR happens gradually in atto-second regime (See fig.4). Finally it asymptotes to macroscopic refraction, in large space-time scales according to "Correspondence" principle.
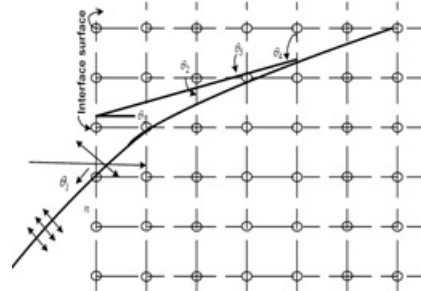

Fig.4 Nano-refraction gradually happens in attosecond time scales, during flight route of photon in first few atomic layers from the interface.

Deflection of light occurs in interatomic distances inside of a real material. It works well according to causality. Nature supports it. So QC which works based on QP, may not be misused in form of IoT human oriented conspiracy, mentioned in previous section. In quantum photonic computer (QPC), It's "Truth" that will be dominant! Of course politicians and Hollywood actors may not be satisfied at this real scenario. Because they all are interested in duality, not causality. In this route, we must do our best to find truth. Optic routes in optical materials does not happen in Hilbert but in Real space, with some "Hidden Variables".

A. Quantum CPU versus Classical CPU

In classical digital computers, central processing unit (CPU) were required. It may consist of sequential (Von-Neumann) or parallel (non-Von Neumann) architectures. Processing were executed by clock pulses in CPU. So, AI, IoT, Deep learning, Deduction systems, can all be virtualized, symbolically in CPU. From early pedagogic developed robots PARS-1B (See fig.5) in Sharif University of Technology in 1986 [18], up to most advanced developed robots like Sophia(fig.2) by Hanson Robotics in 2017 [8,19], all follows the same logic principles. Because their hard wares are working according to Boolean Algebra.

Any social surveillance, like traffic controllers in smart cities, intelligent mobiles and so on are in responsibilities of digital CPU. It's inherently a logic device. A logic machine has it's own intrinsic weaknesses. Specially in decision making, where a logic machine does not necessarily satisfy wisdom procedure. As mentioned earlier, wisdom and logic both exist in human brain. But thinking process belongs mainly to wisdom. It's according to cognition and consciousness which certainly can not be simulated by a logic machine. [1]

Basically, it's not still obvious whether we'll finally be able to make a thinking machine, but proposing a quantum CPU, will be a step more powerful toward it's realization.

A quantum CPU should imitate physically, not symbolically what's happening in human brain. So, brain physical shape, materials made from, method of interconnections, all should be taken into account. [1] Bio-photonic, bio-electric and bio-chemical methods of interconnections between nervous cells in human brain, work differently in comparison with a logic CPU, which behaves intelligently, but not with cognition and consciousness. So, a quantum CPU must be more powerful than logic one. It follows the nature physically. It's nature oriented. Not human oriented of digital symbolic CPU. Nature consists of real matters (atoms). Where atoms interact physically with each other. They behave according to rules of quantum theory. So, simulation of brain's behaviors for making an advanced surveillance machine in smart cities, requires quantum CPU [20,21]. Fortunately, it's not human oriented and works according to nature laws and can not violate them and easily be misused by black hackers.

B. Main features of Quantum Photonic CPU

A quantum photonic CPU will use photons as carriers with highest imaginable speed on the order of 0.3 mm per picosecond. Quantum CPU will work according to quantum photonics [13]. In QP, we've four main postulates[12]: First, knowledge of real shape of molecules in 3D spatial coordinates. Second, knowledge of physical shape of materials lattice. Third, precise estimation of Short Range Interatomic Forces (SRIF) between atoms or molecules in a real material. Fourth, space-time analysis and simulation of electron-photon interaction and prediction of photon trajectory when travels inside the matter[12].

Moreover in QP, light itself is assumed to be a stream of billions of photons as particles. Each photon has quantized energy according to Planck's formula ($E = h.\nu$). Photon has zero rest mass and potential energy. Carries momentum and has it's own electric and magnetic fields. It's electrical field has penetration depth on the order of it's wavelength and travels in vaccum at speed of 300,000 km/s. But in transparent solids experiences some kinds of retardation in every molecular layer of material [22,23,24,25].

Equation (1), shows the total time, which takes for photon to travel through a transparent media [13,25]: (see also Fig.6)

$$T = \frac{L}{C_0} + \sum_{i=1}^{N} \tau_{di} \qquad (1)$$

Where "L" is the material length. Travelling time of photon may be assumed as the sum of time that photon spends to pass through the intermolecular (inter-atomic) empty space and sum of N atomic layers photon- matter interactions. The index of refraction is the ratio of C_o (vacuum velocity of the light) over the average velocity of light in the medium for large values of N (number of interactions), so:

$$n = \frac{C_o}{C} = 1 + \frac{C_o}{L} \sum_{i=1}^{N} \tau_{di} \qquad (2)$$

If now, we consider "τ_d" as the mean retardation time per interaction and "d", as the mean free pass between two successive interactions, we have:

$$n = 1 + \frac{C_o}{d} \tau_d \qquad (3)$$

$$\text{(where:} \quad \tau_d = \frac{\sum_{i=1}^{N} \tau_{di}}{N} \quad ; \text{and} \quad d = \frac{L}{N} \text{)}$$

During the interaction, as seen in fig. 6, at first, the photon, annihilates and gives it's energy to the electron in the lowest energy level and perturbs it. Since the energy of annihilated photon is not sufficient to transfer the electron to a higher allowed energy state, the perturbed electron returns to it's initial orbit after a transit time, which we call, τ_p. ultimately the photon recreates.
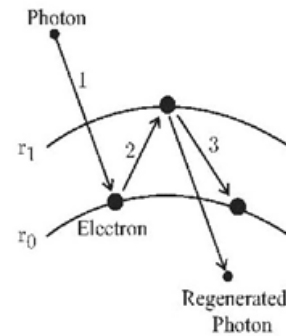

Fig.6 Photon Electron interaction during Annihilation(1), Perturbation(2) and Recreation(3) steps.

Therefore, the retardation time τ_d, for a more precise estimation, may be considered as the sum of photon annihilation time marked "1" in figure 6: τ_a, electron perturbation time marked "2": τ_p and photon recreation time marked "3": τ_r [25,26]:

$$\tau_d = \tau_a + \tau_p + \tau_r \qquad (4)$$

Generally these quantities can be considered as functions of wavelength but, for simplicity as a first- order approximation, we neglect first and third terms since they are estimated to be on the order of zepto-seconds. But according to Quantum Photonics assumptions, second term or perturbation time, will be in the range of atto-seconds [13].

Since quantum photonic CPU is based on Bohmian mechanics, An important hidden variable in QP, is Short Range Interatomic Forces or SRIF. We've estimated SRIF for example for an Orthorhomic lattice as:

$$F_i = F_o.(\sum_{p=i}^{\infty} \frac{1}{p^r} + \sum_{p=i}^{\infty}\sum_{m=1}^{\infty} \frac{2.p.a^{r+1}}{(p^2.a^2+m^2.c^2)^{\frac{r+1}{2}}}$$
$$+ \sum_{p=i}^{\infty}\sum_{n=1}^{\infty} \frac{2.p.a^{r+1}}{(p^2.a^2+m^2.b^2)^{\frac{r+1}{2}}} + \sum_{p=i}^{\infty}\sum_{m=1}^{\infty}\sum_{n=1}^{\infty} \frac{4.p.a^{r+1}}{(p^2.a^2+n^2.b^2+m^2.c^2)^{\frac{r+1}{2}}}$$
$$(1) \ [13]$$

where "a,b,c" are lattice constants and "m,n,p" are some integers [13]. For justification of nano-refraction, we've already shown there's a resultant force between columbic mother atom force and SRIF [13], causes kind of deflection of photon when interacts at i'th layer from the interface between two different transparent materials. This is an intuition scenario for nano-refraction. Figure 4 and table-I, show final results of Nano-Refraction (NR), obtained in our simulations. It's based on Quantum Photonics, a physics-mathematics model, described in details formerly at this section. Results are estimated for typical orthorhombic transparent material with different refractive indices between n=1.5 up to 3. Calculations in nano-scopic and atomic scales have used time-domain Montecarlo method and equations (1) to (5) and also [13]. QP simulation output NR angles in comparison with macroscopic refraction law (Snell), show successful compatibility as seen in table (1). Errors are always below or at most 5%.

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Input angle (deg.)	Output angle QP treatment	Output angle Snell' law
10	6.65	6.64
20	13.19	13.18
30	19.50	19.47
40	25.43	25.3
50	30.80	30.70
60	35.39	35.26
70	38.94	38.78
80	41.09	41.03
85	41.30	41.61

Table 1. Q.P. in comparison with Snell's law(n=1.5)

C. Quantum Memories and I/O

A quantum computer also requires optic and photonic three dimensional spatial memories and interconnections [27,33]. Holographic memory in QPC should be able to save both magnitude and phase of input signals in 3-dimensional volume made from photo-refractive materials [27,28,29,30]. Data signals can be saved in 3D space domain in these materials, where we call them Holograms (see Fig. 7).

Data may also be saved in spatial frequency domain, where we call them optical Vander lugt filters, phase only optic filters, etc. These kinds of memories both Holographic (see Figure 7), [29,30] and Vander lugt[31], are able to store vast amounts of data, voice or images in physical volume of materials. They're made from photo-refractive materials. It means applying suitable external electric field, for example in visible region, may alter material's optical properties like index of refraction. In turn, they cause a kind of optical

Figure 7. Holographic storage: 3D reconstruction of David statue of Michelangelo, developed by Author in PRL-E.E.Dept., Amirkabir University of Technology.

storage for a limited time, from fractions of second up to several minutes, hours, days or even months. Inorganic materials like KDP, BaTio3 …. crystals or organic crystals like 2-cyclooctylamino-5-nitropyridine doped with 7-7-8-8-tetracyanoquinodimethan [27,28,32]. Photo-refractive effect formulation for QPC 3D memories, has been described theoretically using Kukhtarev equations[27,32]. Their applications are in high speed real time complex images correlations as in human face and alphanumeric symbols recognition. We've successfully developed hybrid optical computers for machine vision and recognition [27,31]. Dynamic data storage and retrieving optical bit storage signals are main features necessary for making real time QPC. It's already been studied that brain in pattern storage, behaves very similar to holograms [4]. Other alternative for temporarily data storage in QPC is called Slow Light optical bit memory. Quantum storage of light in atomic sodium vapor at very low temperatures (even micro-Kelvin) has already been reported experimentally [34,35]. We've successfully explained this kind of storage theoretically according to Quantum Mechanics [36]. It's a kind of quantum entanglement of photons for example in Sodium or Robedium vapors at very low temperatures. QC memory is also available in semiconductor solids [37,38]. Slow light devices can also be applied as optical delay lines. Some known optical properties like Stimulated Brillouin Scattering (SBS), Stimulated Raman Scattering (SRS), Electromagnetically Induced Transparency (EIT), Coherent Population Oscillation (CPO) may be used in some nonlinear- dispersive optical devices to realize light speed reduction. We've already successfully simulated and analyzed such devices for designing new optical bit memories [39,40].

In QC, man-machine interface must be more user friendly. Besides, computer size and it's hardware electronic components should be minimized or even be eliminated. Limited reliability of a real keyboard causes thinking about

optical virtual keyboards illuminated by a laser beam as input device. As can be seen in Fig.8, Schema of a keyboard pattern can be projected virtually by laser on table, wall or even in the air.

On the other hand, display devices are used as output. In QC, 3D display devices are suitable choices [41,42].At this technique, volumetric displays have already been developed: volumetric pixels or voxels. Volume is swept by laser array 3D-6400 frame per second instead of 24 frames in 2D images. All of such voxels should be processed using Digital Light Processing technology (DLP). It means processing from ten thousand up to 100 million voxels, using millions of micro-mirrors fabricated by Micro Electro Mechanical System (MEMS) technology with the rate of 2-3 Gigabytes per second. Holography can also be used as display device: optical 3D holography.
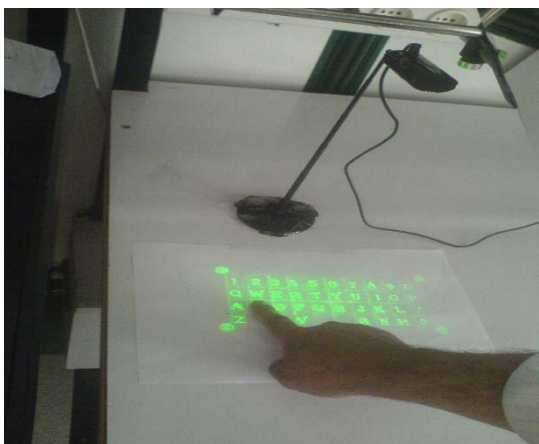

Figure 8. A virtual optical keyboard illuminated by 550nm Green laser. Developed by M. Farhadi, in PRL-E.E.Dept., AUT, year 2009.

II. Conclusions

Anti-rabies vaccine to treat terrible decease of rabies discovered by Louis Pasteur in 19'th century. This great French scientist saved lives of many people since then by this method of treatment in rabies and other diseasing. Human world honor on him. Because of his ethical scientific attempts, world population is now increased to some extent that it seems modern pseudo-scientists, have convinced world management system to act in apposite direction! For population size reduction, the worst way will be violation of ethics and persuade people of the world to do guilty actions to obtain merit to be quarantined by IoT. This is ill management and should be stopped. Quantum Computers have potential capabilities for neutralizing IoT conspiracy in this way. In QPC, photons as signal carriers deviates inside quantum matter it's made from. SRIF have major roles in such nanoscale deviations. What we should do in this real scenario will be tracking photons as message carriers and interconnect optical signals even in attosecond time scales.

This theoretical intuitive viewpoint, introduces a powerful tool for executing huge amount of mathematical calculations, but physically. QPC realization still does not mean we'll be able to realize thinking machine. Since we're not thinking

instruments, as some researchers claims [43]. However, it seems emotional intelligence may be explained now in more details. AI incomplete story will no more be misused in IoT. It will experience one more powerful step physically not symbolically forward. Human brain as container of thinking and intelligence is a physics entity and of course nature oriented.

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