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Sayed`S Theory on Quantum Entanglement and Teleportation: Innovative Controlling Parameters And Equations of Occurrence; E =B Mc^3

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Abstract

Allah, the Creator, is entangled with everything in the universe. The Quantum Entanglement is neither spooky action at a distance nor science fiction. This theory introduces the parameters controlling the quantum entanglement and teleportation occurrence. A Sayed Quantum entanglement energy equation **(SQEEE); E =β mc^3**, with variable speed, was derived to describe the quantum entanglement phenomena. The entanglement speed was found to be variable with distance and in the range from -1x10^{12} to 1.318 x 10^{22}m/s. The light speed violation is a must The Sayed quantum entanglement wavelength (SQEW) was calculated and found to be 2.487 x 10^{-35} m in the Planck scale. The quantum teleportation mechanism of an object from the macroscopic into the microscopic fields might take place through Sayed`s quantum teleportation tunneling (SQTT). Sayed quantum teleportation wavelength (SQTW) was derived and found to be 5.135x10^{-35}m for Planck scale. A hypothetical case for object quantum teleportation acceleration (SQTA) was also calculated and found to be 4.738x10^{20} m/s^2. It can be imagined that the universe (visible and invisible) is connected and entangled in the quantum scale by encrypted vibrational waves of specific wavelengths as the code of communication between all the universe web components. Sayed`s Quantum Entanglement & Teleportation Diagram (SQETD) was proposed.

Keyword: Sayed`s theory on Quantum Entanglement and teleportation/ Sayed`s quantum teleportation Acceleration

I. Introduction

Quantum entanglement is a complex phenomenon in physics that is usually poorly described as an invisible link between distant quantum objects that allows one to instantly affect the other (1). The quantum state of a particle can be transmitted from one location to another without physically moving the particle. This is known as teleportation in quantum mechanics. Science fiction depicts teleportation as the instantaneous transport of objects, but in reality, it does not work that way (2). Entanglement plays a crucial role in quantum teleportation. Whenever two or more particles become entangled, their states cannot be described independently of one another. No matter how far apart the particles are, the state of one particle affects the state of the other instantly (2). Noble prize in physics was awarded in 2022 to Alain Aspect, John Clauser and Anton Zeilinger "for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science" ,Fig.1 (3).

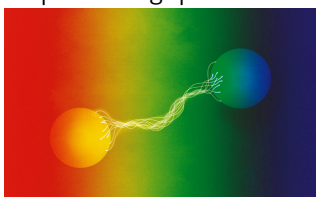


Figure 1: Presentation of Photons Quantum entanglement

This theory gives a proposed explanation for reality, threshold, parameters and the equations controlling quantum entanglement and teleportation occurrence

II. Chronology of Quantum Entanglement & Teleportation.

- An Austrian team led by Anton Zeilinger achieved the first successful teleportation of a quantum state in 1997(4).
- A team of scientists at NIST and the University of Innsbruck succeeded in teleporting information encoded in quantum states of individual atoms in 2004. Their method involved trapping and entangling two beryllium ions and teleporting their quantum state across short distance (5).

- Indeed, China's quantum-encrypted communications satellite, Micius, relies on quantum entanglement between photons that are separated by thousands of kilometers (5).
- Quantum physics says nothing about how the world Is instead, quantum physics only describes the experiments we do to test our theories of how the world works—it gives us probabilities for the outcomes that may happen in an experiment; Fig.2, (1)

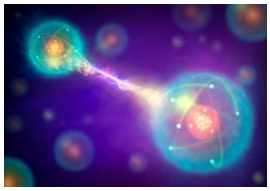


Fig.2: Conceptual artwork of a pair of entangled quantum particles (1)

- Teleportation would require deconstructing the physical body or object at one location, transmitting its precise information or "pattern" to the destination, and then reconstructing it using that information. A person or object would be scanned and encoded, transmitted from this vast amount of information and then recreated at the destination (5).
- Quantum teleportation isn`t science fiction, it`s happing in laboratories today. But teleporting quantum particles and information is a far cry from beaming people through space (6).

III. Derivation of the Sayed`s Quantum Entanglement Energy Equation (SQEEE)

Based on the Einstein mass energy equivalence equation (7, 8);

$E= mc^2$ 1

The mass equals volume multiplied by density ($m=v.\rho$) and by substituting in equation 1;

$E= v.\ \rho\ c^2$ 2

Considering the universe as a sphere of volume ($V= 4/3\ \pi r^3$, where r is the radius. And substituting in equation 2, one gets

$E= 4/3\ \pi r^3.\ \rho.\ c^2$ 3

As it known that the distance equals speed multiplied in time (d = v.t) with considering the distance equivalent to the radius (r=d) and substitute in eq. 3, one gets;

$E= 4/3\ \pi (v.t)^3.\ \rho.\ c^2$ 4

Considering v approach light speed c or $v \approx c$, one gets

$E= 4/3\ \pi\ t^3.\ \rho.\ c^5$ 5

By introducing the mass again into the equation 5 and substitute the value of sphere volume, One gets

$E= 4/3\ \pi\ t^3.\ (m/4/3\ \pi d^3)\ c^5$ 6

$E=(\ t^3/d^3)\ mc^5$ 7

$E=(\ t^3/d^3)\ m\ c^2\ c^3$ 8

By substituting the value of light speed square as a function in energy and mass; $c^2 = E/m$, and the energy ;$E=hc/\lambda$, where λ is the wavelength ,one gets

$E=(\ t^3/d^3)\ m\ (E/m)\ c^3$ 9

$E=(\ t^3/d^3)\ (hc/\lambda)\ c^3$ 10

Taking into consideration the de Broglie wavelength, $\lambda=h/p = h/mv = h/mc$, and $d=c.t$ or $c^2=d^2/t^2$

$E=(t^3/d^3) (mchc/h) c^3$ 11

$E=(t^3/d^3) m\ c^2 c^3$ 12

$E=(t^3/d^3) m\ (d^2/t^2) c^3$ 13

$E=(t/d)\ mc^3$ 14

The equation 14 can be finally written as follow where $\beta = 1/c = t/d$

$$E = \beta\ mc^3 \qquad 15$$

Joule (J)= (s/m). kg. m^3/s^3 = kg m^2/s^2 = Joule

This new formula; **Sayed`s Quantum Entanglement Energy Equation (SQEEE),** gives the following correlation of:

- The Sayed Energy of entanglement is a direct function in mc^3
- The Energy is a function in entanglement time
- The Energy is a function in entanglement distance

Table 1: Entanglement speed values for Free electron using (SQEEE) formula

Energy (Joule)	Distance	Time scale	Mass of electron	Entanglement Speed (SQEEE)
8.19×10^{-14}	1 m	$1x10^{-18}$ s	9.109×10^{-31} kg	0.999×10^{12} m/s
	10^3 m			0.999×10^{13} m/s
	10^6 m			0.999×10^{14} m/s
	10^9 m			0.999×10^{15} m/s
	$9.46x10^{12}$ km (ly)			0.283×10^{17} m/s
	$4.4x10^{26}$ km (universe radius)			1.318×10^{22} m/s

The selected attosecond (10^{-18}) is the scale of the real time observation of electron movement within atoms or space. Based on the calculation given in Table 1, it can be concluded that the entanglement speed between two objects depends on distance (fig.3) and controlled by SQEEE. It can also be concluded that entanglement is ultra-fast than light speed**; violation of $E=mc^2$.**

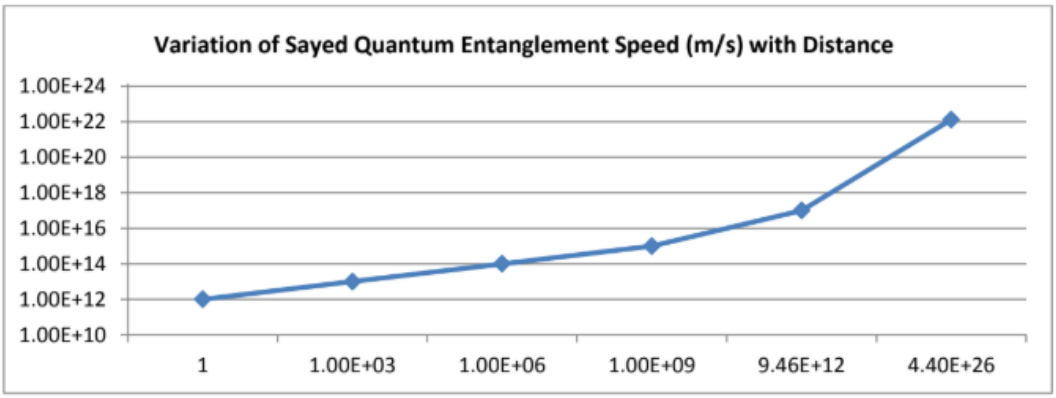


Fig. 3: The calculated Sayed quantum entanglement speed against distance

The equation 15 can also be rewritten as follow:

$Ec = mc^3$ 16

$hc^2/\lambda = mc^3$ 17

$h\,(d^2/t^2\,\lambda) = mc^3$ 18

$$\lambda = (d^2/t^2)(h/mc^3) \quad 19$$

This threshold wavelength for entanglement occurrence is called Sayed`s quantum entanglement wavelength (**SQEW**). It is inverse function in the mc^3. The SQEW was calculated in Planck scale as shown in Table 2.

Table 2: Entanglement wavelength value in Planck scale using SQEW formula

Item	Planck Values	Sayed Entanglement λ (SQEW)
Energy	1.96×10^{9} Joule	2.487×10^{-35} meter
Time	5.39×10^{-44} seconds	
Length (distance)	1.616×10^{-35} meter	
Mass	2.176×10^{-8} kg	
Planck constant	6.626×10^{-34} Joule second	
Light speed	$\sim 3 \times 10^{8}$ meter/second	

It can be stated that entanglement process is accompanied with a wavelength of 2.487×10^{-35} meter in the Planck scale. By applying of SQEW formula for the electron of Hydrogen atom, one can found the following value; Table 3

Table 3 : Entanglement wavelength for electron of Hydrogen atom using SQEW formula

Item	Published Values	Sayed Entanglement λ (SQEW)
Energy	8.19×10^{-14} Joule	0.8508×10^{-11} meter (almost the same wavelength of gamma ray)
Time (rotation in G.S.)	1.52×10^{-16} seconds	
Bohr radius (distance)	5.2918×10^{-11} meter	
Mass of electron	9.109×10^{-31} kg	
Electron speed(1^{st} orbit)	2.18×10^{6} meter/ second	

The next table 4 shows results of simple calculations based on a recent reference found experimentally that the quantum entanglement is in the scale of attosecond (9).

Table 4: Calculation of the Speed of Entanglement in attosecond scale (9)

Time (attosecond)	Proposed Distances	Light speed	Speed of Entanglement
232×10^{-18} second	1 m	3×10^{8} m/s	4.31×10^{21} m/s
	1 km		4.31×10^{24} m/s
	10^{6} km		4.31×10^{27} m/s
	10^{9} km		4.31×10^{30} m/s
	Ly (9.46×10^{12} km)		4.077×10^{35} m/s
	8.8×10^{26} km (the observable universe diameter)		3.79×10^{49} m/s

The calculated ultra-fast speed of entanglement is an evidence of violation of Einstein light speed; 3 x 10^8 m/s. The speed of entanglement is a variable with distance.

IV. Derivation of Sayed`s Quantum Teleportation Equations (SQTE)

Using the derived equation number 14 / 15 with considering the formulas; E=hc/λ of Planck and ; F=m.a of Newton, where a is the acceleration (m/s^2), it can be rewritten as;

$hc/\lambda = t/d\ mc^3$ 20

Taking the de Broglie wavelength (λ=h/mv) formula with considering v ~c and m=F/a ; one gets

$h^2/m\lambda^2 = t/d\ mc^3$ 21

$h^2/\lambda^2 = t/d\ m^2c^3$ 22

$t = (h^2/\lambda^2)(\ d/\ m^2c^3\ )$ 23

$t = (h^2/\lambda^2)(\ d)\ (a/F)(1/\ mc^3\ )$ 24

This is called Sayed`s Quantum teleportation Time**.** This equation can be rearranged to be in the following form describing **Sayed`s Quantum teleportation force** (**SQTF**)

$$F = (h^2/\lambda^2).(d/t)\ (a/mc^3\ ) \qquad 25$$

Considering the correlation of Force (F) and energy (E) transferred; E=F. d, one gets The formula which is called **Sayed`s Quantum teleportation Energy (SQTE).**

$$E=(h^2/\lambda^2).(d^2/t).(a/mc^3) \qquad 26$$

Joule = $(J.s)^2/m^2)\ (m^2/s).(\ m/s^2)/(kg.\ m^3/s^3) = (kg^2m^2.s)^2/\ s^2m^2)\ (m^2/s).(\ m/s^2)/(kg.\ m^3/s^3)$ =Joule

This equation correlates different parameters controlling the occurrence of quantum teleportation. Different forms of the SQTE formula can be given as follow:

$t=(d^2).(h^2/E\ \lambda^2).(a/mc^3)$ 27

$$a=(E\ \lambda^2/h^2\ ).(t\ /d^2)(\ mc^3) \qquad 28$$

$$\lambda^2=(h^2/E).(d^2/t).(a/mc^3) \qquad 29$$

$m^2 = (J^2.s^2/\ J)(m^2/s)(m/s^2)(s^3/kg\ m^3) = (J.s^2)(m^2/s)(m/s^2)(s^3/kg\ m^3)= m^2$

These formulas are called **Sayed`s quantum teleportation acceleration** (**SQTA**), quantum teleportation time and quantum teleportation wavelength (**SQTW).** The following clarification can be given and concluded:

- The Sayed Quantum teleportation Energy is the energy needed to transferring/transporting the object from the macroscopic/ matter form into an identical microscopic/ wave copy.
- The accelerated object is transferred into the microscopic field through Sayed`s quantum teleportation tunneling (SQTT)
- The Sayed Quantum teleportation Energy is inversely correlated to mc^3
- The Sayed Quantum teleportation Energy is inversely correlated to wavelength square
- The Sayed Quantum teleportation Energy is directly correlated to acceleration
- The Sayed Quantum teleportation Energy is directly correlated to distance square
- The Sayed Quantum teleportation Energy is inversely correlated to time

Some calculations for the Sayed Quantum teleportation wavelength are given in the following table 5

Table 5: Planck scale and Sayed`s Quantum Teleportation (SQTW) parameters

Parameter	Planck values	Sayed Quantum Teleportation Wavelength (SQTW) λ
Energy	1.96×10^{9} Joule	5.135×10^{-35} m
Time	5.39×10^{-44} seconds	
Acceleration	5.5608×10^{51} m/s^2	
Mass	2.176×10^{-8} kg	

The calculated value is the wavelength; 5.135×10^{-35} m, at which teleportation can be occurred in Planck scale. A hypothetical case was calculated for quantum teleportation of an object/person of the following parameters given in Table 6

Table 6: Sayed`s Quantum Teleportation Acceleration of a Hypothetical Parameters

Parameters	Proposed value	Sayed Teleportation Acceleration (SQTA)
Energy	630×10^{16} Joule	4.738×10^{20} m/s^2
Mass	70 kg	
Time	10^{-18} second	
Wavelength	5.135×10^{-35} m	
Distance	10^{3} m	
Speed (light speed)	3×10^{8} m/s	
Other Speed (table 1)	1.318×10^{22} m/s	6.064×10^{60} m/s^2

This means that for an object/person of 70kg mass, it should be accelerated by 4.738×10^{20} m/s^2 to be teleported from the macroscopic universe to the microscopic universe. It can be stated that the Quantum teleportation is a process of transport of an object/person from the matter form into an identical wave form copy. Where, all the universe components are entangled in the universe web. Another case was considered with different parameter; different teleported masses. The calculated SQTA are given in table 7.

Table 7: Sayed`s Quantum Teleportation Acceleration of different Hypothetical Parameters

Different Masses (kg)	Proposed values	Sayed Teleportation Acceleration (SQTA)
1	1 km teleported distance 10^{-18} second 3×10^{8} m/s , speed	1.459×10^{16} m/s^2
10^{3}		1.459×10^{22} m/s^2
10^{6}		1.459×10^{28} m/s^2
10^{9}		1.459×10^{38} m/s^2

It can be observed that the acceleration needed for teleporting masses of 1 to 10^{9} kg for a distance of 1 km is in the range from 1.459×10^{16} to 1.459×10^{38} m/s^2. This relation is presented as given in Figure 4.

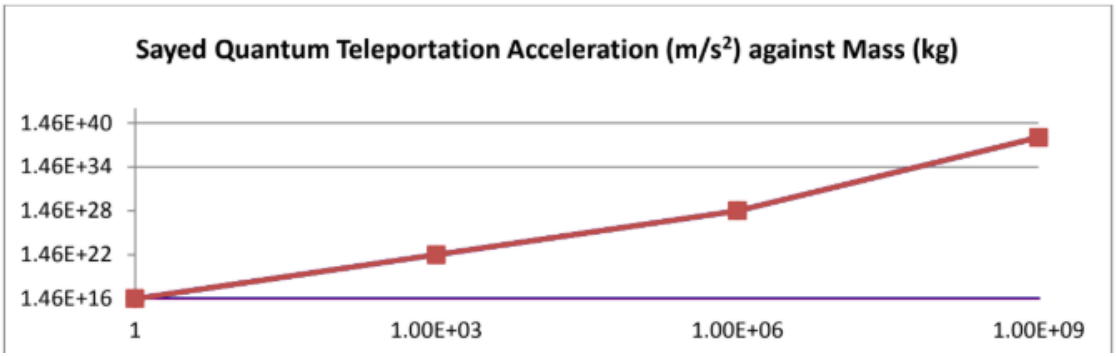
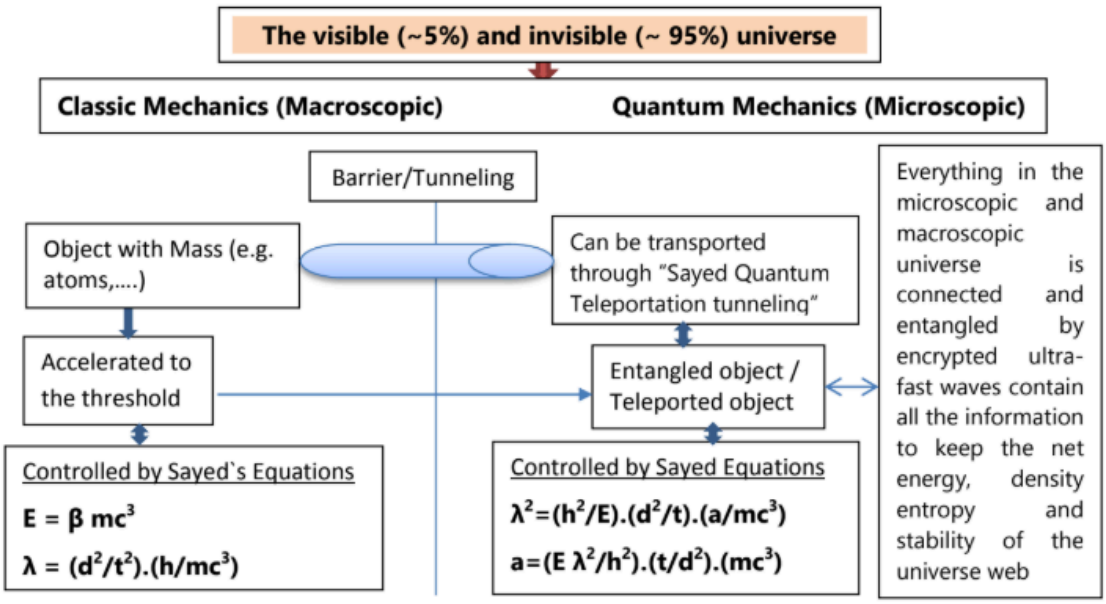


Fig. 4: The required SQTA for teleporting different masses

The following is a proposed **Sayed**`s **Quantum Entanglement & Teleportation Diagram (SQETD);** the following figure 5**.** It shows and represents the transport mechanism of an object to be teleported from the macroscopic field into the microscopic field within the universe web.



A survey for quantum entanglement and teleportation are as follow. In teleportation, the quantum particle (photon, electron, positron) is moved from one position to the other but keep it in mind not the macroscopic object (ball, human, car) (10). It may be performed between different nature, e.g., between light and matter (11). Quantum entanglement has the advantages of wireless capacity, unlimited transmission speed and absolute security (12). A new probabilistic teleportation deals with arbitrary superposed coherent states; even and odd j-spin coherent states (13). Entanglement remains largely unexplored at the highest accessible energy scales produced at the Large Hadron Collider (14,15). Scientists believe teleportation a reality, including the ability to teleport a whole human (16). As quantum entanglement may be the result of tachyons, i.e., faster than light particles (17). Entanglement entropy from various types of quantum fields was considered (18). Distribution of photonic entangled states over free-space or fiber channels were investigated (19). The ORNL sent entangled photons through a commercial fiber-optic network and maintained entangled for over 30 hours! (20). Electron spin can affect the motion of protons in lysozyme crystals; quantum biology (21). A single pair of photons at once, making it unclear whether the two used in teleportation are truly entangled (22). A team was able to hyper-entangle pairs of atoms such that their individual states of motion, electronic states, internal energy levels were correlated among the atoms. (23). Quantum teleportation; separate modules without a physical link entangled via photons travelling through optical fibers (24). The Definitions of Teleportation concepts is classified to; i) Teleportation – SciFi , ii)Teleportation – psychic, iii) Teleportation – engineering, iv)Teleportation – quantum entanglement and Teleportation – exotic (25). Mobile Robots

teleportation was studied using Euler-Maruyama numerical Algorithm (26). The Noble prize in physics; 2025, was awarded to 3 pioneering scientists in mechanical quantum tunneling (27).

Conclusion

This theory introduces the parameters and equations controlling quantum entanglement and teleportation phenomena. A distinguished Sayed Quantum Entanglement Energy Equation (SQEEE) was derived; $\mathbf{E=\beta.mc^3}$, where c is variable speed. The energy and wavelength needed for occurrence of entanglement were calculated for Planck scale, free electron and electron of Hydrogen atom. The parameters controlling teleportation from the macroscopic into the microscopic fields/image were derived. The Sayed quantum teleportation wavelength (**SQTW**) and acceleration (SQTA) were calculated and found to be $5.135x10^{-35}$ m and $4.738x10^{20}$ m/s^2.respectively. It can be imagined the universe as an entangled web of macroscopic and microscopic structure with mutual transportation via Sayed quantum teleportation tunneling.

Conflict of interest

AcThere is no any conflict of interest concerning subject of my article with anyone

knowledgment

Allah, our Creator, You are Greater than either imagination or capabilities of the humankind. This fact is easily concluded by just a glance to your unbelievable universe.

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Biography

Prof. Dr. Sayed Ali El Mongy studied for his Ph.D. in Germany in the field of INAA and delayed neutron counting using TRIGA II reactor. He had been appointed as the vice president of Egypt nuclear regulatory authority (ENRRA). He has about 130 published articles including 10 theories in the field of nuclear and astrophysics. He has more than 40000 readings and is included within the Top 100 of reading and citation in Research Gate. He attended and participated in many national and international conferences and meetings in USA, Canada, Chile, EU states, Russia and Arab states. He worked as an expert with the IAEA for IRRAS mission and NSGC. In the time being He is on leave to the UAE as Supervisor and Academic Coordinator for nuclear and radiological affairs.