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Heat and Photon Energy Phenomena: Dealing with Matter at Atomic and Electronic Level

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Abstract: There is a misconception about using the terms photon and electron. When the electron of the outer ring in the silicon atom executes interstate dynamics for only one cycle, it generates force and energy for the unit photon. The unit photon has a shape like Gaussian distribution in turned ends. When the photon of suitable length interacts with the side of the laterally orientated electron of a semisolid or solid atom, it converts into heat. Under the approximate angle of 90º, when a photon interacts with the tip of a laterally orientated electron, it divides into bits of energy having a shape like integral symbols. Solid or semisolid element atoms can reveal the phenomena of heat energy if their electrons deal with interactions of photons. In the neutral state silicon atom, the center acts as the reference point for electrons executing interstate dynamics, and the north-south tips of the electrons remain along the north-south poles. The energy shapes around the force tracing along the trajectory of electron dynamics. Under dynamics, two forces exert on the electron for one time, whereas two forces shape from opposite sides. In interstate dynamics, the electron of the outer ring first reaches the maximum limit point, where the one-bit energy shapes. In the remaining half cycle, that electron again shapes one-bit energy. When there is an uninterrupted supply of heat energy to the silicon atom, electron dynamics generate the photon having a shape-like wave. Path-independent but interstate-dependent forces take over the control of an electron. That electron executes dynamics nearly at the speed of light. In dynamics, the conservative forces exert on the position-acquiring electron. A photon can be in unending length if the electron dynamics remain uninterrupted. The changing aspect of the electron recalls the auxiliary moment of inertia at each point of turning. Atoms of suitable elements generate differently shaped photons when executing dynamics for the outer ring electrons. Thus, they can also reveal the phenomenon of photon energy.

Keywords: heat energy; photon energy; fundamental forces; electron dynamics; atomic-scale phenomenon; photon-matter interaction

1. Introduction

Technology is achieving its climax, but a basic understanding of science still awaits. The creation of Earth has benefited from heat and photon energy since its existence. Catching fire to different materials and burning various commodities are the usual phenomena under observation.

Many studies have been discussed in the literature studying the light-matter interaction, mainly covered under a phenomenon known as surface plasmons. The origin of plasmons has a long history of exploration [1–4].

In the literature, various terminologies such as phonons, excitons, and plasmons explain the interaction of light or photons with matter. A study based on reviews discussed light-matter interaction considering the properties of polariton modes in two-dimensional materials [5].

In 1931, Frenkel proposed the concept of excitons or electron-hole pairs [6]. It deals with an excited state of the atom in a lattice traveling in a particle-like fashion without the net transfer of charge. Excitons can form due to photon absorption by a quantum dot [7], where the phonon is a collective excitation in the periodic arrangement of atoms or molecules.

Various studies dealing with different developing processes involve tiny-sized particles. The tiny-sized cluster is a simple chemical compound with various essential applications in diversified areas [8]. The unique nature of nanocrystals demands the fabrication of new materials having

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controlled features [9]. The development of nanoparticle technology is an obvious long-term benefit [10]. On the successful assembling of the tiny particles for a larger particle, tomorrow they can become the atoms and molecules of the materials [11]. Understanding the dynamics in the development of nanoparticles enables us to understand a bigger-sized particle [12].

Studying the surface features of nanoparticles can develop high-order materials [13]. Tiny-sized clusters possess molecule-shaped electronic and non-face-centered cubic geometric structures [14]. Geometric and distorted particles deal with different forces to amalgamate in solution [15]. The localized dynamics of the process contribute to developing the structure of gold [16–19], silver [19], and carbon [20,21] atoms.

Atomic elongation in the arrays of a tiny-shaped particle has been discussed elsewhere [22]. A solid atom elongates by stretching the energy knots uniformly [23].

Sir Isaac Newton explained gravity, which mainly covered the Newtonian Physics. Sir Albert Einstein discussed the theory of General Relativity. Bohr proposed electrons move around the allocated orbits, where they have fixed energy in the ground state. Generally, the discussions on the orbits and shells largely remained to describe the electronic structure of different element atoms. The description of atomic structure by quantum states also exists.

However, these studies and other related studies kept the researchers far from thinking about different atomic behaviors. The efforts put forth towards exploring fundamental science remained under less intention. A recent study discussed atomic structure differently from all previously discussed [24].

Under conservative forces, a study discussed the fundamental aspects of structural evolutions [25].

Fundamental aspects of binding different state carbon atoms have been discussed elsewhere [26]. The interaction of the photon with the clamped energy knot electron of any semisolid or solid atom is studied here. The electron dynamics of a silicon atom convert the heat energy into photons is discussed here.

Generating photons under the electron dynamics of suitable element atoms other than silicon atoms is also discussed in preliminary detail. Here, the matter at the atomic and electronic levels, which reveals the phenomena of heat and photon energy, is discussed.

2. Experimental Details

This work does not contain specific experimental details. However, all those studies studying the photon-matter interaction, light-matter interaction, relation between electron and photon, heat energy, photon energy, fundamental forces, renewable energy, photovoltaics, bandgap, semiconductors, energy science, energy application, energy materials, physics and chemistry of materials may refer this study. This study also counters general physics and chemistry.

In the published literature, there are also other types of materials studying the generation of photon energy. Therefore, the discussed mechanisms of generated photons by electron dynamics of different element atoms here can also look for the dye-synthesized, organic, and perovskite solar cells.

3. Models and Discussion

In the process of synergy, atoms of nanoparticles or particles deform under their different interactions [15]. A tiny-shaped particle develops due to elongating its atoms [22]. A photonic current is because of the propagation of featured photons rather than the flow of electrons or charged particles [23]. However, electrons of the suitable atoms can transform heat energy into photon energy when executing dynamics. The photonic current should relate to the propagation of featured photons in a suitable medium. The force and energy directly relate when solid atoms undertake transition states [24].

Different ground points of atoms executing the confined interstate electron dynamics are discussed [25]. Carbon atoms involve energy to form a structure, whereas they engage force [26].

Atoms of those elements, which generate the photons, need energy depending on the characteristics of those generated photons. Therefore, suitable element atoms can execute the electron dynamics to generate the photons.

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A photon can diffract when it interacts with the side of the clamped energy knot electron of a semisolid or solid atom. Photons can interact with the electronic tips at suitable angles to reflect.

3.1. Heat Energy Phenomenon

By dissipating the heat in the air medium, photons travel in the air medium [23]. A long-length photon carries more heat energy than a short-length photon. Short and long-length photons can be named overt photons. However, a very long-length or an unending-length photon is only a photon. When a photon breaks into pieces under suitable interaction, it does not keep nodes and antinodes. The heat of the photon dissipates, and the force of the broken photon permeates the connected medium.

In a silicon atom, the execution of electron dynamics for one forward or reverse cycle generates the unit photon. Thus, the unit photon has the length of minimum conserved force and energy. In Figure 1, label (1) shows the minimum length photon. That photon is like the Gaussian distribution of upwardly turned ends.

The inverted unit photon having a shape like Gaussian distribution with downwardly turned ends is also shown by label (1) in Figure 1. When the unit photon interacts with an electron at a suitable angle, it divides into two equal parts. Each integral symbol relates to one bit of energy, as shown in labels (2) and (3) of Figure 1.

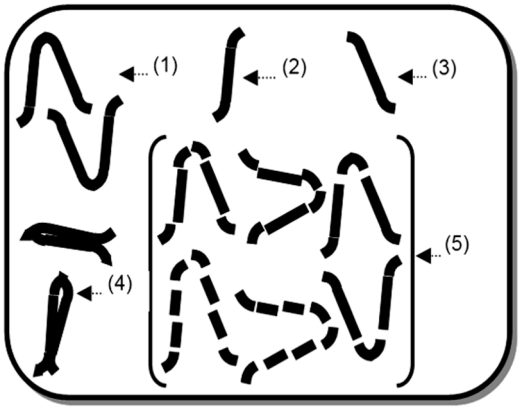

Figure 1. (1) Unit photons shape like Gaussian distribution having turned ends, (2) division of unit photon in shape like integral symbol and (3) division of unit photon in shape like opposite integral symbol, (4) merged energy of unit photons and (5) broken pieces of unit photons.

When a unit photon interacts with the electron of a hypothesized semisolid or solid atom at a suitable incidence, the folded energy shaped as a fish can result. Label (4) in Figure 1 shows it. The folded energy of a unit photon is a bunch of the merging energy. A unit photon converts into many pieces when interacting with the electron's side of the hypothesized semisolid or solid atom. Broken pieces of the unit photons relate to heat, as labeled by (5) in Figure 1. It is possible to validate these models from the experimental data.

If the changing aspect of an electron within interstate executes uninterruptedly, then a photon of unending length results. A wave-shaped photon is labeled by (1) in Figure 2. The generation of that overt photon was by the three forward and three reverse direction cycles of the electron of the silicon atom.

Depending on the potential energy and orientation force, the interaction of photons with that embedded electron can vary. The momentum of traveling or propagating photons can also alter the nature of interaction with the electrons.

Photons of different characteristics can also alter the nature of interaction with an electron. In a specific interaction with an electron, photons can merge into the bed of heat energy. The converted heat energy can work when suitable element atoms execute electron dynamics to generate photons. The different options of photon-matter interaction indicate it can open a new field of research.

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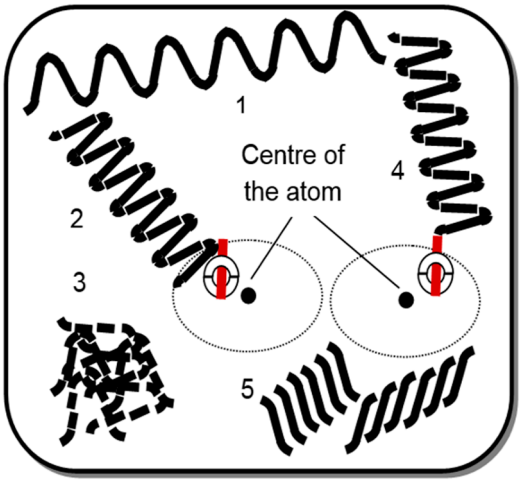

Figure 2. (1) overt photon, (2) interaction of an overt photon with the side of laterally orientated electron of a hypothesized semisolid or solid atom, (3) pieces of heat, (4) interaction of an overt photon with the tip of laterally orientated electron of a hypothesized semisolid or solid atom and (5) bits of energy.

When a photon interacts with the side of the electron of the hypothesized semisolid or solid atom at a suitable incidence, it folds by the impact of absorption. Label (2) in Figure 2 indicates the incidence. That photon converts into many pieces of heat. Label (3) in Figure 2 shows many pieces. They are now related to only heat.

By constructing the approximate angle of 90°, the photon interacts with the tip of the laterally orientated electron of the hypothesized semisolid or solid atom, dividing it into bits of energy. Label (4) in Figure 2 shows this incidence. In Figure 2, many energy bits shaped like integral symbols are labeled by (5). It is possible to validate these models from the experimental data, too.

3.2. Photon Energy Phenomenon

In atoms of the semisolid elements, electrons keep half-length above and half-length below the middle of occupied energy knots [24]. Therefore, suitable electrons of the silicon atoms should deal with the forces of two poles for each time-changing aspect.

Electrons of the outer ring of a silicon atom systematically deal with conserved forces. The heat energy can trigger the interstate dynamics of the suitable electrons to convert into photon energy.

The forces exerted on the relevant poles of the electron introduce a moment of inertia, which is in an auxiliary manner at each point of turning that electron. When the suitable electron of the silicon atom executes dynamics for the first half-cycle, the energy of one bit engages along the tracing trajectory.

The energy of one bit also engages along the tracing trajectory of the electron in the second half-cycle. In a silicon atom, electrons of the zeroth ring and the first ring do not execute dynamics.

To execute interstate dynamics, forces from all four poles exert on the outer ring electron in a silicon atom. However, two forces are there at a time.

Energy covers the force from the remaining two forces' poles.

A force traces along the electronic tip. In Figure 3 (a), a top left-sided electron of a silicon atom executed interstate dynamics. Figure 3 (b) shows the conversion of heat energy into photon energy for the forwarding cycle of electron dynamics.

At the maximum limit point, the energy of one bit engages along the traced trajectory. Thus, one bit of energy shapes around the tracing force in the first half cycle.

The trajectory tracing by the electron for the first half cycle is up to the maximum limit point, as shown in Figure 3 (b). The turning of electrons deals with the auxiliary moment of inertia. In the second half cycle, another energy of one bit engages along the tracing trajectory of an electron to shape around the shaping force.

The tracing trajectory by the electron in the second half cycle is from the maximum limit point. The electron again deals with the auxiliary moment of inertia. Thus, a unit photon is due to the force and energy of one complete forward direction cycle of interstate electron dynamics. That electron

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recalls the moment of inertia at each point of turning, which is in an auxiliary manner. Figure 3 (b) shows a complete forward cycle of confined interstate dynamics of the electron.

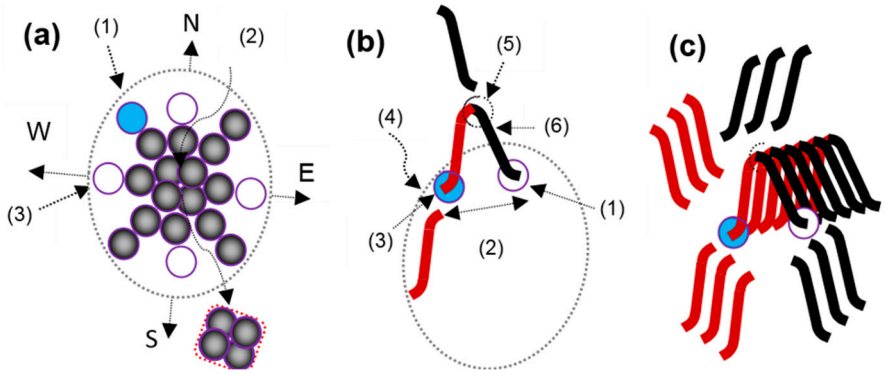

Figure 3. (a) Neutral-state silicon atom: (1) targeted electron; (2) zeroth ring; (3) unfilled energy knot. (b) Electron dynamics in the forward cycle: (1) unfilled state; (2) interstate electron gap; (3) filled state; (4) one-bit energy shaping around the force tracing along the trajectory of an electron in the first half cycle; (5) maximum limit point; (6) one-bit energy shaping around the force tracing along the trajectory of an electron in the second half cycle. (c) Three forward cycles and three reverse cycles of interstate electron dynamics engaging the energy of twelve bits to generate the overt photon having a length equal to the lengths of unit photons in six.

The turning positions of the electron under the auxiliary moment of inertia are responsible for forcing the energy of a photon from one point to another. The exerted forces on the electron remain path-independent. In Figure 3 (b), that electron executing confined interstate dynamics does not possess any other way to regain the state.

When the interstate electron dynamics of the silicon atom complete six cycles, three forward and three reverse direction cycles, the energy of twelve bits forms a wave shape. The electron does not touch the energy knot in the forward or reverse cycle.

Hence, under uninterrupted three forward and three reverse direction cycles, the execution of interstate electron dynamics configures the force and energy to generate that overt photon. The shape of energy engaged along the trajectory of electron dynamics for the first half cycle is like a straight integral symbol (∫).

The shape of energy engaged along the trajectory of electron dynamics for the second half cycle is like the opposite integral symbol (∫). Figure 3 (c) shows the energy bits of both shapes.

For the first-half and second-half forward cycles of electron dynamics, two shapes of integral symbols connect at the center of the maximum limit point. These give the overall shape of force and energy shaped like Gaussian distribution in the turned ends. Figure 4 shows these shapes.

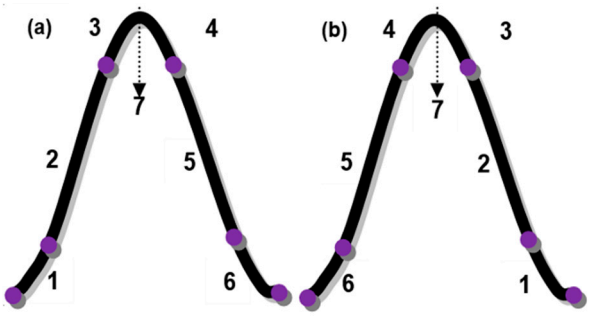

Figure 4. Sections of the unit photon generated under the electron dynamics of silicon atom in (a) forwarding and (b) reverse cycles; (7) connected left and right half-cycles at the maximum limit point.

Figure 4 (a) plots the relationship between force and energy in the forward cycle of the electron. Labels (1) to (6) denote different steps in Figure 4 (a). Figure 4 (b) shows the reverse cycle of the electron and the relationship between force and energy. Labels 1, 2, 3, 4, 5, and 6 also show the different steps in Figure 4 (b). In Figure 4, label (7) denotes the maximum limit point. From that point,

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the electron turns towards the nearby unfilled state to occupy it due to the appearance of the opposite end exerted forces.

Therefore, by recalling the moment of inertia in an auxiliary manner, that electron deals with the following exerting forces. In each step of interstate electron dynamics, forces of two poles act together but from opposite sides, which causes that electron to turn.

Figure 5 (a-d) shows forward and reverse cycles of electron dynamics in all quadrants of the silicon atom symbolically. Figure 5 (a-d) also shows the forces exerted on the electron at each turning point. Electrons of four quadrants trace the trajectories of confined inter-state dynamics in both forward and reverse cycles.

Figure 5 (a) shows that an electron leaves the state from the rear side or tail and enters the nearby state from the front side or head while executing forward interstate dynamics. So, it will leave the state from the rear side or tail and enter the nearby state from the front side or head while executing reverse interstate dynamics.

The electron in Figure 5 (b) oppositely executes dynamics to keep the equilibrium state of the atom. In Figure 5 (c), an electron leaves the state from the front or head and enters the nearby state from the rear side or tail while executing forward interstate dynamics. So, it will leave the state from the front side or head and enter the nearby state from the rear side or tail while executing reverse interstate dynamics.

In Figure 5, the electrons can also execute the dynamics in reverse order. In Figure 5, electrons 'a' and 'b' can also execute dynamics from the front side and electrons 'c' and 'd' can execute dynamics from the rear side (or vice versa). In this manner, electrons executing confined interstate dynamics still keep the equilibrium state of the atom. However, the involved forces at each turning point of an electron are required to undertake its confined interstate dynamics.

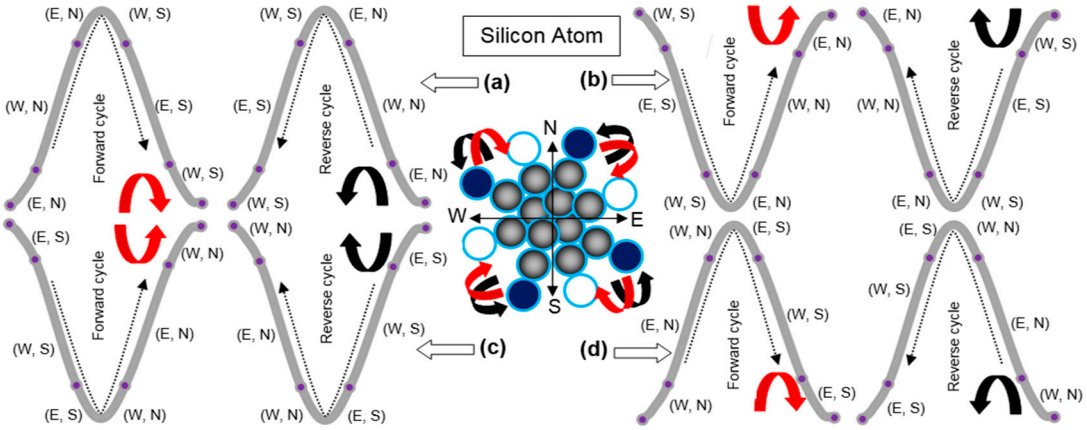

Figure 5. Electrons of four quadrants denoted by (a), (b), (c), and (d) deal with the east (E), west (W), north (N), and south (S) forces along the relevant poles while executing confined inter-state dynamics in forward (red-colored round arrows) and reverse (black colored round arrows) cycles.

In the atoms where conservative forces from three poles are there, interstate electron dynamics transform heat energy into photon energy shape like connected integral symbols. However, it is pertinent to mention that an electron deals with the forces of only two poles at a time to execute interstate dynamics. There is a need to search which element atoms convert heat energy into the integral symbols-connected photon energy.

In the atoms of those elements where conservative forces from only two poles exert, interstate electron dynamics transform heat energy into photon energy having a shape like connected tick symbols. There is a need to search which element atoms convert heat energy into the tick symbols-connected photon energy.

In those atoms where forces from three poles exert at the electron level, a generated photon is due to the connecting shapes of the *L* alphabet. There is a need to search which element atoms convert heat energy into the *L* alphabet-connected photon energy. However, an electron deals with the forces of only two poles at a time.

Figure 6 (a-c) shows the shape of the photon-like connected integral symbols, tick symbols, and *L*-like symbols, respectively. In Figure 6 (d), a photon shows both portions of force and energy.

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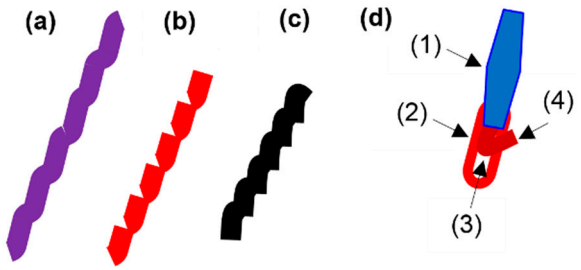

Figure 6. Overt photon of connected (a) integral symbols, (b) tick symbols, (c) L-like symbols, and (d) shaping force and energy along the trajectory; (1) electron dynamics, (2) shaping energy, (3) shaping force, (4) the removed red-colored energy region showing the force in white color.

Suitable element atoms can generate photons of different characteristics. The generated photons with a different nature can open new areas of research. The mechanisms of generating photons in semi behavior materials are studied again.

3.3. General Discussion

Each silicon cell connected in the series in the solar panel adds up to the generating number of photons. As observed in solar panels, atoms of the solar cells can generate maximum power when the setting is under the proper inclination.

The cycles of confined interstate electron dynamics of silicon atoms remain uninterrupted for an extended period, where titling the solar panel at a suitable angle concerning the base results in varying efficiency. Depositing silicon atoms for a few layers can generate high power.

It appears that one electron or three electrons of the outer ring cannot execute interstate dynamics. A generating photon by the confined interstate electron dynamics can also disturb the center of an atom, thus not providing the feasible conditions for one electron or three electrons to execute dynamics.

However, more work is required to depict the complete picture. Figure 5 (d) shows that the electron oppositely executes dynamics under the equilibrium state of an atom.

When the featured photons interacted with the tips of laterally orientated electrons of elongated atoms, the reverted element of force prints the pattern [27]. A structural design is crucial to introduce the specific application [28–37]. A structural shape is due to the controlled behavior of force and energy [17].

Where there is no specific interaction of a photon with the electron, it divides into pieces of heat. The heat of a divided photon dissipates in the structure of atoms. The conversion of energy from one form to another depends on structural characteristics.

The behaviors of force and energy are different in depositing carbon films [20,38]. The development of particles under predictor packing is also studied, where photons shaped as waves get converted into tuned pulses [39]. Measuring the temperature of such materials is an integral part of the research, and some studies have also shed light on it [40–42]. A study explained the role of van der Waals interactions in the isolated atoms by considering the induced dipoles [43]. Dispersion forces or van der Waals interactions occur when charge density fluctuations behave in a wave fashion [44].

4. Conclusion

A unit photon contains the energy of two bits, whereas a long-length photon has several bits. Two unit photons build the least length photon. When an overt photon interacts with the north-sided tip of the laterally orientated electron at approx. 90° angle, it gets divided into bits of energy. Bits of energy can further divide into pieces of heat.

When a photon interacts with the side of the electron of a semisolid or solid atom, it diffracts, dividing into pieces. Pieces of the broken photon dissipate the heat and permeate the force.

When an outer ring electron of a silicon atom executes confined interstate dynamics, two forces apply at a time. However, those forces introduce an auxiliary moment of inertia. In a silicon atom,

energy shapes around the force tracing along the trajectory of an electron. Energy in every electron dynamics shapes from the sides not dealing with the force exertion. When the electron dynamics are for one forward or reverse cycle, they generate a unit photon in shape like Gaussian distribution with turned ends.

The exerted forces on the electron change the aspects by restricting it in the interstate gap. The force and energy shaping along the trajectory of the electron remains preserved. The auxiliary moment of inertia is at each point of the turning electron. In a silicon atom, a reference point of the electrons executing dynamics is the center of an atom. In the first stage, an electron lifts laterally. The forces exerting on the electron remain conserved within the interstate electron dynamics. Before crossing the maximum limit point, the electron is examined by the opposite forces pulling it.

In return, it gets relief from the effect of first-half forces. So, to turn, opposite forces are exerted on the electron. Path-independent conservative forces exerted on the electron acquiring its lateral and adjacent positions are within the natural viability. The electron executes interstate dynamics nearly at the speed of light. Electrons of the suitable atoms build a bandgap where photons propagate to define the photonic band gap. In the propagation of photons, force energy together transfers to another end.

Different atoms generate photons of different shapes depending on the built-in interstate gap of electron dynamics. So, suitable element atoms can generate photons other than a waveform depending on their built-in interstate electron gap. Such investigations open up new horizons in energy science and materials science.

Data Availability Statement: The work is related to the fundamental nature of science.

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