New Physics

Short description for structure of atom, emission of photon, electric and magnetic fields, energy release in chemical and nuclear reactions

By
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Introduction

Most of the present-day technologies are modified or well improved concepts of previous concepts or technologies and still in the process of advancements. This makes them more accurate, sophisticated and efficient as time passes. Unfortunately, in the field of fundamental-theoretical physics, there are some 'frozen concepts' that proposed by scientists one or one and half centuries back. For example, the electromagnetic wave theory of light, mass- energy interchangeable concept and recently, electron clouds surround the nucleus of an atom, matter waves, uncertainty principle, wave particle duality for electron, light etc.

Considering the very fundamental nature of matter and energy, most of the present-day technologies are functioning on a highly macroscopic world and which are not affected by the accuracy of the understanding of the 'real facts' in the too microscopic physical world and hence a little exploration on these areas are tending to investigate by the scientists. Here I would like to share my findings about matter and energy with the scientific community.

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Space inside of atom is not empty, but filled with space matter. In lowest energy level, electrons in an atom have no any motions.

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(3) Chemical relations and releasing of energy

Releasing of energy in a chemical reaction is due to the releasing/expansion/explosion of space matter.

(4) Space matter
Space matter is filled everywhere in the universe. Most of the phenomenons in the physical world are closely connected with the presence of space matter. For example, from light propagation to pair production, from chemical energy to nuclear energy, from starlight bending to gravitational lensing, from strong force to gravitational force.

(5) Nuclear reactions and releasing of energy
Releasing of energy in a nuclear reaction is due to the rapid-huge increasing of volume of ordinary matter to space matter.

(1)
Structure of atom

Introduction
After the Ruther Ford's famous **'**Alpha particle-gold foil experiment', scientists start to explore the state of electrons in atoms. Firstly they thought the electrons are "rotating" in circular orbits around the nucleus in high speed (planetary model). After understanding the instability of this model, they started to think about a series of 'fixed energy levels' for the "orbiting" electrons. At this time, some came up with the idea that, light exhibits the so-called 'wave- particle' dual nature. This was the time to Louis DeBroglie's 'breakthrough postulate' that, particles (electron in this case) have wave nature as well as their particle nature. Many scientists have misguided with these "dual nature" of light and particles and that eventually led to the fabrication of many 'breathtaking' ideas like matter waves, standing waves, electron clouds, uncertainty principle etc and all these are resulted in the development of the present atom model. The model says that, the nucleus of an atom is surrounded by a series of stationary waves. These waves have crests at certain points, each complete standing wave representing an orbit. The absolute square of the amplitude of the wave at any point at a given time is a measure of the probability that an electron will be found there. Thus, an electron can no longer be said to be at any precise point at any given time. This series of stationary waves by the electrons are used for explaining all phenomenons that generated by atoms.

In physics, the Quantum mechanics - the study of the relationship between quanta and elementary particles, is created purely based on the concept of 'dual nature' of particles and light. The historical background for these theories is that, the Ruther Ford's experiment has proved that the 99.98% of the mass of an atom is concentrated in its nucleus only and which has only a diameter of about 1/10000 of the diameter of the atom. This 'mysterious' huge volume of space inside of the atom out of the nucleus has compelled the scientists to find that, what makes the volume of an atom? From the belief of the 'wave- particle duality' of photon, the dual nature was also suggested to particles and reached in a conclusion is that; series of standing waves by the electrons cause the volume and rigidity of atoms.

Experiments that led to believe the 'wave nature' of particles

1) Particle diffraction experiment
2) Slit experiment
3) Davisson and Germer experiment

We can see that, in all these experiments, particles are accelerated to at a great velocity. When particles are accelerated or they are getting kinetic energy, they will try to dissipate its energy and oscillate. The oscillations are caused by one or more reasons as follows- a) interactions with the space matter (charged particles make electric and magnetic field lines by the lineup of space matter units as a chain-see below), b) interactions with the surrounding particles, c) interactions with the surrounding electric or magnetic fields, d) interactions with the radiation background (from radio waves to much higher frequency waves) etc. In short, particles will exhibit wave nature when they are moving in high speed. Also, particle's wavelength decreases with the increasing of their speed. I.e. a particle's frequency increases with the increasing of its kinetic energy.

A particle (charged) can be accelerated in different ways

1) Attraction by opposite charged particles.
2) Repulsion by same charged particles.
3) Attraction by magnetic field.
4) Repulsion by magnetic field.
5) By incident photons.
6) Radioactive nucleus can emit accelerated particles.

Today we know that, in an isolated, non-radioactive atom, there are two types of forces are exerted on its electrons.1) Attractive force from the nucleus, 2) Repulsion between the electrons (in a hydrogen atom, attractive force from the nucleus only). But, these forces cannot able to make the electrons in a consistent motion. Since there are no consistent motions for electrons, there is no any wave nature for electrons.

An electron can exhibit wave nature only when the electron is situated in one or more situations stated below

a) Radiation background: - In a background from radio waves to gamma rays.
b) Varying electric or magnetic field.
c) When an electron is accelerated by an electric field (attraction or repulsion).
d) When an electron is accelerated by a magnetic field (attraction or repulsion).
e) When an electron is accelerated by a radioactive nucleus (beta ray).

Since the 'stationary waves' theory of electrons in the atom has proved wrong, then many questions emerge

a) What prevents the electrons from falling into the nucleus?
b) What makes the volume of an atom?
c) What makes the rigidity of an atom?
d) How an atom emits or absorbs light?
e) How atoms bond together to make molecules? etc.

Since there is no angular momentum (and so, no centrifugal force) for electrons, there must be a force that prevents the electrons from falling into the positive charged nucleus. Refraction when light passes from one medium to another medium (i.e. the slowdown of velocity, when light enters to a medium), pair production of one electron and one positron when an energetic gamma ray photon is passed through near a heavy atomic nucleus, elastic nature of atoms- for example, a) gas atoms move randomly in high speed and bounce back when they collide with other atoms or its container, b) the capacity of a material to store thermal energy (oscillation and collision between atoms), slight mass gain in endothermic chemical reactions and slight mass lose in exothermic chemical reactions etc suggest that, the space inside of an atom is not empty, but filled with a form of matter. I name this matter "space matter". (A method for detecting space matter that released in an exothermic chemical reaction is explained below. See the 'space matter' section). Releasing of energy in a nuclear reaction is due to the rapid-huge increasing of volume of ordinary matter to space matter (see 'nuclear energy' below). Space matter is filled everywhere in the universe. Since the gravitational pull that exerted on space matter, all massive bodies have a denser medium of space matter envelope. Starlight bending and Lensing effect are the evidences for the denser medium of space matter that surround massive bodies (see below).

Conventionally we know that, there are two types of forces that are acting on the electrons in multi-electron atoms (i.e. above of the hydrogen atom). They are, 1) attractive force from the nucleus, 2) Repulsive forces between electrons (electrons within a shell and electrons from inner and outer shells). But we see above that, there is an additional force that exerted on the electrons, which keeps the electrons from falling into the nucleus. That force is the buoyant force that exerted by space matter.

So, there are three factors that determine the electron configuration in a multi-electron atom; they are,

a) Attractive force from the nucleus, b) Repulsive forces between electrons, c) Buoyant force exerted on the electrons by space matter.

We know that, every element has its own unique set of spectrum lines (emission or absorption). Since the emission lines from the atom of an element are unique, we can consider an atom of an element consists of a unique- series of natural frequencies for its electrons. The shortest wavelength radiation that one atom can emit increases with the increasing of its atomic mass. I.e. the natural frequency of the innermost electrons of an atom increases with the increasing its atomic mass.

From Wien's law, we see that a very cold object with a temperature of only a few Kelvins emits primarily microwaves. An object at "room temperature" (about 295K) emits primarily Infrared radiation. And an object with a temperature of a few thousand Kelvins emits mostly visible light. An object with a temperature of a few million Kelvins emits most of its radiation in the X-ray wavelengths.

From this, we can see that, as the temperature increases, an atom's more and more inner electrons will be excited and emit higher and higher frequency radiations.

When a low-pressure hydrogen gas is excited in a discharge tube, the hydrogen atoms generate a set of spectrum lines. Since the hydrogen atom has only one electron, the shortest wavelength radiation that the hydrogen emits will be the natural frequency of electron shell of the hydrogen atom.

Because of hydrogen has only one electron; unlike other multi-electron atoms, the electron configuration in the hydrogen atom is determined by only two factors. They are 1) attractive force from the nucleus and 2) buoyant force by the space matter. We can see that, in hydrogen atom and helium atom, the buoyant force is the only force that keeps the electron ('electrons' in helium) from falling into the nucleus (in a multi-electron atom above of the helium, after the electrons in the innermost shell, the buoyancy and the repulsion from electrons in inner shell(s), both play their roles for preventing the electrons from falling into the nucleus).

From this we can conclude that, a) the density of space matter is greater at the near surface of the nucleus of an atom and it decreases with the increasing of the distance from the nucleus, b), the natural frequency of the innermost electron shell of an atom will be greater and it decreases with the increasing of distance from the nucleus, and c) the radius of an atom is greater than the radius of the outermost electron shell of that atom.

By observing the spectrum lines that generated by hydrogen atoms in a discharge lamp, we can find a wide range of shorter and longer wavelength radiations. From the above, we understood that the natural frequency of the electron shell of hydrogen atom is the shortest wavelength Lyman series. Then how a hydrogen atom can emit this wide range of frequencies? From this we can be reached in a conclusion is that, an atom has an enormous number of 'transitory shells' as well as their electron shells. We see above that the density of space matter is greater in the near surface of the nucleus and it decreases with the increasing of distance from the nucleus and also, the natural frequency decreases with the increasing of the distance from the nucleus.

So, it is clear that, when an atomic electron is excited, it will oscillate in the natural frequency of its shell and emits a photon in that frequency. Since the density of space matter is greater in the inner region of the atom, for every oscillation towards the direction of the nucleus, the high-density space matter in the inner region of the atom expels the electron to an outer low-density space matter region.

How the space matter shells are formed?

We can see that, the line spectrums of isotopes of same element are slightly different. Since the isotopes of same element have same number of protons, we can conclude that the electric charge of the nucleus plays no role in the development of space matter shells. So, the other possible force is the strong force.

Space matter is filled everywhere in the universe. Since every particle is sinked (dipped) in space matter, the distance from the nuclear particles in an atom to its surrounding space matter units (individual units of space matter) is sufficiently close for transmitting the strong force (it is noted that, the strong force has only a range of 10^{-15}

m). The strong force is transmitted through the space matter in a very inefficient way. That is, after passing through a critical amount of space matter in outward direction from the nucleus, it will become to zero. This zero point determines the radius of an atom. The quantity of space matter that surrounds a nucleus is determined by its mass. That is, a heavy nucleus can hold a greater amount of space matter than a low mass nucleus and so the quantity of space matter in a heavy atom is greater than a low mass atom.
Also, since there are no appreciable volume differences between atoms of different elements, the average space matter density in an atom increases with the increasing of the mass of its nucleus.

Facts behind the natural frequencies for shells

Since the incredibly constant density and elasticity of space matter at every fixed distance from the center of the nucleus of an atom (that is, each of the space matter regions that with a precise radius from the center of the nucleus), each of those regions of space matter acts as resonant columns with unique natural frequencies. As the density of space matter decreases with the increasing of the distance from nucleus, each of the different space matter density regions can be consider as shells. An atom consists of an enormous number of space matter shells with each of they are having their own unique natural frequencies. The space matter density and natural frequency of the innermost shell will be greater than all other outer shells and it lowers with the increasing of the distance from the nucleus.

State of electrons in an atom

Normally, all atoms in the nature are situated in one or more energy backgrounds and the electrons in atoms are influenced by those energy backgrounds. For example, incident photons, varying - electric field / magnetic field, collisions of energetic particles with atoms, collisions between atoms etc. When low energy background influences outermost electrons of atoms, a high-energy background influences both the inner and outer electrons. Radiations by an atom (from micro waves to X-rays) are the direct indication for which of the electrons are excited. That is, if an atom emits only microwave frequencies, then we can conclude that only outermost electrons of that atom are excited and the all-inner electrons are perfectly stationary. But, when an atom emits more and more higher frequencies, we can understand that the atom's more and more inner electrons are excited as well as its outer electrons.

Mode of oscillation of electrons in atoms

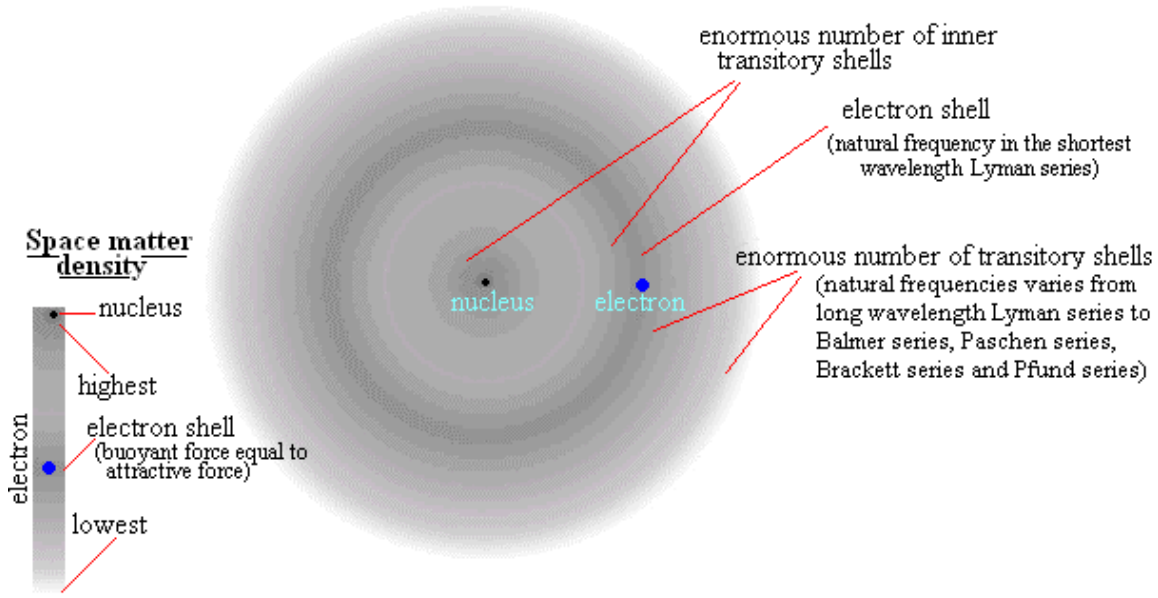
There are two types of oscillations for atomic electrons.

a) Horizontal oscillations (light reflecting): When the binding energy (to the nucleus) of an electron is greater than the energy of an incident photon, the electron will make horizontal oscillations (about the nucleus) and the light will be reflected. For example, the reflection of microwaves, light etc when they fall of atomic electrons.

b) Vertical oscillations (light emitting): If the background energy is greater than that

of the binding energy of electrons, the electrons make vertical oscillations (about the nucleus) and light will be emitted. For example, all types of the excitation of atoms (collision of high energy particles on atoms, when high energy photons fall on inner electrons - secondary radiations, Compton effect etc, exothermic reactions, electric resistance of materials etc).

Cross sectional diagram of hydrogen atom
(electron in lowest energy level)



Recall the main points:

1) An atom consists of a few number of *electron shells** (depends on its atomic number) and enormous number of *transitory shells**.

* Electron shells: - Regions where the electrons are configured in an atom, when the atom is in lowest energy level.

* There are two types of transitory shells: - a) Possible regions, which the electrons can jump from their electron shells, when they are in an excited state. b) Inner transitory shells - Shells that inside of the inner most electron shell. The space matter density in the inner transitory shells that close to nuclei of heavy atoms is sufficient for the production of electron - positron pair, when energetic gamma rays pass through them (see Pair production). In the case of Bremsstrahlung (braking radiation) that caused by the collision of very high-energy electrons on atoms, inner transitory shells play important role.

2) Every electron shell and transitory shell of an atom has its own unique *natural frequency**. Innermost electron shell has the shortest wavelength frequency and the outermost electron shell has the longest wavelength frequency (in the case of photons emitted by the electrons in the electron shells).

*Theoretically it means that the frequencies of absorption lines or emission lines that produced by cooled

atoms (of any element), when they are placed in the path of continues spectrum of Infrared rays to X-rays.

3) The longest wavelength photon that one atom can emit is the natural frequency of the outermost transitory shell of that atom.

4) When an electron oscillates in its shell, the high-density space matter in the inner region of the atom expels the electron to an outer low-density space matter region. I.e. an electron will jump from an inner region to an outer region when the electron is exited and emits a photon.

5) The radius of an atom is greater than the radius of the outermost electron shell of that atom.

Exploring the line spectrum of hydrogen

When the electron shell of a hydrogen atom is excited it will oscillate in its natural frequency, and so the electron present in the shell. This oscillation of the electron causes the emission of the shortest wavelength- Lyman series photon (because, that frequency is the natural frequency of the electron shell of hydrogen atom) and jumps from the shell to an outer transitory shell. If there is no any further excitation for the atom, the electron will instantaneously fall back to its shell. Also, this fall into the shell can cause, the shell get excited in a nominal fashion and the emission of a low intensity photon in the natural frequency of the shell (additionally, this oscillation of the electron can cause, it to jump to a nearer outer transitory shell. If an energetic electron from an external source simultaneously excites this transitory shell, the electron will emit a Lyman series photon in a long wavelength).

But, if the transitory shell (to which the electron has initially jumped) is simultaneously excited by some ways (for example, collision of an energetic electron from an external source --in a discharge tube-or collision between atoms), the electron will again get excited and emit a photon with a longer wavelength, in the natural frequency of that transitory shell. Also, this excitation of the electron will cause a further jumping to a more outer transitory shell, and these processes can be continued until the electron is expelled out from the atom and to turn the atom into plasma of hydrogen at a very high temperature.

For every jumping of the electron to a more and more outer transitory shells, and the excitations of that transitory shells can cause the emission of more and more long wavelength photons, and this is the reason for the emission of more long wavelength photons like Balmer series, Paschen series, Brackett series, Pfund series etc.

Elasticity of atoms and heat transfer

Atoms are highly elastic. The outer shells of atoms have high elasticity because of they have low density of space matter in it. The elasticity of shells gradually decreases, as they close to the nucleus.

There are many examples for the elastic nature of atoms.

a) The random motions of gas atoms and collision between them, b) The random motions of molecules in a liquid, c) Vibrations of atoms in solid materials and heat transfer etc all

are evidences for the elastic nature of atoms. Atoms of lighter elements have more elasticity than that of the atoms of heavy elements. For example, gas atoms move in incredibly high speed and bounce when they collide with other gas atoms or its container.

Some important phenomenons in the atomic world

Zeeman effect

We see above that, the electron configuration in an atom is determined by three factors. a) attractive force from the nucleus, b) repulsive forces between electrons c) buoyant force by space matter.

When an atom is placed in a strong electric or magnetic field, its electron configuration is altered from the atom's normal state. That is, some of the electrons in the electron shells are shifted to inner or outer transitory shells by the influence of the external field. When such an atom is excited, it will emit radiations with the natural frequencies of the 'newly created electron shells' and other transitory shells (and also, its original electron shells). The Zeeman effect is the direct indication of strength of the field. I.e. when a weak field affects only outer electrons, a stronger field influences both the inner and outer electrons. Also, lighter elements can demonstrate Zeeman effect in a weak field comparatively than heavy elements, because of the electrons in a lighter atom are loosely binded than that of a heavy atom.

Absorption spectrum

Every shell (electron shells and transitory shells) of an atom has its own unique natural frequency (or resonant frequency). When a cooled gas is placed in the path of continues spectrum of light, dark absorption lines will be appeared in the resulting spectrum. This absorption lines are caused by the absorption of that particular frequencies by the gas atoms. That means the natural frequencies of some of the electron shells and primary transitory shells of the gas atoms are same as the frequencies of the absorbed spectrum lines.

Emission spectrum

If the same gas is examined at an oblique angle, bright emission lines will be visible against a dark background. The emission spectrum lines are caused by the reflection of light (that absorbed by the gas atoms) by the electrons in the above stated shells. That is, the emission lines are purely the reflection of light from the gas atoms by its electrons. If we can make the whole of the absorption spectrum lines or emission spectrum lines of an atom in all frequencies from Infrared rays to X-rays at their cooled state, we can directly observe the natural frequencies of each of the electron shells and the primary transitory shells of that atom. The total number of electron shells and the primary transitory shells in an atom is equal to the total number of absorption or emission spectrum lines. And the natural frequencies of the electron shells and primary transitory shells are, if we consider the emission lines, then the high frequency line for the innermost electron shell and the low frequency line for the outer most primary transitory shell. Same as, if we consider the absorption lines, then the high frequency absorption

line for the innermost electron shell and the low frequency absorption line for the outermost primary transitory shell.

Mechanism of reflection (reflection of light)
The reflection of light occurs when the light falls on the electrons that in the outermost shells of atoms / outermost electrons in atoms of molecules that in the reflective surface or free electrons in the surface of a reflective material.

The binding energy of 'light reflecting electrons' to its atoms / molecules or to the surface of the reflecting material (in the case of free electrons) will be always greater than that of energy of incident photons that are reflected by the electrons. When light falls on these electrons, they will oscillate with the frequency of the incident photons and the light will be reflected.

Photoelectric effect
In an external photoelectric effect, electrons are liberated from the surface of a metallic conductor by absorbing energy from light shining on the metal's surface. In this case, the binding energy of photoelectrons (electrons that are liberated in the photoelectric effect) to the metal surface will be always lower than the energy of the incident photons that causes the photoelectric effect. The kinetic energy of a photoelectron is depended on the energy (frequency) of the incident photon.

When energetic photons fall on the low binding energy electrons in the metal surface, they will oscillate with the frequency of incident photons. This oscillation causes, the oscillating electrons induce its oscillations to the elastic-outer shells of nearby atoms that in the metal surface. This induced oscillations of outer shells of the atoms cause, it to expel (kick) the free electrons from their surface.

The kinetic energy of a photoelectron will increase with the increasing of the frequency of incident photon. That is, as the ejection of photoelectrons are purely because of the elasticity of outer shells of atoms that in the metal surface, as the energy of incident photons increases, the outer shells of atoms kick the electrons with more kinetic energy.

Compton effect
Compton effect occurs when the binding energy of an atomic electron to its nucleus is slightly less than the energy of incident high-energy photon.

We see above that, every electron shell in an atom has its own unique natural frequency. When a high frequency photon is falls on an electron that in an electron shell with which having a natural frequency less than that of the frequency of incident photon, because of an electron can only oscillate in the natural frequency of its electron shell within that shell, the electron will oscillate with the natural frequency of its shell, and a photon with the natural frequency of that electron shell is emitted at an angle to the direction of the path of the incident photon. This emission of the photon, which has a long wavelength than the incident -short wavelength photon, is the Compton photon.

We see above that, when an electron is excited, it will jump from an inner region to an outer region in the atom. So, the Compton electron will jump at an angle to the direction of the path of the incident photon.

Pair production

The pair production process is one of the most interesting demonstrations for the presence of space matter in atoms. When a gamma ray photon with the energy of 1.2 MeV passes through near a heavy nucleus (that is, the innermost transitory shells) it can result the production of one electron and one positron. The quantity of space matter that closer to a heavy nucleus is equal to or more than the mass of one electron and one positron, because of its high density at these region. When such an energetic gamma ray photon is passed through the high-density space matter region, the individual space matter units will be bonded together to produce the electron-positron pair.

When a pair production occurs, the equal amount of space matter (with the mass of one electron and one positron) will be entered from outside of the atom and the natural densities of the space matter in the atomic shells will be always maintained.

(2)
What is light?

Introduction

Maxwell's electromagnetic wave theory of light originated mostly from three phenomenons.1) When a conductor brakes a magnetic field, an electric field is created within the conductor, 2) Flowing of electrons through a conductor creates a magnetic field around that conductor, 3) Faraday effect- a magneto-optical phenomenon (the rotation of the plane of polarization by the application of a magnetic field). Maxwell has mistakenly concluded that, if an oscillating magnetic field creates an oscillating electric field in a conductor, an oscillating magnetic field should also create oscillating electric field in empty space. He has also believed that, oscillating electric field creates magnetic field. He has hurried with these observations and applied this in the development of his theory of light. The theory says that, light is an electromagnetic phenomenon and the perpendicularly oscillating electric and magnetic fields in space make the propagation of light.

In this article we see that, an oscillating magnetic field can create an oscillating electric field only in a conductor and not in empty space.

When a conductor breaks a magnetic field, the magnetic field lines exert force on the free electrons (mobile electrons) and push or pull them through the conductor. This creates an electrical potential difference between the ends of the conductor. On the other hand, magnetic field is created when charged particles are aligned in a single mode in a material.

Electric field
Electric field will be created in the below stated circumstances.

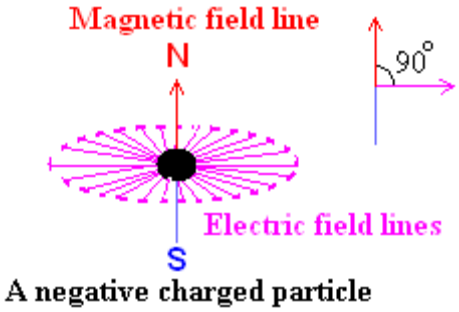
a) A charged particle (negative/positive) can create an electric field around that particle.
b) An oscillating magnetic field can create an oscillating electric field within a conductor.
*Electric field lines hold nucleus and electrons in an atom together; atoms in a molecule are together.

*An unbalanced and opposite charges within a conductor or between two conductors cause the flow of charges through that conductor(s).

Magnetic field
A charged particle (positive/negative) has magnetic property and act as a small magnet. When charged particles are aligned in a single mode in a material, a magnetic field will be created around that material. For example, when electrons are flowing through a conductor, all electrons will be aligned in a single way. This alignment of flowing electrons creates a magnetic field around that conductor (flowing electrons cause to align them, otherwise there is no any direct connections between motion of electrons and magnetic field). In a permanent magnet, outer electrons of the atoms of domains are aligned in a single way and all domains are also aligned in a single way. This alignment creates a magnetic field around a permanent magnet. In the case of an iron core inside of a solenoid, the influence of the magnetic field that created by the flowing electrons in the conductor, the outer electrons of the atoms of the iron core will be aligned in a single way and causes to create a magnetic field around the core. Since the mutual repulsions between magnetic lines, the magnetic field lines created by a magnet will be always are bended.

Charged particles
* Electron is a particle with having 'North Pole dominated' magnetic property (electron's magnetic line starts from its North Pole and ends at South Pole).
* Proton is a particle with having 'South Pole dominated' magnetic property.
* Negative charged particles (electron, antiproton etc) have North Pole dominated magnetic polarity and positive charged particles (proton, positron etc) have South Pole dominated magnetic polarity.

Creation of field lines
A charged particle creates electric field line and magnetic field line in right angle (see image below). Charged particles have electric and magnetic fields, whether it moving or not, unlike the current belief. The both field lines are created by the alignment of '*space matter units**' as a chain (see space matter section below). [* Space matter unit => individual unit of space matter]



Magnetic line propagation: - How the magnetic line is propagated?
"Electric/magnetic line is propagated by the propagation of compressing of space matter units"

One of the major properties of space matter unit is that, it is compressible and de- compressible from its natural volume (see space matter). When they are lineup in a field line (electric or magnetic), the particle's individual volume will be decreased from its natural volume and get compressed.

Because of the magnetic induction, the line upping of space matter units will be propagated through the space. When an electron attracts a space matter unit, it will be compressed and the magnetism is transferred to the adjacent space matter unit, and that space matter unit will be also get compressed and this process will be continued and the line will be propagated through space with the velocity of light. Normally, magnetic lines that created by charged particles are bended because of adjacent magnetic fields created by adjacent charged particles (because of mutual repulsion between lines).

Light propagation: - How the light is propagated?
We see above that, charged particles make magnetic field lines by the lineup of space matter units. When a negative charged particle like electron oscillates, the 'line' that formed on the 'North Pole' of the electron will oscillate with the electron and the oscillating magnetic line (OML) is propagated through space with the velocity of light. The OMLs will be always radiated perpendicular to the oscillation of charged particles. That is, there is a 90* angle between oscillation charged particles and emissions OMLs.

Why do radio waves bend and light rays are not?

We can see that, as the wavelength of a radiation increases, they bend significantly. For example radio wave frequencies. And conversely, as the wavelength decreases to up to the visible light, they travel straightly. As the length of OMLs increase, the chances of mutual repulsion between them are also increase. And conversely, short wavelength OMLs create minimum mutual repulsion between them.

Flow of electrons through a conductor and magnetic field

We see above that, when electrons are flowing through a conductor, all electrons will be aligned in a single way and that alignment creates a magnetic field around that conductor.

A low voltage- high current creates a short-range, concentrated magnetic field. But, a high voltage- low current electron flow creates a long range (wide spreading), diluted magnetic field.

In a high voltage -low current electron flow through a conductor, there are two factors that affect the resultant magnetic field.

a) Drift velocity increases with the increasing of the voltage, b) As the current decreases, the number of magnetic field lines are created by the electrons will be also decreased.

Because of these factors, the 'field density' at any point of the conductor will be less and so the mutual repulsions between the magnetic lines will be also less. Since the mutual repulsions are less, the magnetic field lines to spread at a wide range.

Oscillating magnetic field created by a radio wave transmitter
We can see that, the transmission range of a transmitter circuit sharply jumps when we deliver the signal to the circuit in the tuned frequency with an increased voltage.

The tuned frequency with the increased voltage influences the transmission range in two ways.

1) Since at resonance the voltage is maximum and current is minimum in a resonance oscillator circuit, the transmitter creates oscillating magnetic lines with minimum mutual repulsion between them because of the field density is minimum at any point of the transmitter. In this minimum mutual repulsion, the magnetic lines will be comparatively straighter and spreads wide range.

2) Since the increased drift velocities at higher voltages, when the electrons oscillate, high amplitude oscillating magnetic field lines are created. (Since the amplitudes of photons that emitted by atoms are almost the same for all frequencies, we consider only the photon's frequency when we calculate its energy. But, the radio waves can be generated with different levels of amplitudes, they should be also considered as well as the frequency, when we are calculating the energy of a radio wave).

Induction in the receiver antenna
We see above that, an oscillating magnetic field creates an oscillating electric field in a conductor. When the oscillating magnetic lines fall on the receiver antenna, tiny oscillating electricity is created in the antenna and a tuned receiver circuit can pick up the signal.

Recall the main points:

- Photon (light) is intermittent oscillating magnetic line. A polarization filter permits to pass only the OMLs that vibrate in phase with the filter gaps is a demonstration for the OML nature of light.
- Emission of photons by an atom is caused by the oscillation of its electrons.
- Frequency of an emitted photon is the frequency of the oscillating electron.
- There is a 90* angle between the oscillation of electrons and emission of photons.
- Velocity of light is the velocity of the propagation of magnetic lines (i.e. the velocity of the lineup of space matter units).

- As like in the case of an electromagnetic induction (in an electric generator or a transformer), an OML photon has the ability to oscillate an electron in a material. For example, an OML with the frequency of a radio wave makes tiny oscillating electricity in the receiver antennae of a radio receiver in the frequency of that radio wave OML. In the case of an external photoelectric effect, when the sufficient frequency OML photons fall on the free electrons of some elements, electrons are liberated. Light reflection, Compton effect, ionization of gas atoms by high-energy photons etc is also the demonstrations for the OML nature of photons.
- Since the photon nature (intermittent) of light, it is very difficult to influence on light by magnetic fields. But a continues radio wave transmitted by a radio wave transmitter, can be disturbed with the help of a strong magnetic field.

(3)
Chemical reactions

When atoms react with other atoms, the volume of individual atoms decrease because of the overlapping between them. I.e. the volume of any product molecule is less than the sum of the separate volumes of its reactant atoms. The releasing of energy in a chemical reaction is directly related to 'how much the atoms are overlapping each other'. If the overlapping is more, then the releasing of energy will be also more and if the overlapping is less, then the releasing of energy will be also less.

We see above that, space matter shells surround nucleuses of atoms and the diameter of an atom is greater than the diameter of its outermost electron shell. I.e. the outermost electron shell of an atom is covered by further outer transitory shells. When a bond making between atoms occur (i.e. the sharing of outer electrons between atoms), the atom’s outer transitory shells will overlap each other. When they overlap, the overlapped volume of space matter will be released for maintaining the natural densities of space matter in the shells. Since the space matter is in compressed state in the shells of atoms, when they released, they will explode. Since these explosions are take place where from the regions the atoms are bonded together, the product molecules act as projectile with great kinetic energy. When these energetic molecules collide with the surrounding molecules/atoms cause the generation of heat energy.

Mass defect
Since an exothermic reaction releases space matter from the reactant atom's overlapped shells, the mass of the released space matter will be decreased from the reactant’s original masses (this effect is only measurable if the reactants are in much quantity).

Endothermic reactions
All form of bond braking reactions between atoms / molecules (large molecules into smaller molecules) absorb energy for the splitting process (in some cases, some bond braking reactions seem as non- endothermic. But the fact is that, in the same time of the bond braking reactions, there will be some types of bond making reactions are also

underway. The bond braking reactions absorb this energy, that released in the above reactions and the net effect appears as neutral).

Electrical force of attractions between the ‘shared electrons’ and the nuclei of reactant atoms hold the atoms in a molecule are together. The equal amount of energy that released when they are bonded together is required to separate the atoms. When the bonding brakes, the overlapping between atoms withdraws. This withdrawal causes the nuclei of atoms absorb space matter from surroundings for maintaining the space matter densities in natural levels in their shells.

Mass gain
Since the absorption of space matter from outer regions to the product atom's (or atoms in the product molecules) shells, the net masses of the products will be increased (here also, this effect is measurable only if the reactants are much in quantity).

Recall the main points:
*Sharing of electrons between atoms cause the formation of molecules and releasing of energy (exothermic).
*All bond making reactions release energy.
*Withdrawal of the shared electrons between atoms in a molecule set the atoms free and these reactions absorb energy (endothermic).
*All bond-braking reactions absorb energy.
*The releasing of energy in a chemical reaction is due to the releasing, expansion or explosion of space matter

(4)
Space matter

Space matter is filled everywhere in the universe. All matter in the universe (in the ordinary world) is made of space matter. Since the gravitational force is exerted on space matter, a denser region of space matter surrounds all massive bodies. Bending of light when it passes through near massive objects like stars, lensing effects in some regions in the galaxies are because of the refraction of light by the denser space matter that present in these regions and are purely the demonstrations for the presence of space matter in the macro world. Increasing of mass of a fast moving body, change in shape of a body resulting from its motion; the effect, known as the Lorentz-FitzGerald contraction etc are also the evidence for space matter in space. Also, electric field lines and magnetic field lines are created by the alignment of space matter units.

All form of energies (except gravitational potential energy) are released because of the explosion, expansion or releasing of space matter. For example, the releasing of energy in a nuclear reaction is due to the rapid-huge increasing of volume of ordinary matter to

space matter. The missing mass (mass defect) in a nuclear or chemical reaction is converted into space matter. Since the ordinary matter is an extremely compressed state of space matter, when it released, they will explode violently and release energy.

Space matter wind (ether wind)

The Earth orbits the Sun in about 30 km/s. The Sun orbits the Galactic center in about 250 km/s. The Milky Way's orbital or linear motion --km/s. Also, if we consider the direction of motion of a particular celestial object against a frame of reference, because of the orbital motions of smaller systems to larger systems, is constantly changing in time-to-time. For example, as the Earth orbits the Sun, the Sun orbits the Galactic center and the Milky Way itself is moving at a great velocity. We see above that, a body holds a space matter envelop around that body (recall starlight bending and lensing effect). Because of these reasons, the detection of 'space matter wind' when a body moves through the space is difficult to verify.

Properties of space matter units

"The attraction and repulsion in the electric and magnetic field are caused by the contraction and expansion of space matter units respectively".

1) A free space matter unit has no any magnetic property; but when a space matter unit is attracted by a charged particle, it will become a magnetic particle with the same magnetic field strength of the charged particle. This property of space matter unit is the reason behind the creation of electric field lines and magnetic field lines.

2) Space matter unit is compressible from its *natural volume* (the volume of a single space matter unit at its free state). For example, a). We see above that, ordinary matter is a highly compressed state of space matter. b). When the space matter units are aligned in an electric or magnetic field line, they will be get compressed.

3) Space matter unit is de-compressible from its natural volume:
Repulsion between like poles (electric or magnetic) is caused by the de-compressible property of space matter units. I.e. when like poles come face to face, the opposing space matter units will be get expanded. This expansion of space matter units is the reason for the repulsion.

*Attraction between opposite poles is caused by the contraction of space matter units between the poles.
*Repulsion between same poles is caused by the expansion of space matter units between the poles.

Also, the other attractive forces like gravity, strong forces etc are caused by the contraction of 'tiny' space matter units between two bodies and nuclear particles respectively.

A method for detecting space matter

We see above that, the missing mass in a nuclear or chemical reaction is converted into

space matter. Here I suggest a mechanism for detecting space matter that released in an exothermic chemical reaction.

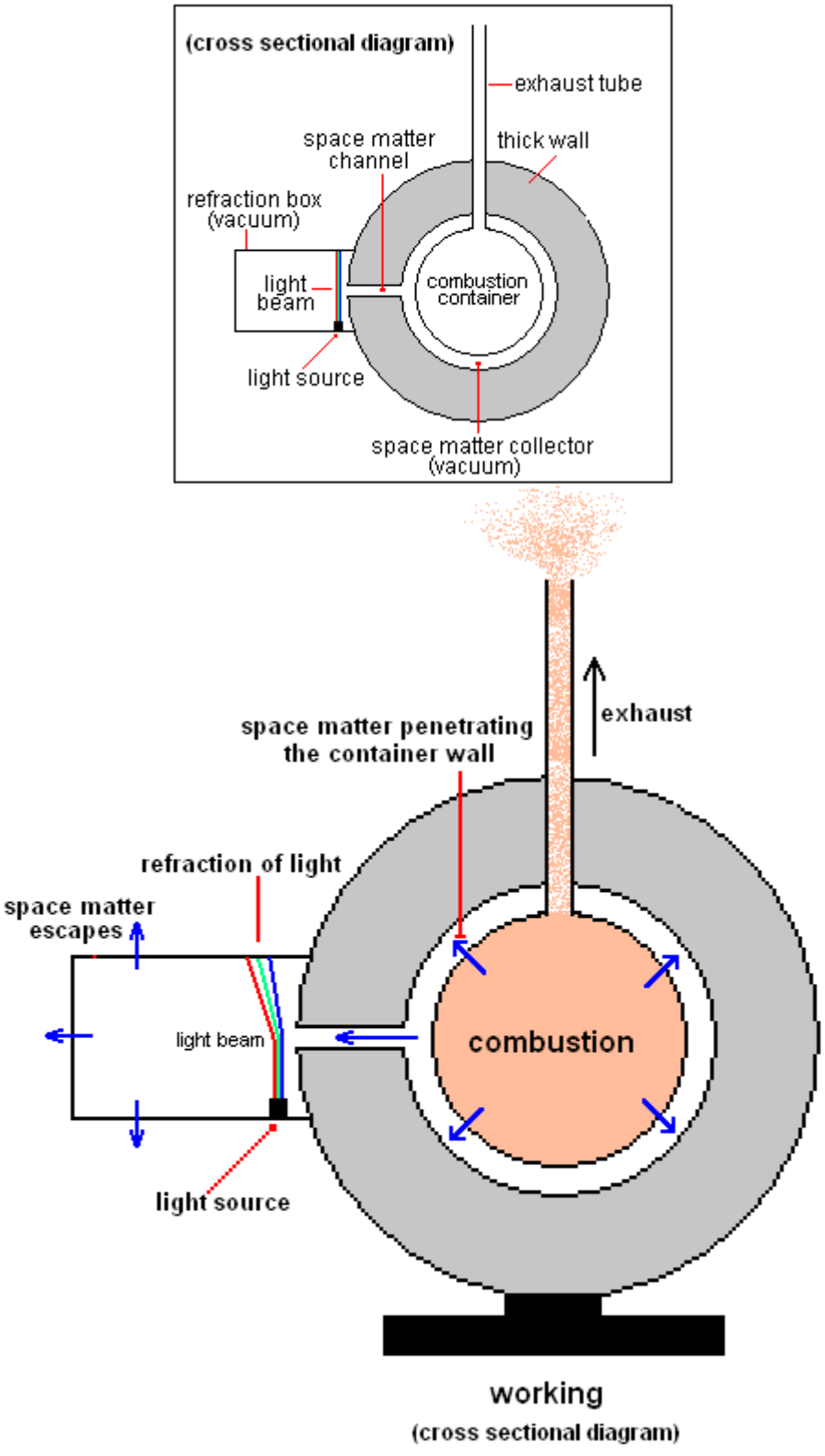


Diagram description

1) Combustion container:
The combustion container is made of high melting point material with low thickness and transparent to space matter.
2) Thick wall: The thick wall is made of high-density material, which prevents the space matter penetrate through it.
3) Space matter collector: The space matter collector is a vacuum space and it sandwiched between the combustion container and the thick wall.
4) Space matter channel: The space matter channel allows escaping the space matter that collected in the space matter collector to the refraction box.
5) Light source: A light source is placed in the refraction box (see fig).
6) Refraction box: The inside space of refraction box is vacuum and the box is made of low density material and transparent to space matter.
7) Exhaust pipe: The exhaust pipe allows escaping the exhaust that developed in the combustion container.

Working

Since the combustion container is transparent to space matter, when the combustion is takes place in the container, the space matter that released in the reaction will be entered to the space matter collector. As the thick wall is made of high density material and less transparent to the space matter, the space matter will escape to the refraction box from the space matter collector, through the space matter channel. When the space matter is flows to the refraction box and the light is passed through the space matter, the light beam is refracted.

(5)
Nuclear reactions and releasing of energy

Introduction

The earlier investigations on the cause of releasing nuclear energy is focused only on the mass deficiency and the mass defect is directly interpreted for the calculation of energy release and arrived in a conclusion is that "mass and energy are interchangeable" and the mass that missed is simply converted into pure energy (Einstein's famous equation $E=mc^2$). In this article we see that, the decreasing of volume of individual nuclear particles in the reactions are also equally important as well as the mass defect for the accurate measurement of the energy release and also importantly, only fusion reactions between nuclear particles release energy. When two or more nuclear particles are bonded together to form a nucleus, i.e. the sticking protons and neutrons together cause some of their volumes to shrink. Since a free proton or neutron (without any binding each other) has its own natural volume and density in constant temperature and pressure, when the particles overlap each other, they tend to release the overlapped volume of matter to the outer world for maintaining the densities of the particles in natural levels. Since the greater densities of nuclear particles, the released matter will detonate and will become to space matter (reference from my notes, written in 1994 April). Since these explosions are

take place where from the regions that the particles are bonded, the bonded particles act as projectiles with very great kinetic energy. When this highly energetic particles collide with the surrounding particles with colossal kinetic energy, which causes the intensive thermal and other form of radiations as well as the enormous blast waves.

Releasing of energy in the fusion process

When one proton and one neutron are fused together to form a deuterium nucleus, their net volume decreases (because of the overlapping between the particles) without changing (without increasing) its densities. Then what will be happened? The only option is to release the overlapped volume of their masses to the outer world. It is noted that, the density of an atomic nucleus is about 10^{14}g cm^{-3} (i.e. the combined density of proton and neutron in a nuclear formation). Then what will be happened when such a mass with this density released to the outer world with an undetectable density (with the help of present day technologies)? It is very clear that, it will detonate with an unimaginable expansion ratio and velocity. We can calculate the releasing of energy if we know the expansion ratio (or the density of matter in empty space) from the nuclear density and the time that takes for the reaction.

Absorption of energy in the fission process

When one deuterium nucleus splits into one proton and one neutron, the two particles regain its natural volumes because of the withdrawal of their overlapping, but without changing (without decreasing) their densities. How this will be happened? The only option is to compress the extremely low-density matter (space matter) that present in the outer world, to form the matter with the density of proton and neutron. But, for such compression process of space matter requires a very great deal of energy (the same amount of energy that released in the fusion of one proton and one neutron to form the deuterium nucleus. i.e. the binding energy of proton and neutron in the deuterium nucleus).

One of the major limitations is that, even though we can make fusion reactions between two deuterium nucleus or deuterium nucleus with a tritium nucleus etc, we can not able to precisely split a deuterium nucleus into one proton and one neutron because of the lack of the sufficient technology at present time (the splitting process described above is only theoretical). If we accelerate the deuterium nucleus in a particle accelerator with the sufficient kinetic energy for a collision process, it will be scattered into much smaller elementary particles or even they will be completely vanished and completely released (to become to space matter).

One misunderstanding about the nuclear fission reactions

There is a widely accepted belief is that the fission of large nuclei like Uranium 235, Plutonium 239 etc are release energy when neutrons bombard with them. The real fact is that, when a neutron bombards a Uranium 235 nucleus for example, it absorbs the kinetic energy of the neutron for the splitting process and it is purely an endothermic nuclear reaction. But, the energy is released when the partially scattered nuclear particles (neutrons and protons) are re-arranged and fused together to form the two daughter nuclei of one Cesium and one Rubidium atom. I.e., when a neutron bombards a U235 nucleus, it

splits into two un-spherical pieces as well as 2-3 free neutrons. It is noted that, in a nuclear density, the spherical arrangement of nuclear particles (to a attainable level) is very important for a nucleus for restoring its physical equilibrium state (actually any nucleus, except hydrogen atom with one proton in its nucleus, are not having a perfect spherical shape). For achieving the stable shape, the protons and neutrons will undergo a rapid re-arrangement in the daughter pieces (mostly the particles that present in the outer regions). This process will lead to some extra bonding (fusions) between every of the particles. As stated above, when the fusion reactions between the particles are take place, the net volume that decreased of the particles will be released and expanded and this yields the releasing of nuclear energy as well as the emission of gamma rays like radiations (including the blast -shock waves).

Evidences for the releasing and expansion (detonation) of space matter in the nuclear reactions

a) Kinetic energies associated with the particle radiations in nuclear reactions (nuclear explosions or radioactive decay process): The particles get its kinetic energies from the explosion of space matter (the particle radiations get only a fraction of energy from the explosion of space matter as there is no 100% efficient projectiles)

b) High temperature and radiations: Since the space matter explosions are take place where from the regions that the particles are bonded, the bonded particles act as projectiles with very great kinetic energies. When this highly energetic particles collide with the surrounding particles with colossal kinetic energies, that cause the intensive thermal and other form of radiations.

c). The shock wave is caused by the fast expansion of the air because of the heat (explosion).

Recall the main points:

* Only bond making reactions between nuclear particles release energy.
*All bond-braking reactions between nuclear particles absorb energy.
* Releasing of energy in a nuclear reaction is due to the rapid-huge increasing of volume of ordinary matter to space matter.
*Mass defect (missing mass) in a nuclear reaction is converted into space matter.