

# PROBLEMS IN CONTEMPORARY PHYSICS

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**Abstract:** Contemporary physics has many unsolved problems. Most of them are due to inadequacy of theories or illogical application of one theory to seemingly similar problem elsewhere. An alternative concept, presented in book 'MATTER (Re-examined)' proposes to provide logical explanations to all these apparent problems. In this article, author proposes to present short notes and pointers to detailed explanations in the book. All explanations are based on a single assumption that '*Substance is fundamental and matter alone provides substance to all real entities*'. There are neither imaginary particles nor mysterious actions nor actions at a distance through empty space in this concept. Cause and effect relations are followed in all topics.

**Keywords:** Unsolved problems in physics, problems in contemporary physics.

## **Introduction:**

Following list of unsolved problems in contemporary physics is gathered from various sources on internet. Single headings represent identical or similar problems. Problems, which have no logically accepted explanations and those with recent explanations, are also included in this list, which is not exhaustive. This list shall be elaborated by including more problems as and when they are brought to author's notice. Readers are welcome to point out problems that are not included but have no logical explanations in contemporary physics. Many of major unsolved problems in physics are theoretical, meaning that existing theories seem incapable of explaining certain observed phenomenon or experimental result. They are not problems in physics but they show inadequacy of corresponding theories. Others are experimental, meaning that there are difficulties in creating experiments to test proposed theories or investigate phenomena in detail.

## **Problems:**

### **Space:**

Although space is an undefined functional entity, in certain theories, it is able to perform all actions that a real matter-body is able to do.

All real entities have positive existence and objective reality. Space is a container without form or structure, envisaged by rational beings, whenever they think about a real entity. Space extends to infinity means, matter-bodies can be found however far we go. When space is filled entirely by universal medium, they become synonymous and space becomes a real entity.

Refer: Chapter 2, section 3 in book 'MATTER (Re-examined)'.

**Spatial dimensions:**

Some theories envisage many spatial dimensions to justify their mathematical analyses, disregarding conceptual rationality.

Spatial dimensions are devised by rational beings for convenience to observe their environment. They are man-made conveniences rather than discovered natural phenomena. Generally, we use three-dimensional spatial system in which space is partitioned into eight parts, about a point of origin, by three mutually perpendicular planes. Except convenience to understand relative actions, dimensional space system has no influence on matter-bodies or their apparent interaction.

Refer: Chapter 2, Section 2.3.3 in book 'MATTER (Re-examined)'.

**Action at a distance:**

'Action at a distance through empty space' is the most illogical assumption in contemporary physics. In order to overcome this irrational assumption, various imaginary entities are used to provide intermediary media.

An all-encompassing universal medium, structured by real matter-particles in definite formations, fills entire space and acts as originator and intermediary in all actions in nature.

Refer: [http://www.worldsci.org/pdf/abstracts/abstracts\\_7207.pdf](http://www.worldsci.org/pdf/abstracts/abstracts_7207.pdf), <http://vixra.org/abs/1007.0042>, Chapter 2 in book 'MATTER (Re-examined)'.

**Extent of universe:**

Universe is currently assumed as a closed system, limited within the sphere of its expansion. What is outside the expanding sphere is not considered.

Universe is of steady state and it extends infinitely in all directions. However, extent of universe is limited to the extent of space from which information may be gathered by an observer. This extent is equal in all directions with the observer always in the centre.

Refer: Chapter 4, section 4.10 in book 'MATTER (Re-examined)'.

**Cosmic inflation, Horizon problem:**

On a large scale universe appears uniform. Advent of theory of gravitational attraction necessitated that all matter-bodies in nature accumulate at one point. This is against commonsense and observation. Hence, it has become necessary to invent certain phenomena that oppose accumulation of matter-bodies at one point. Theories on imaginary cosmic inflation and related phenomena, like, cosmological constant, zero-point energy of vacuum, electroweak epoch, etc are invented to justify observation.

Ability of stable galaxies to remain without translational motions in space removes necessity of these baseless inventions.

Refer: <http://vixra.org/abs/1101.0016>

**Particle-wave duality of light:**

Most theories in physics consider light as part of electromagnetic spectrum, while few others assign light with corpuscular nature.

Light and other radiations are flow of basic 3D matter-particles with associated energy (photons). Associated energy is contained in inertial-pocket surrounding 3D matter-core of photon. Inertial-pocket in any transverse plane (about direction of motion of photon), has appearance similar to electromagnetic wave in universal medium. Thus, nature of light is simultaneously particle as well as wave.

Refer: <http://vixra.org/abs/1312.0130>, Chapter 4 in book 'MATTER (Re-examined)'.

**Dark matter, Galaxy rotation problem:**

Apparent galactic rotation anomaly necessitated additional matter in galaxy to sustain observed spin speed. Since no additional matter could be observed, imaginary dark matter was invented to provide suitable explanation to galactic rotation anomaly. As dark matter is not defined, it is assigned different meanings in different theories.

Galactic rotation anomaly is an apparent phenomenon caused by assigning reality to apparent planetary orbital paths around central bodies.

Refer: <http://vixra.org/abs/1403.0972>

**Dark energy:**

Dark energy is an assumed property of empty space, required to validate the assumption of cosmic inflation at accelerating pace.

Since universe is of steady state, assumption of dark energy is superfluous.

Refer: <http://vixra.org/abs/1101.0016>

**Black Hole:**

Theoretical black holes are mysterious matter-bodies with many imaginary properties like; infinite matter-density, event horizon, singularity, etc.

Except for extremely large quantity of 3D matter it contains, a black hole is like any other macro body. It has no special properties or mysterious abilities.

Refer: <http://vixra.org/abs/1310.0195>

**Dilation of solar-day:**

Relative motion between earth's core and moving water-body on its surface due to tides is assumed to cause tidal drag on earth's spin motion to decelerate it. This phenomenon is credited with gradual expansion of terrestrial day.

There is no relative motion between earth's core and water-body on its surface due to tides. Tides are nothing but deformation of earth due to action of a linear effort on a spinning macro body. Dilation of solar-day is due to insufficient compensation to accelerated spin motion of earth.

Refer: <http://vixra.org/abs/1008.0029>

**Random motion of gaseous atoms:**

Internal pressure (pressure on container) of a gaseous-body is assumed as the result of collision by atoms on container. Rate of mutual collisions by atoms is equated to energy-level of gaseous-body. Same assumption is carried on for solid and liquid macro bodies by changing random motion to vibrations. However, there is no logical mechanism or cause for such motions/vibrations.

Atoms in macro bodies are held in their stable relative position by balance between mutual gravitational attraction and mutual repulsions due to field-efforts. They do not have cause-less random motion/or vibrations. Changes in their sizes or relative positions alter balance of attractive and repulsive efforts on them and thus cause resultant internal pressure.

Refer: Chapter 17, section 17.2.3 in book 'MATTER (Re-examined)

**Hierarchy of 'natural forces':**

Currently, 'natural force' is classified into four categories; gravity is considered as weak natural force with electromagnetic force and weak and strong nuclear forces as stronger natural forces.

Gravitation is the only one and original natural effort. All other 'natural forces' are different manifestations of gravitation, related to various phenomena. Gravitation is enormously strong natural effort. However, gravitational attraction between macro bodies is a minor by-product of separate gravitational actions on their constituent basic 3D matter-particles and hence it is very

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weak compared to other manifestations of gravitation.

Refer: Chapter 3 in book 'MATTER (Re-examined)'

### **Magnetic monopole:**

Certain theories envisage magnetic monopoles as real entities.

Magnetic poles are relative references of direction of magnetic field. They indicate relative directions of imaginary lines of force of magnetic field. Direction from which (linear) line of force appears to come from is north magnetic pole and the direction towards which (linear) line of force appears to terminate is south magnetic pole. Therefore, there is no magnetic monopole. Magnetic poles are synonymous with electric charges.

Refer: Chapter 11 in book 'MATTER (Re-examined)'

### **Electric charge:**

Electric charge is an undefined entity. It is credited with providing electric properties to associated matter-particles.

Electric charge is relative reference of directions of imaginary lines of force of electric field. Side from which (circular) lines of force of an electric field appears clockwise is positive electric charge and the side from which (circular) lines of force of an electric field appears anti-clockwise is negative electric charge. Every electric field has both positive and negative electric charges. As they are relative references, they depend of the reference. Therefore, there is no single electric charge. Electric charges are synonymous with magnetic poles.

Refer: Chapter 11, Section 11.4.2 in book 'MATTER (Re-examined)'.

### **Electric potential:**

Accumulation of imaginary electric charges (electrons or electrically charged particles) is assumed to cause electric potential.

Electric potential is the measure of angular difference between nuclear axis of an atom and its own (or of neighbouring atoms) atomic axis.

Refer: Chapter 14, section 14.6 in book 'MATTER (Re-examined)'.

### **Electric current:**

Electric current is assumed as translational motion of electrons (or holes) in a conductor.

Electric current is presence of identical (resultant) electric fields in all planes, perpendicular to axis of a conductor. There are no translational motions of 3D matter-particles (electrons) along the conductor.

Refer: Chapter 14, section 14.7 in book 'MATTER (Re-examined)'.

### **Super conductance:**

Property of super conductance causes certain materials to exhibit (near) zero resistance to passage of electric current at much higher temperatures.

Super conductance is caused by sluggishness of atomic and nuclear axes of atoms to realign after relative deflection. In certain materials, this can happen when it is in super-cooled state and in some other materials; this can happen in very hot condition.

Refer: Chapter 14, section 14.9.1 in book 'MATTER (Re-examined)'.

### **Lightning:**

Flow of accumulated electrons, in thunder clouds, towards earth is assumed to appear as lightning.

High electric potential of (atoms in) clouds, gained by mutual rubbing, causes local breakdown of surrounding universal medium. Liberated free quanta of matter form photons and radiate. This

appears as lightning from thunder clouds.

Refer: Chapter 15, section 15.5.1 in book 'MATTER (Re-examined)'.

### **Proton decay:**

Some theories envisage protons with finite life-time and assume their gradual decay.

Protons are 3D matter-particles with complimentary constituent 3D matter-particles and definite structure. They are self-sustaining entities and stabilises under all normal unstable conditions. They do not decay gradually. Excepting accidents, protons have infinite life span.

Refer: Chapter 12, Section 12.8 in book 'MATTER (Re-examined)'

### **Coronal heating problem:**

Sun's Corona is determined much hotter than the Sun's surface.

Sun's corona is not (abnormally) heated by conduction or convection from its surface. Temperature of corona is determined by measuring (frequency of) radiation from that region. Frequency of radiation is not always related to temperature of the region. There are reasons, other than heating, that produce radiation in coronal region. This is misunderstood as a measure of high heat in the region.

Refer: <http://viXra.org/abs/1406.0171>

### **Flyby anomaly:**

Minute variation observed momenta of satellites, flying by Earth, from value predicted by related theories is generally known as flyby anomaly.

This apparent anomaly is the result of employing earth's apparent orbital path, around sun, in calculations.

Refer: <http://vixra.org/abs/1108.0022>

### **Pioneer anomaly:**

Deviation in the predicted accelerations of Pioneer spacecrafts as they left Solar System is believed as a result of previously unaccounted-for thermal recoil.

This apparent anomaly is the result of employing apparent earth orbital path, around sun, in calculations.

Refer: <http://vixra.org/abs/1106.0035>

### **Quasars:**

Quasar is now accepted as a type of active galaxy, where enormous (undefined) energy output is the result of matter falling into a massive black hole in its center.

Quasars are small black holes almost at the end of their status as black holes.

Refer: Chapter 16, section 16.1.6 in book 'MATTER (Re-examined)'.

### **Supernovae:**

It is assumed that implosion of a dying star becomes its explosion (without any logical mechanism).

Full mechanism of star formation and explosion of supernovae is given in Chapter 16, Section 16.1 in book 'MATTER (Re-examined)'

Refer: <http://viXra.org/abs/1310.0194>

### **Cosmic rays:**

Some cosmic rays appear to possess energies that are impossibly high level.

Considering cosmic rays as flow of photons with very high matter-content, they could be produced anywhere in space, where very large quantity of free quanta of matter are available, in

very short time. This usually happens under chaotic conditions during super novae or at interior of very large stars/black holes.

Refer: Chapter 3 in book 'MATTER (Re-examined)'.

### **Rotation rate of Saturn:**

True rotation rate of Saturn appears different at different latitudes.

Rotation rate of a planetary body depends on many factors including its real orbital path. Equatorial region of large planets/central bodies with fluid surface have higher rotation speed compared to their polar regions.

Refer: <http://vixra.org/abs/1008.0029>

### **Origin of magnetar magnetic field**

Magnetosphere of Saturn exhibits (slow changing) periodicity close to that at which the planet's clouds rotate.

Magnetic field about a cosmic macro body is formed alignment of free floating atoms in relatively calm fluid on or about its surface.

Refer: <http://vixra.org/abs/1102.0038>

### **Space roar:**

Space roar appears six times louder than expected background radiation. It is unusually higher frequency CMBR received from certain directions.

Although distribution of macro bodies and radiations in all directions are assumed uniform, presence of very large macro bodies (black holes) are not very uniform around any point in space. Moreover, radiations from these macro bodies produce very high magnitude of resisted light to create higher quantity of background radiation from their direction. These radiation, although identical with those received from tired light, adding with others may produce small fluctuations in magnitudes of CMB radiation received from various directions.

Refer: <http://vixra.org/abs/1404.0056>

### **Nature of 'nuclear force':**

'Nuclear force' is assumed to bind protons and neutrons into stable nuclei.

There is no special effort as 'nuclear force', that binds protons and neutrons in stable nuclei. Most components of stable nuclei are deuterons, which are currently counted as one proton plus one neutron. In rare cases, free neutrons are used in nuclei as spacers or balance weights for stability of spinning nuclei.

Refer: Chapter 10 in book 'MATTER (Re-examined)'.

### **Nuclear structure:**

There are no mechanisms for origin of simple patterns in complex nuclei.

Atomic nuclei (of atoms with higher atomic weights) are formed by circular sections, linked coaxially on nuclear spin axis. Generally, nucleus appears as an elongated spheroid formed by rings of different girths about its spin axis. Each section of nucleus may be formed by circular, axial or mixed arrangements of deuterons.

Refer: Chapter 10 in book 'MATTER (Re-examined)'.

### **Neutron star:**

It is currently assumed that neutron stars are dense nuclear matter formed by amalgamation of nucleons.

Neutrons are fundamental 3D matter-particles. They have definite constituents, structure and size. They can be neither larger nor smaller than natural size provided by their structure. Hence,

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assumption of a neutron of the size of a star is incredible. A matter-body cannot be denser than that provided by its structure and constituents. Therefore, extra ordinarily denser nuclear matter is pure imagination.

Refer: Chapter 10, section 10.7 in book 'MATTER (Re-examined)'.

### **Origin of elements:**

There is no mechanism to describe formation of diverse elements in cosmos.

Availability of complimentary inferior 3D matter-particles and time available determines type and number of elements formed. Usually all types of basic, primary and fundamental 3D matter-particles are formed in chaotic condition during great natural upheavals.

Refer: Chapter 13 in book 'MATTER (Re-examined)'.

### **Catalyst:**

Certain materials are found to affect rate of chemical reactions by their mere presence and without being affected by the chemical actions.

Chemical interactions between two materials are affected by changes in their environment (temperature, pressure, fields, etc.). Catalysts have ability to affect environment of chemical actions to influence their rate, without taking part in chemical actions.

Refer: Chapter 13, section 13.11.3 in book 'MATTER (Re-examined)'.

### **Stellar nuclear reactions:**

Currently nuclear (fusion) reactions in stars are assumed responsible for radiations from them and stellar explosions.

Stars and large macro bodies in cosmos produce and radiate matter-radiation (with associated energy) under gravitational collapse. Compression, by gravitational collapse, compels primary 3D matter-particles to discard quanta of matter and expand in size. Discarded quanta of matter form disturbances, which are turned into photons by universal medium and radiated away in the form of heat, light and other radiations.

Refer: Chapter 16, Section 16.1.1 in book 'MATTER (Re-examined)'.

### **Amorphous solids:**

Mechanism of physical processes giving rise to general properties of glasses and the glass transition (between fluid or regular solid and a glassy phase) are not explained.

Distinct physical process takes place only during changes between liquid and gaseous states or between gaseous and plasma states. Solid and liquid states of bulk matter depend only on matter-content levels of their atoms and external pressure on them.

Refer: Chapter 17, section 17.2 in book 'MATTER (Re-examined)'.

### **Sonoluminescence:**

Imploding bubbles in a liquid, when excited by sound, cause emission of short bursts of light

Implosion of small bubbles locally breaks down universal medium to release sufficient quanta of matter free to produce disturbance in it. Disturbances are converted by universal medium to photon and radiated from the region. If photons are within visible frequency range, they appear as light.

Refer: Chapter 17, section 17.5 in book 'MATTER (Re-examined)'.

### **Formation of planets:**

All macro bodies in a planetary system are currently assumed to have formed according to 'Nebular hypothesis'.

As central body has linear motion in space, planetary orbits are wavy paths about central

body's linear path. All planetary bodies come from outside to join a planetary system. Each planet, depending on its current parameters and central body's parameters, has to enter its particular stable orbital path. Once entered, orbital paths cannot be changed (except for accidents).

Refer: <http://vixra.org/abs/1311.0018>, <http://vixra.org/abs/1008.0010>, Chapter 16, section 16.3 in book 'MATTER (Re-examined)'.

### **Three-body problem:**

Three (many)-body problem remains a mystery and unsolved.

Basically, 'Three-body problem' is related to planetary orbital motion. Currently, planets are assumed to orbit around their central bodies, which are stationary in space. In three-body problem: out of the three bodies, at least two bodies have to be stationary and at least two bodies have to orbit around stationary central bodies, simultaneously. This is an impossible proposition. Similar logic applies to 'many-body' problem also. Rotation around barycentre also uses similar logic.

Refer: <http://vixra.org/abs/1205.0097>

### **Long-term heat balance of Earth:**

It is assumed that earth was formed from hot environment and its internal temperature decayed, gradually since it formed, to current level.

Earth, like all other macro bodies in a galaxy, is formed independently from galactic cloud. Hence, initial temperature of earth is equal to that of galactic cloud. As earth formed into a single macro body, gravitational collapse of its matter-content gradually heats it to current state. Earth reached its current state of heat balance, when its gravitational collapse is balanced by expansion in its size, due to loss of matter-content from constituent primary 3D matter-particles. Stable heat balance of earth is appropriate to its total matter-content. This is equal to state of heat at a place, where no heating effect is experienced from external sources (like below surface of earth near its poles).

Refer: Chapter 16, section 16.1.4 in book 'MATTER (Re-examined)'.

### **Energy:**

Energy is usually defined by one of its attributes: as 'ability to do work'. Ability to do work is quality of energy. It does not tell what is energy, where and how it exists, how it is transferred or acts, what is its form and structure, what is the mechanism of its action, etc.

Energy is the stress associated with deformation in universal medium. As it is a functional entity, it has no independent or real existence. It exists as a shadow of work. Work, being deformations in universal medium, has real existence. Energy is always measured in terms of work.

Refer: <http://vixra.org/abs/1111.0104>.

### **Inertia:**

Currently, inertia is defined as a property of matter (bodies). It enables macro bodies to continue their states of motion in straight-line paths at constant linear speeds, unless acted upon by external efforts.

Universal medium causes all actions in nature. Hence, inertia is a property of universal medium.

Refer: <http://vixra.org/abs/1010.0041>, Chapter 5 in book 'MATTER (Re-examined)'.

### **Values of natural constants:**

Certain experiments suggest variations in values of natural constants.

Universal medium carries out by all actions in nature. Hence, values of natural constants

depend on nature of universal medium. Changes in nature of universal medium due to changes in its parameters or locations are likely to affect values of natural constants.

Refer: Chapter 2 in book 'MATTER (Re-examined)'.

### **Antimatter:**

According to assumed big bang theory, equal amounts of matter and anti matter were created. Yet, universe contains matter irrespective of probable annihilation between matter and antimatter.

Matter-particles exhibit properties they derive from their structures. These are mainly determined by directions of linear motion and spin of their constituent photons. At the level of primary and fundamental matter-particles, 50% are anti to other 50%. However, they are usually prevented from approaching each other by universal medium. However, rarely they may collide and annihilate each other and dispersing their matter-content into universal medium. These may then form radiations or be absorbed into universal medium.

Refer: Chapter 12, section 12.7.3 in book 'MATTER (Re-examined)'.

### **Arrow of time, Entropy:**

Entropy of universe is considered to increase, resulting in distinction between past and future. Time appears to have a direction (arrow) from past towards future.

Our constant training of relationship between cause and effect compel us to regard passage of time as a flow from past to future. In fact, time has no physical existence, so that it can neither shrink, nor dilate nor flow.

Refer: <http://fqxi.org/community/forum/topic/273>, Chapter 2, section 2.8.3 in book 'MATTER (Re-examined)'.

### **Mass-less objects:**

Many matter-particles are currently regarded as mass-less. Yet some of them have associated momenta.

Mass is a mathematical relationship between matter-content of a matter-body and its acceleration under action of an external effort. It is used to represent matter-content of the matter-body. All mass-less objects, if they are real, have matter-content. They are mass-less because the above mathematical relation has no meaning in their cases.

Refer: <http://vixra.org/abs/1105.0034>, Chapter 4, section 4.12 in book 'MATTER (Re-examined)'.

### **Gravity:**

Gravity is considered as the weakest of 'natural forces' that is always attractive and acts between objects.

Only dynamic part of gravitation – gravitational attraction – is considered in contemporary physics. Gravitation has a static part that is property of universal medium. Gravitational attraction is relatively a minor by-product of separate gravitational actions on two matter-bodies.

Refer: Chapter 3 and chapter 7 in book 'MATTER (Re-examined)'.

### **Constancy of speed of light:**

Speed of light is accepted as a universal constant.

Linear speed of light is constant because that is the highest possible linear speed at which universal medium can move any 3D matter-particle, without causing its own breakdown. Linear speed of light is with respect to surrounding universal medium. Since universal medium is the moving agency, constancy or magnitude of linear speed of light depends on nature of universal medium in any region of space.

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Refer: <http://vixra.org/abs/1103.0026>.

**Superluminal motion:**

Currently it is believed that speed of light is the limit of linear motions of matter-bodies. However many objects appear to move faster than this speed.

All objects are moved by universal medium. Hence, ability of universal medium to move 3D matter-particles is detrimental to highest linear speed of matter-bodies. Highest possible linear speed at which universal medium can move a matter-particles is the speed of light. Therefore, linear speed of any object is limited to well below this limit. Universal medium moves each basic 3D matter-particle of a macro body separately rather than move whole of the macro body as a single unit. As linear speed of a macro body is increased, its content shall breakdown to inferior 3D matter-particles until at the speed of light only corpuscles of light survive.

Refer: <http://vixra.org/abs/1103.0026>

**Reference:**

[1] Nainan K. Varghese, MATTER, <http://www.matterdoc.info>

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