# The Enigmatic Positron Confounds Atomic Theory

Ever since mankind ditched the flat-Earth model and taken on an orbital planetary model, albeit the Earth-centred Ptolemaic or the Sun-centred Copernican model, Physicists have been enthusiastic about orbital models. Thus, it is not surprising that after the discovery of atoms by John Dalton in **1803** and a reasonably accurate measurement of the charge of an electron by Robert Millikan in **1908**, that the orbital atomic model developed by Neils Bohr in **1913** quickly gained early widespread approval and adoption.

The **Bohr atomic model** represented a perfectly logical extension of the notion that patterns of Nature observable at the astrological level are reflected at the atomic scale. Apart from scale, the main difference was that the planets of our solar system are held in orbitals by gravitational attraction whereas, at the sub-microscopic level, high-speed electrons are considered to be held in orbitals by their electric-charge attraction to a positively-charged nucleus.

However the Bohr model was soon proven to be flawed, with discrepancies becoming apparent between the calculated energies (attributed to electrons transitioning between Bohr orbitals) and the measured energies (as determined from spectral line emissions and absorptions). Such discrepancies were attributed to the lack of provision for angular momentum related to **electron spin**.

In **1923**, Louis de Broglie put forward a theory that particles can exhibit wave characteristics and vice versa, and by **1926** Erwin Schrödinger, using new matrix mechanics developed by Heisenberg, Born and Jordan, developed the wave-form based **Schrödinger equation** for the generalised case of de Broglie's theory. The Schrödinger equation provides a predictor of the probability of a wave-form electron being at a particular location within an electron orbital, allowing orbitals to be considered to be electron probability clouds. Incorporating Heisenberg's uncertainty principle, in **1927** Paul Dirac began the process of unifying quantum mechanics with special relativity by proposing the **Dirac equation** for the electron.

The Bohr model was thus in effect the prototype that was converted into the current **Orbital Nuclear Atomic Model** (**ONAM**) by the inclusion of the wave function mathematics. By 1930 ONAM was established as the undisputed guiding mainstream model and reference point for atomic research up to and including the present day. Through parametrisation, the wave equations provide enough flexibility to reflect the fine line spectrum of Hydrogen, but they are ineffective for most other elements and certainly do not represent a predictive tool.

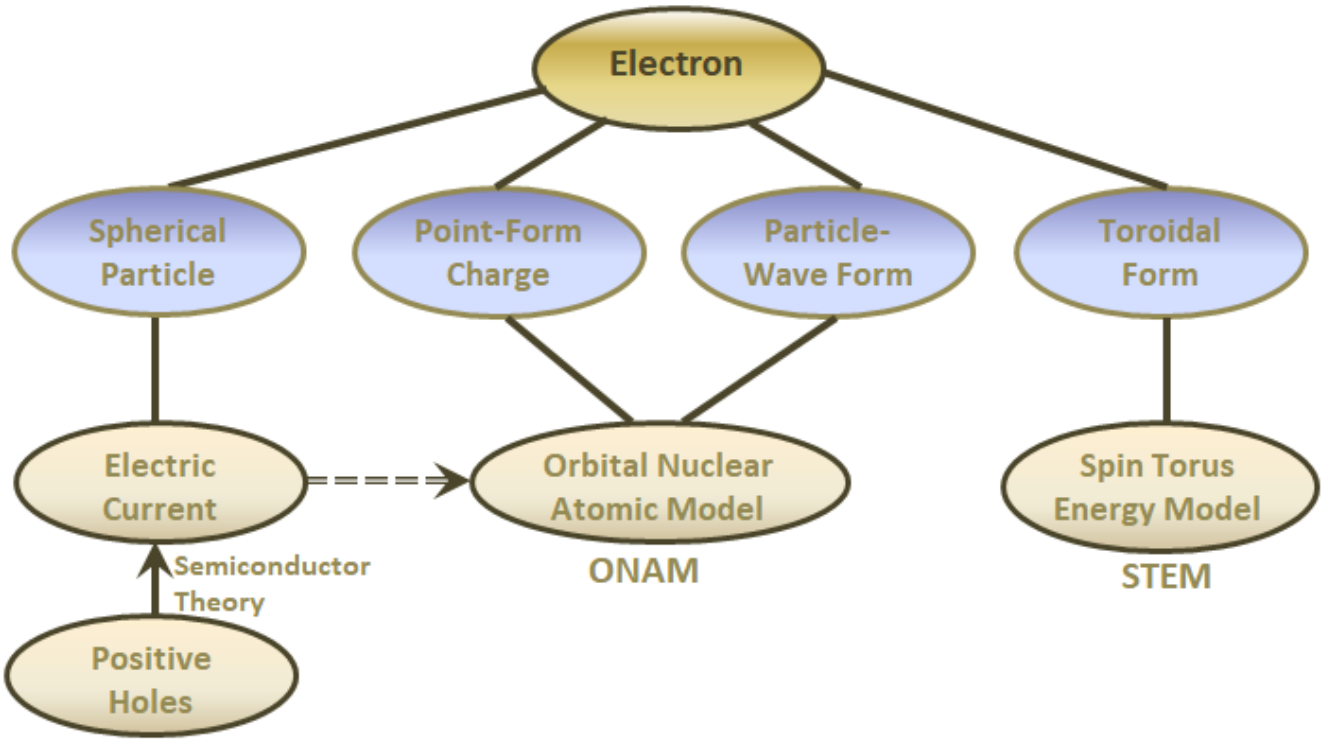
It is interesting to note that the **positron**, the positive anti-particle of the electron, satisfies the Dirac wave equations, but the positron was not discovered until **1932** by David Anderson, well after ONAM had been widely accepted and adopted. However ONAM has no provision for the existence of positrons within the atom: positrons just magically and inexplicably result from high energy particle/matter interactions. So, although positrons mathematically fit into the wave function equations that underpin ONAM, they represent a perplexing enigma because ONAM has no provision for their existence within atom structure or matter and cannot reasonably explain how they come into being.

The **electron** is variously considered to have different forms: it is considered to be a **spherical monopole charged particle** for explaining electric currents; **a point-form monopole charge** for mathematical modelling (i.e. the wave equations); and a **particle-wave** for explaining the interference patterns of the electron-based version of the 2-slit experiment. Although not readily accepted by ONAM protagonists, the **vortex ring** (or **toroidal**) electron is well documented and represents a fourth representation of the electron. However, as shown in the bubble diagram on page 2, the torus model of the electron accounts for positrons, but can lead to an atomic theory quite different to that of ONAM.

Although industrial electricity applications use a positive-to-negative flow direction, the ONAM-based conventional Science view is that **electric currents** consist of the one-way movement of electrons from a negative to positive terminal. However, with the development of the transistor by Shockley, Bardeen and Brattain in 1956, explanations in terms of the movement of monopole electrons alone were insufficient to explain how semiconductor electric currents form. Thus, because the ONAM approach makes no provision for free positrons within matter, Science was forced to introduce the concept of **positive holes**, which are the functional equivalent of positrons, to address the shortcomings.

The late discovery of the positron begs the question that, had the existence of positrons been known or suspected when ONAM was being developed (i.e. in the pre-1930 period), '*would ONAM have been significantly modified to include a provision for positrons within the atoms and/or matter?*' Had provision for positrons within matter been made, it would have certainly negated the need to invoke the dubious concept of positive holes within semiconductors.

Adopting the vortex-ring electron (the fourth representation of an electron mentioned above) leads to the **Spin Torus Energy Model** (**STEM**). The STEM electron is considered to have a torus-shaped **energy core** consisting of rapidly moving (close to the speed of light) concentrated energy, and an outer **energy field** of less concentrated energy that circulates atmosphere-like in synch with the movement of core energy.




STEM electrons are considered to be a **polarised** form of the unpolarised (or neutral) form of the electron called the **bitron**. For a **neutral bitron**, its energy field flow is purely circular paralleling the energy core flow direction and speed: when polarised, often by an applied emf, the bitron's field energy takes on a linear flow component (i.e. parallel to the core energy's spin axis). STEM contends that it is the **chirality** of the field energy flow of a polarised bitron's energy field that determines whether it presents as an electron or as a positron. A neutral bitron may thus become an electron or a positron depending upon the relative polarisation direction of its energy field.

The energy field of a low-speed electron (e.g. free electrons within metal or those forming an electric current) or a positron is considered to have a **dipolar** form whereas the energy field of a fast-moving electron (e.g. cathode rays) or positron is distorted so as to present as a **monopole** electric charge. STEM contends that slow-speed free electrons and positrons can co-exist within matter, and readily form electric currents within electrical conductors (mainly metals). And certainly STEM does not need to invoke positive holes to explain electric currents within semiconductors.

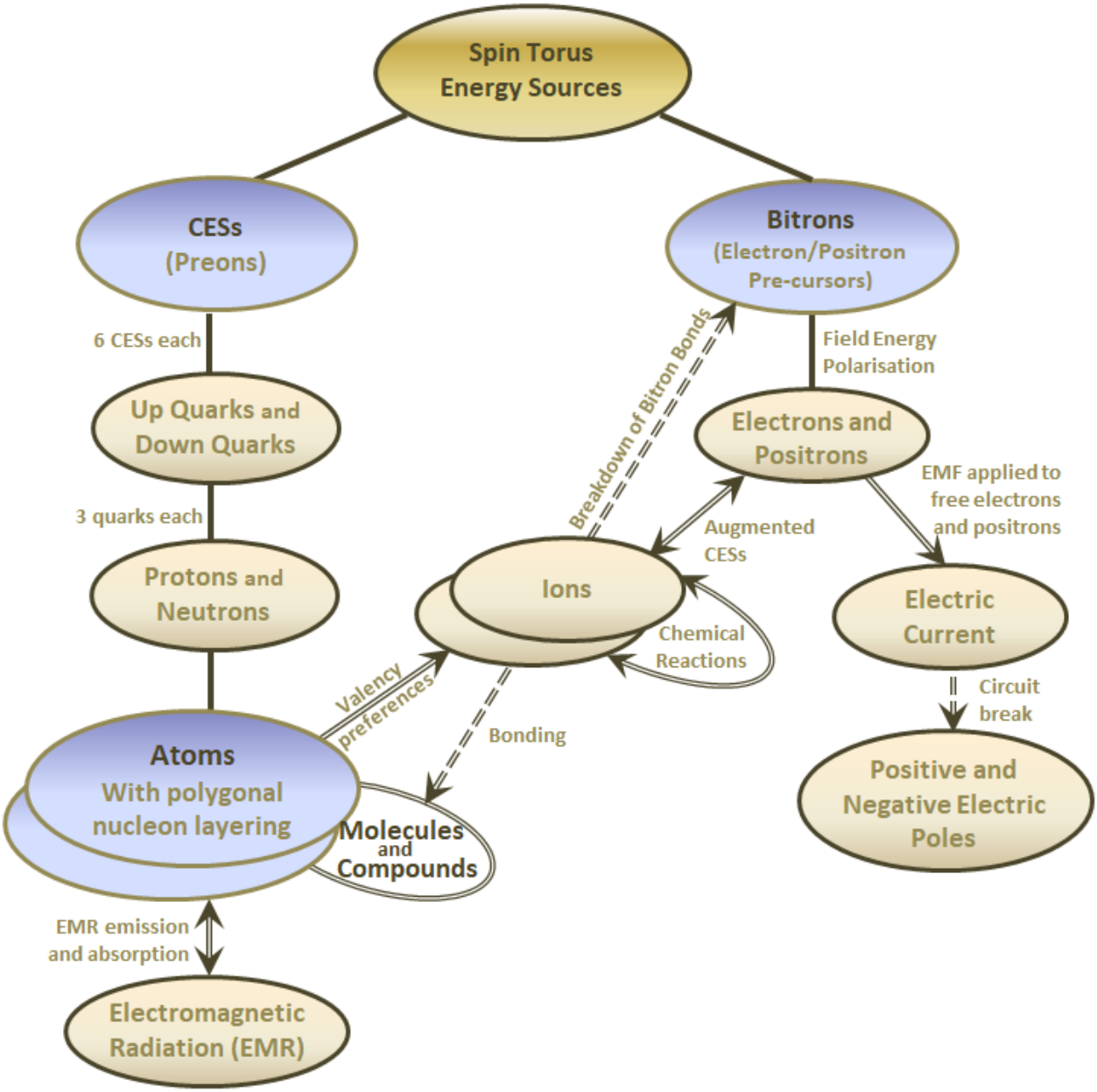
Due to the similarity between free electrons and positrons, and because STEM contends that they co-exist in approximately equal numbers within electricity conductors, leads to a question along the lines of: 'if electrons and positrons are so similar, why are electrons much more readily available (e.g. emitted by the photoelectric effect or cathode ray tubes) than positrons?' The answer to this question is that free positrons require at least twice as much kinetic energy to allow them to escape from their host material than do electrons. Positrons can thus only escape when high-energy exchanges are involved (e.g. beta radiation or the high energy bombardment of metal film). Positrons do not escape in low-energy exchanges and are not readily extracted from matter: this is the reason why they remained un-noticed and un-discovered until 1932.

Extrapolating the torus model for the electron, STEM hypothesises that the generalised torus-form of bitrons (and thus electrons and positrons) typifies the structure of many other fundamental particles. The other main particle grouping consisting of concentrated energy in a spin-torus form is the **Concentrated Energy Source** (**CES**), which can build into **nucleons** (Protons and Neutrons): it corresponds to the concept of a **Preon**. A summary of the STEM approach based upon bitrons and CESs is provided in the bubble diagram overview on page 3.

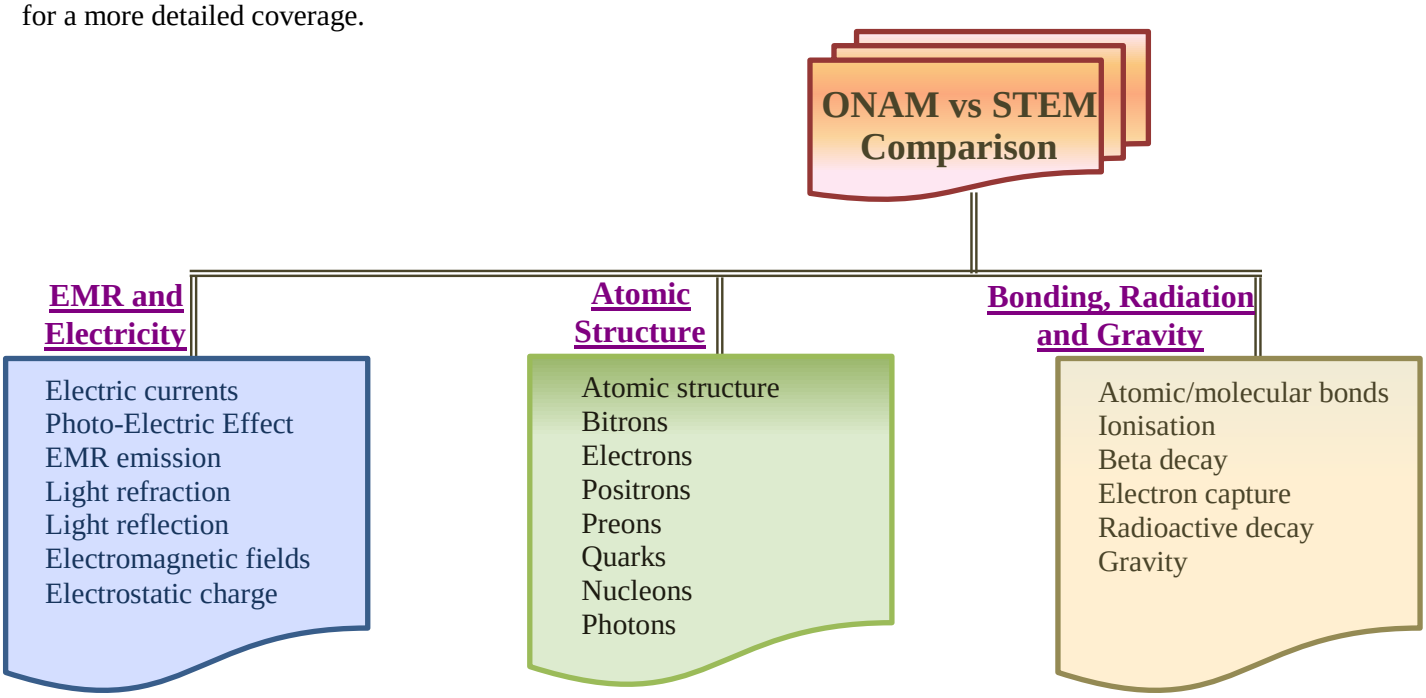
A more detailed three-part coverage of the **STEM** approach can be downloaded in **pdf** format using the leftmost links below, or in a variety of **e-pub book** formats free of charge from the Smashwords site using the rightmost links below:

- STEM and the Orbital Model (Part 1): Has Atomic Physics Lost its Way? pdf e-pub
- STEM and the Orbital Model (Part 2): The Atomic Structure of Matter pdf e-pub
- STEM and the Orbital Model (Part 3): Electromagnetic Radiation and Gravity pdf e-pub

The advantages of the e-pub versions are that they are easier to read anywhere (home, work, train etc.) on a range of devices (tablets, PCs, phones or smart TVs), are more dynamic and better cross-referenced. Also, using an e-reader such as **Freda**, the material can be read in speaker (audio) mode so reducing eye-strain.




A comparison of the ONAM and STEM approaches covering a wide range of Science-related topics is provided in pages 4 to 6. The comparison is presented as 3 separate tabulations, with the topic-list for each listed in the flowchart diagram below. Each topic is also cross-referenced to the 3-part STEM and the Orbital Model series should you wish for a more detailed coverage.



# EMR and Electricity

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| Topic | ONAM (Conventional Science) | STEM |
|---|---|---|
| Electric Currents [Part 1] | An electric current consists of **monopole electrons** moving from a negative to a positive terminal, although the electricity industry convention is that electric currents move from positive to negative. Problems also arise when attempting to explain semiconductor current flow in detail, requiring the introduction of the concept of positive hole (effectively a positron equivalent) movement to explain current flow within **P-N junctions**. However, this approach results in electrons moving in the **reverse-bias** direction for a **photovoltaic cell**. | An electric current is caused by the movement of **dipolar electrons** and **positrons**. Most currents (source-to-sink, magnetically induced, capacitor charge and discharge, diodes, transistors and AC electricity) consist of electrons and positrons moving synchronously within strands in opposite directions. **Photovoltaic cell** and **photodiode** current is predominantly the one-way movement of electrons and positrons respectively. The magnetic field around a current-carrying wire conductor is due to the same spin-direction of the participating electron and positron energy fields. |
| Photo-Electric Effect [Part 3] | Some incident photon energy liberates an electron from an electron orbital as a free electron particle, and the remaining photon energy contributes to the electron's kinetic energy. If the photon does not have sufficient energy to liberate an electron (i.e. is below the threshold frequency) it is re-emitted as a rebound photon. | An incident photon liberates a bitron from a bitron bond; or collides with a free bitron so as to polarise it and provide it with kinetic energy; or it can be captured and absorbed, possibly to be released as a rebound photon. The polarised bitron may be an electron or a positron, but only electrons with sufficient kinetic energy can escape the host material. |
| EMR Emission [Part 3] | **Photons** are considered to be the electromagnetic energy released when an electrons jump from an outer to a more inner orbital. Incident photons may be absorbed and re-emitted as **rebound photons** with an increased wavelength. | In an energised environment it is the unrestrained CESs with an out-facing AI or CI-pole that generate and release photons. Photons can also be captured by out-flow vortices of CESs and released as **rebound photons** with a marginally increased wavelength. |
| Light Refraction and Reflection [Part 3] | Refraction is a change in the direction of light as it passes from one transparent medium to another as described by Snell's Law. It is accompanied by a frequency-dependent change in speed and wavelength of the light that results in **dispersion**. **Reflection** involves the bouncing of light by the second medium. Refraction and reflection involve a degree of light polarisation. | Refracted light (the angle of refraction defined by Snell's law) is reflected if it to passes directly into the **reflection area** of an appropriately orientated CES. **Reflection** and associated polarisation may occur at any depth to which the light can penetrate. Any refracted light that is not reflected continues as **partially polarised light** until it **exits** the host material or is **absorbed** by it. |
| Electromagnetic Fields [Part 1] | **Electric fields** are produced by stationary charges and **magnetic fields** by moving charges (currents). The interaction of charges and currents with an electromagnetic field is described (but not explained) by Maxwell's equations and the Lorentz force law. Field **lines of force** are used to visualise electromagnetic fields. The Quantum Mechanics view is that an electromagnetic field is quantized and composed of individual particles. | Magnetic and electric fields consist of the same type of field energy, with their subtly different properties being due to different energy flow patterns. **Magnetic fields** emanate from magnets, or are generated by an electric current moving in a loop circuit (or a coil). Unlike electric fields, they do not involve energy-field spin. **Wisps** and **threads** associated electric monopole charges present as electric field **lines of force**. |
| Electrostatic Charge (Static Electricity) [Part 1] | Static electricity is an imbalance of electric charges within or on the surface of a material created whenever two surfaces contact and separate, and at least one of the surfaces is an electrical insulator. **Triboelectric materials** are defined as having a tendency to release electrons to become +ve, or to attract them to become -ve, with such charge remaining until it can move away via an electric current or as an electrical discharge. Static electricity is detailed and described but is not properly explained. | Static electricity is due to friction-induced polarisation of neutral bitron strands, with the structure of **triboelectric materials** pre-disposing them to develop more p-strands (+ve charge pre-disposition) or more e-strands (-ve charge). The surfaces are charged by the concentration of +ve only or -ve only polarised strands: thus no electric current is generated in either material, but the polarised strands are pushed towards and concentrate at the materials' outer surface. |

# Atomic Structure

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| Topic | ONAM (Conventional Science) | STEM |
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| Atomic Structure [Part 2] | An atom consists of a spherical nucleus formed by an amorphous mix of protons and neutrons. The nucleus is enveloped by electrons moving in a variety of different shaped orbitals. | An atom consists of polygonal proton and neutron layers held together by a combination of strong force inter-quark bonds, bitron bonds and off-set bonds. |
| Bitrons [Part 1] | No equivalent particle. | **Bitrons** are a **spin toroidal** form of energy and are pre-cursors to electrons and positrons. They form as **bitron bonds** within atoms and as **chemical bonds** between atoms. Released (i.e. free) neutral bitrons tend to self-organise into same-spin **strands** within conductors. |
| Electrons [Part 1] | Electrons orbiting a nucleus in mathematically defined orbital patterns are considered to be wave-like in nature. A **free electron** (external to an atom) is usually represented as a spherical negatively-charged monopole particle: it defines the unit (e) for electric charge. Mathematically it is considered to be **a point-form monopole electric charge**. | Electrons are dynamically polarised bitrons. Slow moving low-energy electrons have a **dipolar** form, whereas fast moving high-energy electrons have an asymmetrical energy field and present as a negative electric **monopole** charge. Electrons can attach to atoms to create or enhance **anions**. |
| Positrons [Part 1] | The positron is considered to be high-energy positive **anti-particle** of the electron, and is considered to have no role within atoms. No explanation is provided for the appearance of free high-energy positrons (and electrons) from the high-energy bombardment of metals and helium gas, or from beta radiation. 'Slow' positrons (energised positrons with reduced kinetic energy) are quickly destroyed via electron-positron annihilation within matter. | Positrons are dynamically polarised bitrons that have opposite **chirality** to electrons. As for electrons, slow moving low-energy positrons have a **dipolar** form and fast moving high-energy positrons present as a positive electric **monopole** form. Free positrons require at least double the kinetic energy required by an electron in order to escape a host medium's electromagnetic field. Positrons can attach to atoms to create or enhance **cations**. |
| Preons (smallest fundamental particle) [Part 2] | Preon-based models for quarks and nucleons are not widely accepted. The list **of fundamental particles** (those with no sub structure and not consisting of other particles) currently consists of the fermions (quarks and leptons) and their anti-particles (a total of 24 particles), but none of these are considered to represent preons. | The **CES** (**C**oncentrated **E**nergy **S**ource) is the Preon equivalent. It is considered to have the same form as electrons and positrons (i.e. a spin torus energy core and a polarised energy field). A CES's energy core is considered to contain approximately 100 times more energy than an electron or a positron. |
| Quarks [Part 2] | There are six flavours of quarks (**up**, **down**, strange, charm, bottom and top) plus their antiparticles. Up quarks have an electric charge of +2/3 e and down quarks -1/3 e. No structure is suggested for quarks and they are currently considered to be fundamental particles. | An **up quark** consists of 5 p-CESs and 1 e-CES, and a **down quark** of 2 p-CESs and 4 e- CESs. The 6 CESs of each type of quark are arranged in a regular octahedron (or cubic) form. The net electric charge equivalent of up quarks is +2/3 e and for down quarks is -1/3 e. |
| Nucleons [Part 2] | A **Proton** consists of 2 up quarks and 1 down quark and an electric charge of +1e, and a **Neutron** consists of 2 down quarks and 1 up quark and has no net electric charge. | Quark composition and electric charge as for ONAM. Nucleons are considered have an 'L' (L-form) or triangular (T-form) shape, but within nucleon layers they present as linear (I-form). |
| Photons [Part 3] | Several models for photons exist, and thus their form is conjectural and undecided. Photons are considered to be emitted by electrically charged particles undergoing acceleration. **Emission spectral lines** of atoms represent electrons jumping from various outer orbitals to further-in orbitals. When photons are absorbed by an atom, it can cause an electron to jump to an orbital further away from the nucleus. | A photon is considered to consist of inert field energy in a **helical** form that spins as it moves. **Base photons** result from the clearing of energy congestion from within the in-flow vortex of CESs. Photons can also be captured by out-flow vortices of CESs and released as **rebound photons** with a marginally increased wavelength. **Spectral lines** consist of unique combinations of base and rebound photons. |

# Bonding, Radiation and Gravity

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| Topic | ONAM (Conventional Science) | STEM |
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| Atomic and Molecular Bonding<br><br>[Part 2] | Molecules, crystals, metals and diatomic gases are mainly held together by **chemical bonds**, which dictate the structure and the bulk properties of matter. Atomic bonds are **primary** (metallic, covalent, and ionic bonds) and **secondary** (hydrogen and Van der Waals bonds). For metallic bonding electrons are delocalized over a lattice of atoms whereas ionic bonding relies on binding by cations and anions. Covalent bonds involve electron sharing as described by **Valence Bond** (VB) and **Molecular Orbital** (MO) theories. With nuclei considered as a spherical amorphous group of nucleons, attempts to explain the orientation and length bonds between atoms in terms of electron orbital patterns have largely failed. | The physical characteristics of atoms are dependent upon structure of their nucleus, with their chemical bonding preferences and orientation being dictated by the polygonal geometry of the nuclei involved. Covalent, ionic and hydrogen bonding predominantly involves a balance between bitron and offset bonds (commonly referred to as **chemical bonds**). **Metallic bonds** occur when geometry compatibility of the nuclei of different metals allows them to inter-lock, possibly with pseudo bonding between nuclei. **Complex molecular chains** such as carbohydrates form **coordination complexes** involving bitron and offset (and/or pseudo) bonds which are collectively called **ligands**. |
| Ionisation<br><br>[Part 2] | Ionisation is when an atom or molecule acquires a negative or positive charge by gaining or losing electrons, often in conjunction with other chemical changes. It occurs when sufficiently energetic charged particles or radiant energy travel through gases, liquids, or solids. Alpha radiation particles and fast moving energised electrons and positrons also cause extensive ionization along their path. | **Ionisation** involves the breaking of a bitron and off-set bond combination so releasing the bond's bitron and creating a **cation** and an **anion**. Upon release, the bitron becomes transformed into a free electron or a positron (i.e. it is polarised). Ions can be enhanced by the attachment of electrons and positrons to the outer fixed and swivel CESs. (Causes of ionisation are covered in the ONAM column) |
| Beta Decay and Electron Capture<br><br>[Part 2] | Beta decay is a common form of radioactive disintegration by which unstable atomic nuclei spontaneously gain or lose a positron without any change in mass number. The three processes are electron emission (**β– decay**), positron emission (**β+ decay**), and electron capture (K-capture). Lighter isotopes (neutron deficient) generally tend toward stability by positron emission or electron capture, whereas the heavier isotopes (neutron rich) usually approach stability by electron emission. | **β+ decay** is triggered by the high speed collision of a free electron with a foot-in L-form proton that causes it to CES-flip into a neutron with the release of an energised positron and a neutrino. When the collision is lower energy β+ decay is called **electron capture. β- decay** is triggered by a high speed positron collision with a foot-in L-form neutron, converting it into a proton with the release of an energised electron and an anti-neutrino. |
| Radioactive Decay<br><br>[not covered in detail in this three-part series] | The **radioactive decay chain** refers to a series of radioactive decays of certain heavier atoms different radioactive that undergo sequential transformations until eventually a stable isotope is reached. The main series are those for thorium, uranium, actinium and neptunium with half-lives between 0.7 and 14 billion years. | Many heavier atoms consist of a series of **embedded polygonal forms**. Some of these atoms (e.g. thorium and uranium) are unstable and the embedded forms separate into daughter products accompanied with alpha (energised helium atoms) and beta decay bi-products. |
| Gravity<br><br>[Part 3] | Gravity is considered to be one of the four fundamental forces together with strong, weak and electromagnetic forces. According to Einstein's 1915 **theory of general relativity** gravity is not a force and results from matter warping **space-time**. The mathematical space-time model relates well to the gravitational interaction of large-scale objects in space but is incompatible with quantum mechanics and fails to explain at the smaller scale why objects unsupported within a gravitational field (such that of Earth) fall downwards due to gravity. | Minor energy losses occur from most concentrated energy sources via their energy fields. Such energy loss accumulates as an atmosphere-like pool of **weak inert energy** around objects called an **Enersphere**. All normal matter is considered to have an enersphere and, for objects that are sufficiently close, their enerspheres overlap and merge. The competitive pull by CESs within atoms on their merged overlapping Enerspheres is considered to represent the pull of **Gravity**. |