International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Atomic Binding Energy

Eufstratios Lafcharis

Abstract: ***The binding force that keeps an atom intact is derived from the external perimeter of negative charge around an atom that takes on a defining role as a tough and extremely flexible protective shield, which replicates the properties of a nuclear binding force because Coulomb forces of electrical attraction serve two purposes in holding electrons in position; however, the encirclement of negative charge provides a pulling force from all sides, which essentially locks the nucleus in position, and prevents nucleons from disbanding.***

Keywords: binding force, atom

It is always challenging when attempting to alter deeply imbedded perceptions, irrespective of whether they are totally unfounded, and based on nothing other than speculative hypothetical assumptions. The structural stability of the nucleus falls under this classification, as a mythical superpower that miraculously binds nucleons together; even though, known properties of individual constituencies provide no scientific justification for any internal binding force. The "SLA" theory rebuffs this assertion as a form of pseudo science that is based on nothing other than disingenuous properties that cannot be substantiated.

"SLA" research into isotopes and the disintegration of Uranium 235, demonstrate high fluid properties within the bounds of a nuclear structure, which essentially eliminates any prospect of powerful intra-nuclear binding forces keeping nucleons firmly attached to one another. Quite the contrary; from an "SLA" perspective, a nuclear structure is perceived as a collective of weakly held nucleons banded together by an external perimeter of energy-efficient swirling electric fields.

Yet! It is purported that nuclear binding energies are approximately a million times greater than the binding energies of electrons, so how can such differences be justified if nucleons are loosely bound within an atomic nucleus?

Interactions between sub-atomic particles are electric and/or magnetic in nature, so binding energies are likewise reliant on electric and magnetic interactions. The "SLA" Theory of Atomic Structure provides a very detailed account of how electric and magnetic fields interact in order to generate electron structural configurations; so this is a continuation of the same logic, but with a slight modification to investigate the origins of so-called nuclear binding energies.

The aim of this exercise is to utilize verifiable electrical interactions between charged particles, rather than perceived interactions between nucleons that cannot be substantiated. Envisage a model of an atom just prior to the inception of Quantum Mechanics, based entirely upon elementary electrical interactions between negatively charged electrons and a positively charged nucleus; in order to truly understand the intricate role of electric fields, and subsequent complexities that contribute to an element's stability.

Non-Sensical Nature of Quantum Mechanics

When a moving electron comes within range of a proton, an electrical interaction ensues! But at what point do we presume that a wave function is enacted, because as separate entities moving through open space, each of these particles has a definite position and velocity without any quantum mechanical properties. So if a wave function did not exist prior to interaction, at what point does it take effect. It is a similar notion to that in which measurement or observation is purported to collapse a so-called wave function, except in reverse; so what causes an electron to essentially change its identity, for it is nothing other than an electrical interaction that is taking place between two charged particles?

There is an inconsistency with this interpretation that defies reality, or any form of logical reasoning; but that is the nature of Quantum Mechanics; there are no rules or justifications based on laws of physics, just unexplained phenomena that are so weird that they necessitate a totally new field of science, claiming that such properties are endemic to micro-particles! Frankly; it is quite disappointing at how easily science discarded hundreds of years of advancement in physics on a whim of frustration. The "SLA" Theory rejects the validity of the Quantum Mechanics assessment of an atom on the grounds that it is pseudo science, based on nothing other than disingenuous properties that cannot be substantiated.

Just because specific properties cannot be explained, does not mean that such properties are endemic to a particle in question. For instance; when an object defies gravity, then we scrutinize properties of the object, against the properties of the environment, and then rely on the laws of physics to account for what is being observed. Yet when it comes to electrons within an atom; science ignores their endemic properties, and the physical environment in which they exist, and instead makes references to numbers of electrons within imaginary shells! There is acknowledgment of particles being charged, but not that charge has any contribution to the defined shell structure in which they exist.

Electrons cannot count, and imaginary shells have no physical presence to lock them in position. So how and why do electrons assemble themselves into very distinct quantised energy states, with the capacity to transition instantaneously between states? Quantum Mechanics assumes such properties as being endemic to electrons and to micro-particles in general, based on hypothetical wave functions that allocate electrons in accordance to four

quantum numbers. The four quantum numbers have extremely vague definitions that amount to nothing; for if there is no physical model, then definitions have no practical applications; resulting in meaningless expressions of spin when there is no spin, Magnetic Quantum numbers that have no association with any form of magnetism, and angular momentums when there are no orbiting motions. These are all pointless contradictions that confound any potential resolution to an atomic structure!

Why are moving electrons within an atom treated differently from other moving objects; such as moving aeroplanes, birds, projectiles, or air molecules, which can all defy gravity and occupy different altitudes within the Earth's atmosphere? ***From an "SLA" perspective there are no differences between each of these motions; it is only a matter of matching the properties of an object in question, to the properties of the environment in which it exists, and then relying on the laws of physics to account for what is being observed.***

When a magician performs tricks; no one assumes that there are different rules that govern their outcomes. It is apparent that optical illusions create a false sense of reality. So why are scientists so adamant that electrons follow different rules of engagement?

In other words; scientists failed dismally in their attempts to justify quantum states, based on laws of physics; but that does not imply that such justifications don't exist. It just means that scientists were not up to the task of resolving the issue.

Consequently, it comes down to human limitations, and a lack of awareness that prevents a precise understanding of what is taking place, and while such strange phenomena are indeed affiliated to microscopic sized particles; their actions have nothing to do with endemic properties of the particles in question, and everything to do with micro-particles being indistinguishable to our five human senses. In other words, electrons are too small and incomprehensible for our five senses, so there is no way of deciphering what types of interactions are taking place. It may be argued that air is also microscopic and invisible so what makes electrons any different. The difference is that we can breathe air, feel wind, hear and see the effect of wind on surrounding responsive objects, so these properties are readily taken into consideration when determining an outcome; whereas, science has still not grasped the definition of magnetic polarity, let alone the origins of all forms of magnetism. In other words, electrons exhibit properties that are electric in nature; so properties of atomic orbitals cannot be realised without incorporating the active ingredients from which those properties are derived.

Electrons are defined by properties of electric charge, so how absurd to ignore properties that exemplify their physical presence; and while it may be argued that properties of charge are formally acknowledged within an atomic structure; it is a fallacy because moving electrons induce magnetic fields, so the prospect of perpendicular aligned orbitals are not feasible on the grounds that resulting interference would obstruct each other's motions, making such configurations unsustainable; let alone the physical overlap between the electric fields of individual energy subshells sharing a common shell, which is an impossibility from an electrical perspective, because each electric field restricts each other's expansion.

Moving electrons do not exist in isolation! In other words, electrons exhibit dual properties as particles and as regional intensities of charge, which subsequently occupy broad regions as they expand to encompass the entire perimeter of a given volume, be it an orbital or shell; so it is counter intuitive to classify electrons as infinitesimal particles within an empty space or shell, for the parameters of a shell are actually defined by the physical boundary over which resident electric fields expand. This implies that each additional electron contributes to the regional intensity of a shell, by constricting neighbouring electric and magnetic fields (orbitals) into smaller volumes of space.

This implies that orbitals do not have fixed dimensions, and that electrons can only co-exist within a common shell when their moving electric (magnetic) fields are aligned (based on "SLA" Principles), while simultaneously having to comply with natural properties of compaction, in attaining a uniform radial intensity gradient of charge. These are fundamental principles to the creation of an atom.

It becomes apparent that the collapse of a so-called wave function is a nonsensical notion because moving electrons generate magnetic fields that not only expand to occupy the entire physical parameters of an orbital or shell, but also possess directional orientations (Magnetic Polarity) that cannot collapse to single point; otherwise there is nothing holding electrons in position. In other words a probability distribution does not extinguish the presence of electric and magnetic fields; both of which have volume and directional orientations of motion (Magnetic Polarity) with uninterrupted links with the atomic nucleus; and by definition an electron cannot change positions without inducing a magnetic field. This essentially puts the very existence of wave functions into doubt, because electric and magnetic fields cannot overlap, and the prospect of perpendicular aligned orbitals would cause disruptive interference that would be unsustainable. Adaption's of Quantum Mechanics regarding atoms have been discredited on many fronts, rightfully classifying it as a form of pseudo science, based on nothing other than disingenuous properties that cannot be substantiated.

Inception of an Atom

Let us now take a different approach, based on "SLA" Concepts of Atomic Structure; and once again envisage an atom at the time of inception! A moving electron comes within range of a proton, and is subsequently drawn into an orbital cycle, arising from on a natural equilibrium between outward centrifugal forces enacting against an inbound Coulomb force of electric attraction to the positively charged nucleus. All version of atomic structure are in consensus thus far! However, orbiting electrons are assumed to expend energy that should presumably cause electrons to collapse and be drawn into the nucleus; so how can perpetual motion be justified from a theoretical point of view?

Nature provides a credible insight into the origin of perpetual motion! Air and electric fields exhibit similar properties of expanding in the direction of least resistance, which is based on a form of back pressure that instigates a natural inclination for pressure/intensity equalisation; yet energy efficiency of a circulating tornado overcomes such inclinations of natural expansion, in favour of an orderly circulating motion. Circulating efficiencies are endemic properties of all fluid substances, be they gases, liquids, and now that definition has been extended to include electric fields. Similar properties induce similar outcomes, so circulating efficiency is a predicted property of electric fields in accordance to the laws of physics.

This is where the "SLA" Concept of energy efficient circulating electric fields takes on a defining role! The first ground state or shell of a 1s electron orbital represents the optimal distance or circumference, in which regional Coulomb forces of electrical attraction are counterbalanced by the energy efficiency of circulating electric fields.

In other words, energy efficient circulating electric fields activate a physical force based on the same principles as a swirling tornado; however, there is no friction between electric field, so once an orbital cycle is enacted, the circulating motion continues into eternity, or until an external force breaks the cycle. It is therefore apparent that energy efficient slip-streams of swirling charge are sources of frictionless perpetual motion that do not expend energy, and subsequently resist the natural inclination for electrons being drawn into the nucleus. Sceptics may question its validity; however, science is well aware that moving electric fields induce a magnetic field, so the "SLA" Concept of swirling charge falls within that definition. In other words, it is abundantly clear that science has not deciphered the origins Magnetism, whereas "SLA" has identified circulating electric fields as a form of Magnetic Polarity; so at the very least, acknowledge the potential of circulating electric fields as being a credible source of atomic stability; which is more than can be said of Quantum Mechanics, and the mystical properties of super positions and quantum entanglement, which are based on nothing other than a mathematical equation.

Perpetual motion is a consequence of electrons following in their own energy efficient electromagnetic slip-streams of circulating charge, which conserves energy and sustains indefinite orbital activity, whilst their associated electric and magnetic fields expand laterally to occupy a three dimensional space that constitutes an orbital or shell. In fact it is the distribution of an expanding electric field that defines the physical parameters of an orbital or a shell, rather than any absurd notion of a wave function and so-called superpositions. Electrons subsequently abide by the laws of physics, while conforming to all the known properties of atomic orbitals.

The establishment of the first ground state or shell subsequently takes on a primary role as a foundational base, upon which successions of electrons are reliant for their structural stability. Successive electrons then experience electrical resistance, which is a form of like charge repulsion from underlying accumulations of negative charge that obstruct their passage to the positively charged nucleus. This is not to say that energy efficiency does not play an active role in ensuing orbital stabilities; however, a filled "$1s^2$" orbital marks the first saturated state that is impenetrable to incoming electrons; denoting a defined property of a filled first shell. Following electrons then abide by a natural inclination for electric fields to conform to a uniform radial intensity gradient; justified as an inherent property in which quantised units of negative charge establish a natural order of compaction, where outlying electric fields compress and/or penetrate underlying electric fields, in order to retain a uniform radial intensity gradient of one energy subshell between consecutive shells. It is based on the same principles of compaction that govern the pressure gradient in the Earth's atmosphere.

This is the origin of the famed "Aufbau Principle", which allocates electrons into designated energy states in ascending order. In other words; the first ground state sets a precedent in which subsequent shells are subjected to slight variations in the rules of engagement. Latter Coulomb forces of electrical attraction are still subject to energy-efficiency; however, electrical resistance or like charge repulsion from accumulating layers of like charge replicates the same conditions, and subsequently becomes the primary indicator of orbital priority.

Atoms therefore represent structural configurations that have attained equilibrium between inbound Coulomb forces of electrical attraction, and outbound Coulomb forces of like charge repulsion, with energy-efficient circulating electric fields being silent contributors that coincide with the same outcome; whilst at the same time, retaining an underlying potential to contribute to the order of priority, in very specific circumstances when regional instabilities override primary Coulomb forces of electrical attraction; subsequently resulting in specific exceptions to the order of priority, in which orbitals do not comply with the "Aufbau Principle" order of ascending energy levels. This provides an accurate physical account of an atom that is based on the laws of physics.

ATOMIC BINDING ENERGIES "SLA" PERSPECTIVE

As with many previous suppositions; "SLA" findings into binding energies are at odds with current interpretations of nuclear stability. Binding energies are confirmed physical properties that are not disputed by "SLA" ideology; but it is the interpretations, or origins of those binding energies that are under scrutiny.

So! What other options can possibly feign or simulate such immensely powerful binding forces? It was briefly quoted on a previous occasion, how circulating electric fields have a unique ability to isolate the perimeter of an atom, enabling clusters of constituent sub-atomic particles to respond as unified entities that are resistant to internal physical manipulation. In other words; circulating electric fields take on a defining role as a tough and extremely flexible protective shield that absorbs impacts, and

subsequently protects the structural integrity of an atom. Consequently, it is this protective shielding that replicates the esteemed properties of a formidable nucleon to nucleon binding energy, because applied energy is dispersed across the entire structure, with much of the energy being converted into different forms, such as heat, kinetic, and potential energy, which subsequently enables an atom to resist extreme conditions without necessarily breaking apart; and thereby giving an impression of being indestructible.

Coulomb forces of electrical attraction derived from circulating electric fields serve two purposes, one of which keeps electrons within their orbital cycles; however, since the dispersion of negative charge is distributed around the entire spherical periphery of an atom, then the encirclement provides a balanced pulling force from all sides, effectively sealing and locking the nucleus into position. In other words, four equal outbound pulling forces from perpendicular directions are no different to fastening an object to the central position.

This implies that Coulomb forces of electrical attraction serve dual roles, in firstly stabilising electrons within their allocated positions, but also preventing nucleons from disbanding, as a type of sealed container retaining internal contents.

Energy-efficient swirling electric fields are therefore fundamental to the creation of an atom, in not only serving to bind and isolate individual sub-atomic particles into unified entities, but also taking on defined roles as tough, flexible protective casings that protect the structural integrity of an atom.

Atoms are made up of two distinct regions, consisting of a positively charged inner core that is enveloped within a swirling manifestation of negative charge. This implies that proton extractions need to overcome the entire binding force linking positive and negative charges; whereas, electron extractions are predominantly associated with individual electrons slipping out from external surface layers that are constrained by a vastly reduced Coulomb force (large distances between opposite charges).

How could such properties be interpreted in real-life examples? Consider the magnitude of force required for an internal molecule of air to escape the circulating efficiency of an enormous expansive cyclone. It is an astronomical force that is basically immeasurable as compared to an air molecule that escapes from the external perimeter; because energy from internal molecules dissipate quickly when having to overcome a multitude of established circulating efficiencies.

In other words, it would take a force of a nuclear blast to disrupt the circulating efficiency of a cyclone, whereas external air molecules routinely and effortlessly slip out from the external perimeter without affecting the main body of circulating motion.

Atoms are subject to similar multi-layers of swirling electric fields. Admittedly there is an immense mass disparity in the proton's favour, but Coulomb forces are based on electrical charge, which is equal in magnitude, irrespective of the weight differential. Hence, physical extractions of nucleons are extremely difficult because they need to overcome, and physically break through a literal sea of negative charge (protective shield), representing close-quarter electrical interactions between opposite charges, and the near destruction of the entire fabric that holds an atom in together.

It is difficult to quantify relative extraction energies, and whether this explanation justifies the million-fold increase in energy between nucleons and electrons, but it is definitely within the realm of feasible possibility, which further reinforces the "SLA" perception as being credible.

We have currently justified the origin of immense binding energies as being derived from circulating electric fields. These circulating electric fields serve a primary role in binding opposite charged particles, in a process that attains a counterbalancing equilibrium between inbound Coulomb forces of electrical attraction, and outbound Coulomb forces of like charge repulsion.

It is this equilibrium that regulates the structural configuration of an element; however, it is not an accurate reflection of the overall stability and binding energy of an element, because there are distinct minor contributions from somewhat weaker binding energies between nucleons, along with a number of inherent regional instabilities (lateral like charge repulsion) that undermine the principal binding energies; all of which need to be taken into consideration.

For instance, inadequate ratios of neutrons to protons cause potential instability within the nucleus, by not minimising repulsion between positively charged protons. Another distinct form of instability arises from paired and unpaired electrons that essentially equates to uneven distributions of like charge around the spherical perimeter of an atom, because each experiences different levels of (interference) electrical repulsion against one another.
These are very distinct like charge repulsive forces that are at tangent to the spherical surface, and subsequently cause lateral instability that undermines the structural integrity of the primary binding force.

In other words, Coulomb forces are directional vectors which do not necessarily have the same alignments; and as such, have varying degrees of influence upon each other's forces. Inbound Coulomb forces of electrical attraction, and outbound Coulomb forces of like charge repulsion are directly opposed to each other, and subsequently establish a balanced equilibrium that culminates in the "Aufbau Principle" order of orbital priority; whereas uneven distributions of charge in a lateral plane around the spherical perimeter, cause lateral (sideways) instabilities that undermine the structural integrity of the primary binding force, and subsequently detract from the structural stability and binding energy of an atomic structure.

I appreciate that paired and unpaired states also exist within proton orbital structures, however, nuclear

structures are not attributed to variations in regional intensity of charge (energy) as are electrons configurations, which make lateral instabilities far less relevant within nuclear structural configurations, due to the role of neutrons.

All four variables (primary Coulomb forces of attraction, nucleon to nucleon binding energy, like charge repulsion between protons, and lateral like charge repulsion between electrons) contribute to the overall stability of an element; however, it is apparent that there is minimal association to any form of powerful nucleon to nucleon binding energies, as the name, "nuclear binding energy" suggests. This pretty much concludes the descriptive account of "SLA" Atomic Binding Energies. So it is simply a matter of adapting theoretical representations to practical values from so-called nuclear binding energy graphs in order to gauge the accuracy of the "SLA" perspective.

I understand that this research goes against established opinion with regard to present interpretations of strong close-up nuclear binding forces; however, I am only the messenger from an "SLA" Theory that is in control of its own destiny. In other words; "SLA" Concepts are the instigators, and I am only interpreting properties as they arise from this investigative analysis. However, there is a consistency that is unifying the entire atom, and I suspect that it will eventually prove to be extremely accurate.

Binding Energy Per Proton

Let us now apply these "SLA" principles of atomic binding energy, and match them to data from current "Nuclear binding energy graphs", in an endeavour to confirm or deny ***the assertion that binding energies are not bound or restricted to internal parameters of a nuclear structure, but instead take into consideration the entire gamut of electrical interactions between like and unlike charges throughout the entire atom.***

In other words; from an "SLA" perspective, the binding energy of an element is proportional to the magnitude of all combined Coulomb forces of electrical attraction, which is inclusive of a minor contribution of nucleon to nucleon binding energies, minus regional instabilities from like charge interference within the nucleus, and between paired and unpaired electrons within a receptive shell.

The following commentary will refer to binding energies based on known "SLA" electron structural configurations instead of protons, so that a connection between atomic binding energies and electron/proton inspired Coulomb forces becomes apparent to the reader. The binding energies between nucleons are weak, fairly constant, and relatively insignificant in terms of variations between consecutive elements, so their contribution to an element's binding energy is generally ignored when analysing binding energy graphs.

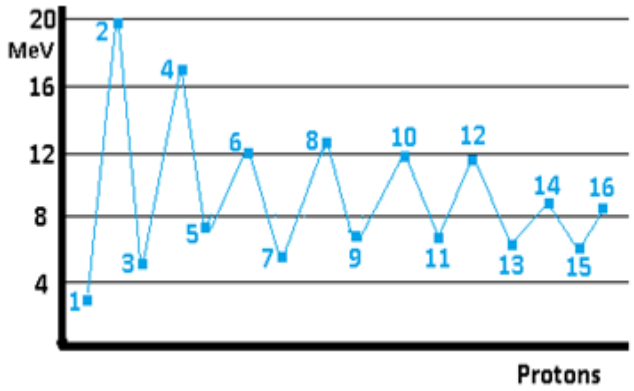
Before initiating the following analysis into atomic binding energies, it is important to refresh some fundamental suppositions relating to "SLA" Atomic Structure:

- Order of orbital priority is a natural property by which electric fields conform to a uniform radial intensity gradient that allocates electrons in accordance with regional intensities of charge.
- Electron orbitals exist in parallel alignments, in which the first orbital occupies the central Alpha DiR, with subsequent energy subshells increasing their orbital capacity by two orbitals at a time; one in either hemisphere as mirror images of each other.
- Orbitals maintain perfect symmetry at all times, in which electrons effortlessly switch between adjacent orbital pathways.
- Odd and even numbers of orbitals have different pre-conception of symmetry within odd numbers of DiRs, which subsequently establishes an intra-subshell order of priority that switches between central and outlying flanks.
- Opposite spin electrons occupy opposite sides of the same orbital cycle, so that they are always moving in opposite directions at all times.
- Atomic binding energy (stability) is attributed to the combined Coulomb forces of all forms of electrical attraction, minus regional instabilities from all forms of like charge repulsion.
- Unpaired and paired electrons exhibit a unique form of instability, by inducing like charge repulsive forces that are tangent to the spherical surface, since paired and unpaired electrons experience different levels of (interference) electrical repulsion against one another**.**

Electrons are shown to be highly fluid and readily switch between adjacent DiR orbital pathways in order to retain perfect symmetry at all times. The first "s" orbital within an empty shell replicates the trajectory of a projectile, which always occupies the Coriolis-inspired largest circumference (Alpha DiR) that divides the sphere in half. Following orbitals effortlessly switch between central and outlying flanks in order to retain symmetry at all times.

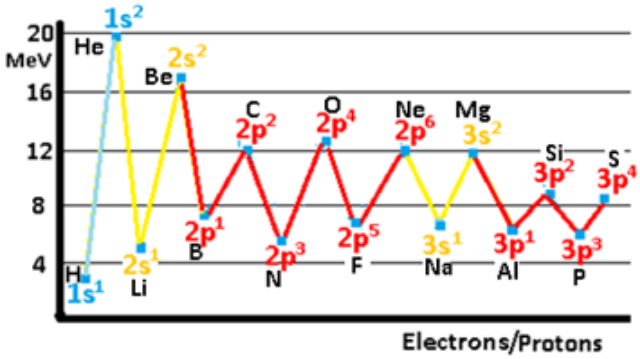
It is now a simple process of following the guidelines set out by the "SLA" Principles of atomic structure, in order to demonstrate the accuracy of the predicted stability or binding energy attributed to each additional electron/proton pair.

Each additional proton-electron pair contributes to the binding energy of an atom; however, given that protons occupy a central focal point that is not dependent upon regional intensity of charge, then the magnitude of a resulting Coulomb force of attraction is regulated by the position of an electron within the structural configuration (radial distance from the nucleus).



Binding energy of each proton
Figure 508

This implies that an element's binding energy and total Coulomb force is increasing by an amount that is equivalent to the change in regional intensity within an atom's receptive shell, minus any regional like charge interference (repulsion) instigated by that inclusion.



Binding energy of each electron/proton pair
Figure 509

The 1st [$\mathbf{1s^1}$] electron in the element of "H" has a weak regional intensity (Coulomb force) and binding energy due to the electric field of a lone electron being distributed throughout the entire parameters of an empty first shell (fig 508 & 509), so there is minimal energy required to overcome the binding forces that keep this atom intact [consistent with the graph].

The 2nd [$\mathbf{1s^2}$] opposite spin electron in the element of "He" clearly represents a sharp increase in binding energy and stability, because a doubling of charge increases the regional intensity; inducing a substantially stronger Coulomb force of attraction [higher binding energy], while the paired status adds extra stability (binding energy) by minimising like charge repulsion (fig 511) [consistent with the graph].

The 3rd electron [$\mathbf{2s^1}$] (fig 510-a) in the element of "Li" is inclined to occupy the central Alpha DiR of an empty second shell in order to retain perfect symmetry. A lone unpaired electron once again has a low regional intensity and binding energy (lower stability) due to the distribution of a lone charge around the entire perimeter of an empty 2nd shell; however it is one shell further away from the nucleus, so it is predicted to have a slightly lower binding energy when compared to the "**1s**" electron. The graph reveals a slight increase in binding energy, which is attributed to a significant increase in the atomic mass of the element.

In other words; binding energy is defined as energy that is required to break an atomic nucleus into its constituent sub-atomic particles, so a substantial increase in atomic mass requires far greater energy to attain a similar level of agitation; which must subsequently be multiplied by the numbers of additional sub-atomic particles. This additional energy accounts for the higher than expected rise in binding energy (relative to 'H') for the element of "Li".

For instance, Lithium has an atomic mass of "Li^6", with an isotope "Li^7" having an abundance of 92.5%. ***The prior element of Helium has two neutrons accompanying two protons, so "Li^7" has two additional neutrons accompanying a single proton, representing a significant increase in both, the ratio of neutrons to protons, and total atomic mass of the element. This potentially increases the stability within the nucleus, as well as the atomic mass, requiring greater energy, and easily accounting the unexpected binding energy of "Li"*** [within reasonable approximations of the graph].

The inclusion of a second [$\mathbf{2s^2}$] (fig 510-b) opposite spin electron in the element of "**Be**" induces an immediate increase in stability and binding energy, due to a significant increase in regional intensity of charge, and a corresponding increase in Coulomb force (binding energy) of electrical attraction; while the paired status contributes to extra stability due to minimal like charge repulsion between electrons. The increased separation from the nucleus predicts a lower (Coulomb force) binding energy as compared to a $1s^2$ orbital [consistent with the graph].

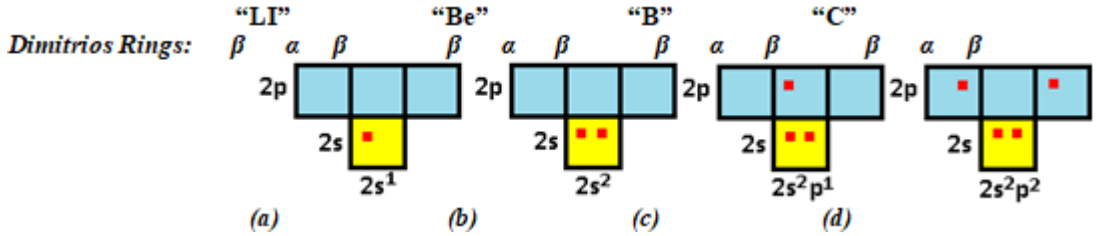


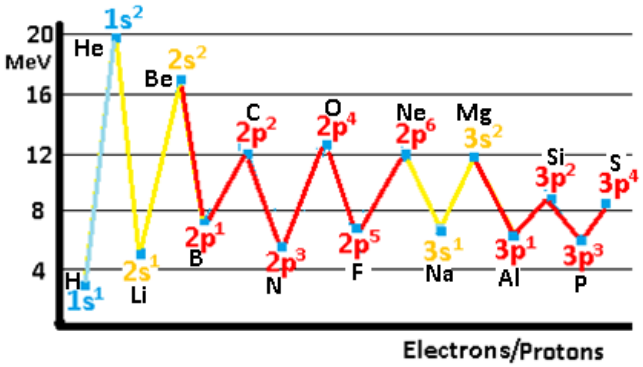
Figure 410
Electron configurations in accordance to intra-subshell orbital priority!
Each square represents an orbital, and each row an energy subshell, and red dots represent positions of electrons.

The 5th [$\mathbf{2s^2p^1}$] (fig 510-c) electron in the element of "**B**" is inclined to occupy the central Alpha DiR, along with an existing "2s" pair of opposite spin electrons, in order to retain perfect symmetry.

Even though there is additional charge contributing to a small increase in regional intensity of charge; interference attributed to an unpaired electron sharing the same orbital pathway with an established pair of opposite spin electrons, induces considerable lateral like charge repulsion that destabilises the structure. So a significant decrease in binding energy is within expectations and is thereby consistent with the graph (fig 511). Linear and/or lateral like charge repulsion, is a trait of multiple energy subshells sharing the same shell, which is a probable reason for the lower binding energy across the entire energy subshell. Percentage changes in atomic mass still apply; however, the effects become increasingly irrelevant as atoms become heavier.

The 6th [$\mathbf{2s^2p^2}$] (fig 510-d) electron in the element of "**C**" induces a reshuffle of existing orbitals; positioning two unpaired electrons in symmetrical positions in either hemisphere, occupying opposing Gama Dimitrios Rings (fig 510-d). There is a slight percentage increase in regional intensity due to the addition of an extra electron; however, there is a level of instability (like charge repulsion) between two unpaired electrons positioned on either side of the central Alpha DiR (fig 510-d); subsequently decreasing the magnitude of an element's stability and binding energy to a level that is considerably lower than the previous filled "$\mathbf{2s^2}$" orbital [Be].

The increased stability of "C" as compared to "B" (fig 511) can be justified on the basis that unpaired electrons experience less resistance when occupying adjacent orbital pathways, as compared to sharing the same orbital pathway with a pair of opposite spin electrons [within reasonable approximations of the graph].



Binding energy of each electron/proton pair
Figure 511

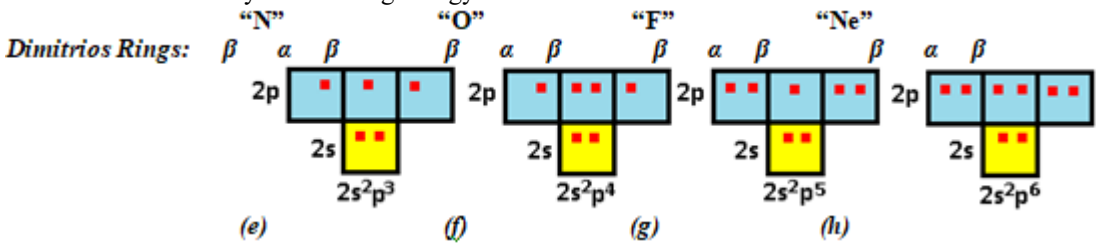


Figure 512
Electron configurations in accordance to intra-subshell orbital priority!
Each square represents an orbital, and each row an energy subshell, and red dots represent positions of electrons

The 7th [$\mathbf{2s^2p^3}$] (fig 512-e) electron in the element of "**N**" (fig 511) once again occupies the central Alpha DiR for the reason of attaining balanced symmetry, with a further decrease in stability (lower binding energy) as a consequence of three adjacent unpaired electrons inducing far greater like charge repulsion; with one unpaired electron sharing the same Alpha DiR with an existing "$2s^2$" pair of opposite spin electrons [consistent with the graph].

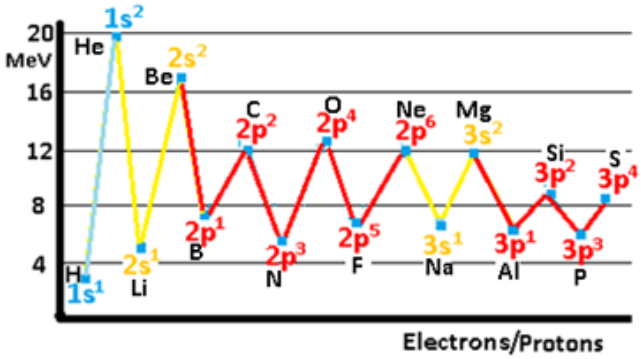
The 8th [$\mathbf{2s^2p^4}$] (fig 512-f) electron in the element of "**O**" establishes the first opposite spin pair of "2p" electrons within the Alpha DiR, which is essentially replicating a similar level of stability as "C", in which unpaired electrons existing in either of the two hemispheres; however, with a very slight increase in binding energy and stability due to increased intensity, and the presence of two sets of paired orbitals within the central Alpha DiR [consistent with the graph].

The 9th [$\mathbf{2s^2p^5}$] (fig 512-g) electron in the element of "**F**" brings about another reshuffle, in which there are "2p" pairs of opposite spin electrons in either flank, with an unpaired electron sharing the same space as a "2s" opposite spin pair of electrons within the central Alpha DiR.

There is a level of instability associated with unpaired and paired electrons sharing an Alpha DiR, but not to the extent of the previous odd-numbered configuration, because there is increased regional intensity, and pairs of opposite spin electrons on either hemisphere are relatively stable [consistent with the graph].

The final 10th [$\mathbf{2s^2p^6}$] (fig 512-h) "p" energy electron in the element of "**Ne**" reveals a level of stability that is ever so slightly lower than the previous even number element of "O"; which subsequently implies that there is minimal interference between unpaired and paired electrons, when they occupy adjacent orbital pathways. But in any case; it does not explain even a slight decrease in binding energy since there is minimal interference between paired orbitals in each of the Dimitrios Rings. However, there is one other source of instability within the atomic nucleus that could potentially lower the stability and binding energy below that of the unfilled orbitals. It is apparent that for the inclusion of one addition proton for the element of "Ne", there are no additional neutrons as compared to the prior element of "F", so like charge interference within the nucleus has increased, causing greater nuclear instability that has the potential to lower the overall increase in binding energy. This implies that a lower than expected binding energy for "Ne" is consistent with the expected outcome. In a general sense; it seems that linear and/or lateral like charge repulsion

between adjacent orbitals inhibit "p" energy orbitals from attaining "s" energy stabilities.



Binding energy of each electron/proton pair
Figure 513

Ensuing orbitals 11 & 12 in the elements of "**Na**" & "**Mg**" relate to a "**3s**" opposite spin pair of electrons occupying the central Alpha DiR of the 3rd shell. The similarity between "**2p**" and "**3s**" electron binding energies (stability) may appear strange, given that they represent different energy states that occupy separate shells.

It is apparent that each additional "p" energy electron is contributing a consistent level of additional charge and binding energy across the entire energy subshell, which is why each subgroup has similar high and low zigzag values, with varying degrees of regional instability within the nucleus and between paired and unpaired electrons contributing to the slight variations in the zigzag binding energy values.

In all likelihood, the following "**s**" energy orbital within an empty shell simply coincides with the same binding energy as the "p" energy subgroup; so what appears to be an inconsistency happens to coincide with previous variations between "s" & "p" orbitals, when there was a transition from a "**2s**" to a "**2p**" energy subshell (fig 514 & 515).

In other words; the "**3s**^{1}" & "**3s**^{2}" orbitals (fig 513) look to be a continuation of the "**2p**" energy subgroup, but are instead consistent with a corresponding large disparity just prior to the onset of a new larger energy subshell (fig 514), as is typical between "**2s**" and "**2p**" orbitals (fig 514). This implies that lateral (sideways) like charge repulsion between adjacent orbitals is the underlying reason for larger energy subshells possessing progressively lower binding energies. Consequently, the "**3s**" binding energies revert to a series of lower binding energy "**3p**" orbitals (fig 515), which is consistent with the disparity between the "**2s**" & "**2p**" energy subgroups.

In other words, there are significant disparities in stability (like charge interference) between "s" and "**p**" energy subshells due to lateral like charge repulsion, irrespective of which shell; so what looks to be a continuation of the "**2p**" energy subgroup is actually consistent with the binding energy of a "**3s**" subshell, just prior to the onset of the next series of "**3p**" orbitals. The 3rd shell is further from the nucleus bringing "**2p**" and "**3s**" binding energy values to a very similar order of magnitude (fig 513).

Binding energy of each electron/proton

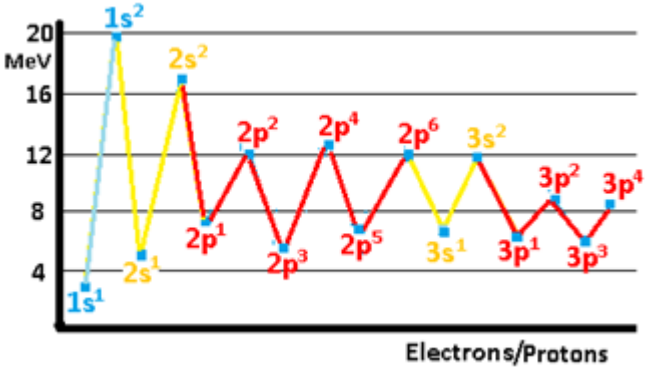


Figure 513

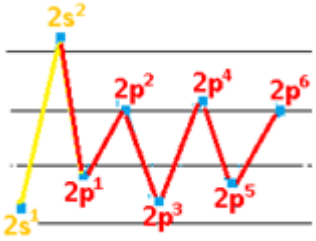


Figure 514

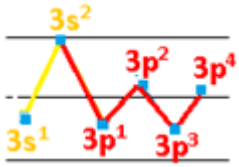


Figure 515

Binding energy variations between **2s/2p** energy subgroups
Binding energy variations between **3s/3p** energy subgroups
Note how binding energy variations between **s** & **p** energy subgroups in the second shell (fig 514)
are consistent with binding variations between **s** & **p** energy subgroups in the third shell (fig 515)

Note how the declared properties of "SLA" electron configurations, conform very precisely with the up and down variations for each of the values in the "binding energy per proton graph"! In other words, the variations are so precise that it is analogous to reading a script of music that fits perfectly with a known melody.

"SLA" Concepts are once again flawless in their depiction of each zig-zag fluctuation in the "binding energy per proton graph"; which is essentially a repeat of the "SLA" accuracy in predicting the "Disintegration of Uranium 235 graph". All in all; it leaves no question of doubt about the true origin of so-called nuclear binding energies, as being derived from a combination of all Coulomb forces of electrical attraction, minus regional instability from all sources of lateral like charge interference.

In other words, once allowances for radial distancing from the nucleus are taken into consideration; then it is simply a process of combining all regional Coulomb forces of attraction, based on localised intensities of charge and numbers of resident electrons within each shell, and then subtracting regional interferences and instabilities within the nucleus and between paired and unpaired electrons, to

accurately predict each of the variations in binding energies between consecutive elements on any graph (fig 513).

ATOMIC BINDING ENERGIES ANALYTICAL INVESTIGATIONS

As mentioned at the beginning of this article; it is always challenging when attempting to alter deeply imbedded perceptions, irrespective of whether they are totally unfounded, and based on nothing other than speculative hypothetical assumptions. The structural stability of the nucleus falls under this classification, as a mythical superpower that miraculously binds nucleons together; even though, known properties of individual constituencies provide no scientific justification for any internal binding force. On the contrary; underlying properties are indicative of electrical interference rather than attraction; but that is the nature of scientific ingenuity; a simple classification as a phenomenon resolves the issue out of hand. This is where the "SLA" Theory of Atomic Structure comes into its own, as an unprejudiced source of information that takes the initiative to rectify past failing, by abiding by the laws of physics.

In accordance to the "SLA" Theory; Coulomb forces of electrical attraction serve dual roles in not only stabilising electrons within their allocated positions, but also preventing nucleons from disbanding, as a type of sealed container retaining internal contents.

This implies that energy-efficient swirling electric fields take on a defining role as tough, flexible surface layers that protect the structural integrity of an atom, and which subsequently replicate the esteemed properties of formidable nucleon to nucleon binding energies. It is thereby assumed that neutron contribution to an atom's overall binding energy is moderate at best, because the only known binding forces between sub-atomic particles are electrical in nature. In other words, Coulomb forces only exist between charged particles, and neutrons do not fall within that definition because they are electrically neutral. However, that does not preclude modest dipole interactions between nucleons that may be enacted at close quarters.

Dipole moments: Nucleons are known to undergo Beta decay, which transforms a neutron into a proton by releasing a resident electron. So, from a theoretical perspective, if a neutron consists of a blend of positive and negative electric fields, then there is a reasonable possibility of dipole moments being activated when a charge comes into close proximity, as is the case within a nuclear structure. In other words, a proton is likely to instigate a polar induced attraction that binds protons and neutrons into conjoined pairs, or amalgamates adjoining protons into a centralised cluster, with an option of incorporating some type of circulating activity.

An alternative preferred notion, relating to the structural composition of protons and neutrons; is that repulsion between protons may be so intense that neutrons are secured in position in order to retain nuclear structural stability. In other words; given that protons cannot escape due to being isolated within a negatively charged electromagnetosphere, then the structural arrangement within the nucleus favours the lowest available energy state. This could explain the structural interrelationship between protons and neutrons; not so much as an extremely powerful binding force, but rather as a structural configuration that conserves energy, by restraining neutrons in set positions that reduce like charge repulsion between protons. For instance; if it were theoretically possible to place any number of protons within a sealed container, and then slow down motion by lowering the temperature to a level where charged particles come to an absolute stop, then protons will occupy equidistant positions throughout the entire volume.

Next, conduct the same experiment and include an appropriate number of neutrons; then protons will once again occupy the same equidistant positions, with neutrons occupying intermediate positions between protons in an effort to reduce interference, and subsequently conserve energy by attaining the lowest available energy state. [I suspect that this explanation resolves one major uncertainty in regard to atomic nuclear structure; dated Friday 9-09-2022].

Uniform circulating motion, in which particles retain relative positions to each other, while spinning around a central axis, will achieve the same outcome. It is thereby reasonable to assume that nucleons are induced into structural arrangements that reduce interference and conserve energy, without the need for any immensely powerful intra-nuclear binding energies. This does not preclude the possibility of moderate polar induced attraction that can potentially bind protons and neutrons within allocated positions.

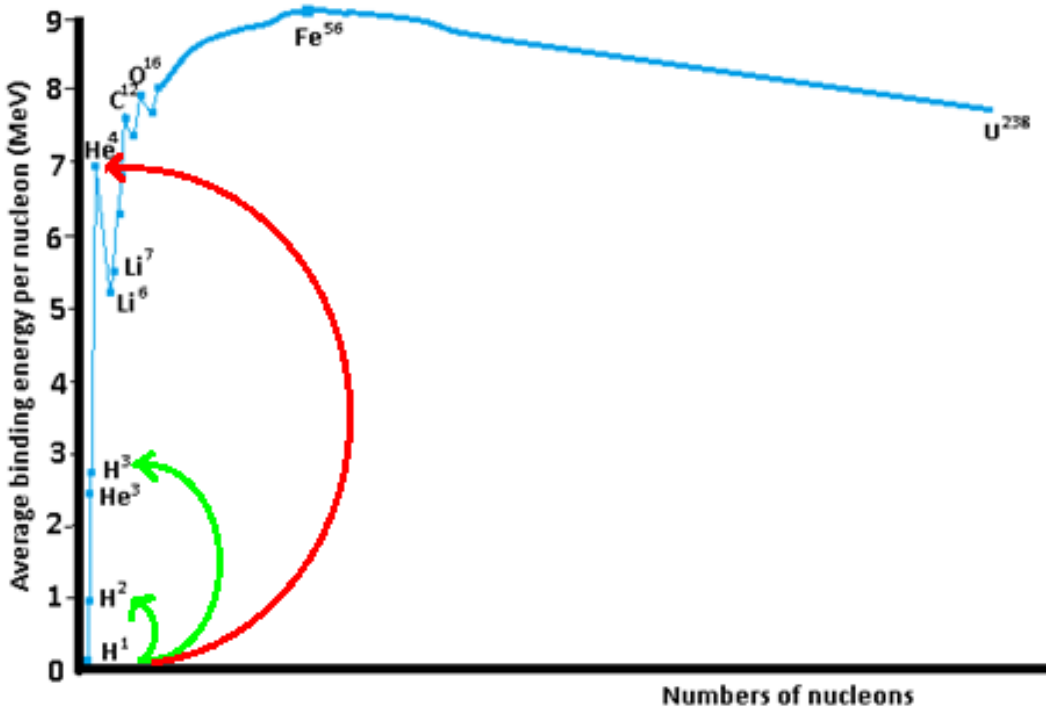
One dilemma; is that even though nucleons are enveloped and constrained by the external perimeter of swirling negative electric fields; there is no inbound force that is pushing them together. Consequently, it is thereby assumed that neutrons minimise some of the like charge repulsion between protons, which activates some degree of close-up Polar attraction between nucleons, while a uniform circulating motion enables the nucleus to respond as a unified entity, which is subsequently locked into position by outbound pulling forces.

In any case; the magnitude of any nucleon to nucleon binding force is not in the range of any immensely powerful so-called nuclear binding energy. This "SLA" portrayal of a nuclear structure seems to provide a credible solution to an arrangement of nucleons that are prone to like charge repulsion, yet are bound together without any powerful intra-nuclear attraction.

Another positive endorsement is that such a hypothesis is largely dependent upon the laws of probability, which subsequently predicts the existence of multiple isotopes of the same element, with some compilations being more probable than others.

Average Binding Energies per Nucleon Graph [Analytical Assessment]

In order to assess whether there is a similar level of accuracy as depicted in the curvature of the "binding energy per proton graph", an in-depth analysis of the average binding energy per nucleon graph needs to be undertaken, in order to identify specific characteristics of the curvature that can be directly linked to the "SLA" depiction of atomic binding energies.



Average binding energy per nucleon
Figure 500

The following is a verbal description of how different variables contribute to the stability of an element. In other words, this chapter provides the theoretical groundwork for how to interpret relevant data from varying fluctuations in the average binding energy per nucleon graph; whereas, the ensuing chapter provides a more simplistic account of how each variable influences the final outcome.

Nuclear binding energy is defined as the level of energy required to break an atomic nucleus into its constituent sub-atomic particles. Such a definition is fundamentally flawed, because it is not acknowledging the role of circulating electric fields in stabilising the nucleus. In any case, the element of **Hydrogen** "**H^1**" has a low regional intensity (Coulomb force) and binding force for reason that a single electric charge is distributed across the entire parameters of an empty first shell; however, by definition, it is classified as having zero binding energy for reason that it represents the smallest division of a nuclear structure.

The first element of Hydrogen "H^1" is found to be somewhat peculiar, in that isotopes "H^2" & "H^3" entail higher binding energies with corresponding minuscule percentage abundances [H^2 0.001%-0.028%] & [H^3 trace element]; whereas, as a general rule it is expected that higher binding energies should make elements more stable and subsequently result in higher abundances, which is the case for "He^4"[99.9998%] & "Li^7"[92.2%-98.1%] as compared to their counterpart "He^3" & "Li^6" isotopes.

Obviously, it takes energy to dislodge a neutron, once it is in position; but it is not reflective of any so-called nucleon to nucleon binding energy, because energy efficiency of circulating electric fields isolates the perimeter of an atom, which subsequently serves as a type of protective shield that dissipates energy, while keeping an atom intact.

The strength of the shielding effect is dependent upon the sum of regional intensities of circulating charge within each shell, while dispersion of energy is dependent upon the atomic mass of an atom; so the inclusion of one and two neutrons, doubles, and triples the atomic mass of a "H^1" atom, enabling isotopes to absorb double and triple the amounts of energy before attaining equivalent levels of agitation that could potentially dislodge a particle. This process must subsequently be multiplied by the numbers of additional sub-atomic particles.

It is thereby assumed that average binding energies per nucleon for Hydrogen isotopes, are not in any way indicative of any so-called nucleon to nucleon binding forces, but are instead reflective of the perceived ability for circulating electric fields to disperse energy and keep a nuclear structure intact; for under normal circumstances higher binding energies should make elements more stable and subsequently result in higher abundances; but this is not the case for Hydrogen isotopes, which invalidates the ill-conceived notion that neutrons contribute to an immensely powerful nucleon to nucleon binding force. This is not denying moderate binding energies between nucleons, due to potential Polar induced electrical attraction. In fact; the

prospect of neutrons sharing the nucleus with a single proton (in isotopes H^2 & H^3) is verification that Polar attraction takes place between protons and neutrons, for neutrons serve no purpose, other than reducing interference between protons, so if there is only one proton there is needs to be some moderate physical binding force keeping them together.

Having said that; there one more credible and somewhat preferred option that is worth consideration! "H^1" represents a single proton occupying a static central location with an orbiting electron at a set radius; however, additional neutrons inadvertently cause a shift in the center of gravity, and a subsequent expansion in the dimensions of a nucleus. Meanwhile, the orbiting electron retains the same circumference and consequently finds itself closer to the resident proton; thereby inducing a greater Coulomb force of electrical attraction. However, the downside is that a circulating negative charge may not retain an even Coulomb force of attraction around the entire perimeter of the positively charged nucleus, as the position of a neutron may provide a shielding influence to one side of the nucleus; consequently making an atom far less stable and somewhat improbable. These are two compelling arguments, both of which predict lower abundant isotopes; and in fact, the application of one does not detract from the relevance of the other. So in all likelihood, Hydrogen isotopes attain a stronger Coulomb force, with an associated Polar attraction between nucleons. In any case; both models incorporate active participation from circulating electric fields, which eliminates any likelihood of powerful nucleon to nucleon binding forces.

The subsequent inclusion of an ***electron & proton pair*** (with an adequate number of neutrons) increases the binding energy of "He^4" to an astronomical magnitude, which seems to imply that doubling the Coulomb force of electrical attraction induces a massive increase in binding energy, and stability of an element.

It could be mistakenly argued that the disparity in binding energy between "He^3" to "He^4" is a direct consequence of a neutron being added to the nucleus, for the Coulomb force of electrical attraction between the two elements has remained the same.

However, interactions between sub-atomic particles are electrical in nature, so Coulomb forces only exist between charged particles, and neutrons do not fall within that definition because they are electrically neutral. However, that does not preclude modest dipole interactions between nucleons.

It is therefore reasonable to assume that the deficit of a single neutron (inadequate numbers of neutrons) causes regional instability within the nucleus that subsequently undermines (lowers) the binding energy of "He^3", not the other way around, in which the inclusion of a neutron is perceived as being a direct source of binding energy.

The theoretical concept of a nucleon to nucleon binding force is an unproven hypothesis that is rightly classified as an unknown phenomenon, since it has no scientific foundation; whereas "SLA" atomic binding energies are derived from verifiable electrical interactions that are prevalent throughout the entire atom. There is no comparison, in that one is an unfounded phenomenon, as opposed to predicted properties of electric fields! However, when "SLA" predictions coincide perfectly with known outcomes, time and time again, across all aspects of atomic and nuclear structure, then it is safe to deduce that "SLA" Concepts are genuine, and extremely accurate.

It may therefore be concluded that binding energies are not attributed to the inclusion of protons and neutrons into a nucleus; but instead, attributed to the inclusion of pairs of oppositely charged particles that increase the overall Coulomb force of electrical attraction within the entire atom; while making allowances for regional instabilities from like charge interference within the nucleus, and between paired and unpaired electrons within a receptive shell [information pending].

The stabilising role of neutrons within a nuclear structure is evident, given the observable disparity between binding energies of isotopes of the same element, in which "He^3" is considerably less stable than "He^4" (even accounting for the greater body mass); thereby signifying the essential role of neutrons in inducing greater stability by minimising the level of like charge repulsion between protons; however, it has nothing to do with any so-called immensely powerful nucleon to nucleon binding energies; and in fact, excess numbers of neutrons can cause cataclysmic annihilation of the nucleus, which is what takes place in the disintegration of Uranium 235.

The large disparity between "He^4" and its isotope "He^3" relative to isotopes of different elements is also partially due to the minimal numbers of resident nucleons, representing an enormous percentage change in regional stability. Subsequent disparities between isotopes of the same element such as "Li^6" & "Li^7" become progressively smaller as mass numbers increase, and eventually becoming indiscernible to the far right of the graph. Another contributing factor, is that Coulomb forces decrease substantially as shells move increasingly away from the nucleus; thereby ensuring that variations in binding energies between isotopes (lateral like charge instability) are increasingly closer together.

Increasing the radial separation between opposing charges is known to have a profound effect on lowering the magnitude of a resulting Coulomb force; however, such decreases do not necessarily equate to lower binding energies in the second and third shells (fig 516), since regional intensity of charge (Coulomb forces) is derived from a combination of all charges that share a given shell.

The **second electron shell** [red coloured elements] is very significant in terms of defined properties of atomic and nuclear structure, because it exposes several abrupt reversals (downturns) that disrupt the upward trend, but which then recover to continue on the same overall trajectory of an accelerated rate of decline in the upward gradient (fig 516).

The first electron that occupies the* second shell *"Li^6" [red coloured elements] brings about a massive decrease in stability and binding energy, attributed to a lower Coulomb force that is a direct consequence of single electron charge being dispersed over the entire volume of an empty 2^{nd} shell; however, this decrease in magnitude of charge is further weakened by an ever-increasing radial distance from the nucleus, because Coulomb force is inversely proportional to distance squared.

The combination of these two factors represents a very significant decrease in the regional intensity (Coulomb force), average binding energy, and overall stability of an element, which is consistent with the massive decline in stability and binding energy between the elements of "He^4" and "Li^6". Binding energies between nucleons could never account for such a reversal, since nucleons are continually increasing in numbers.

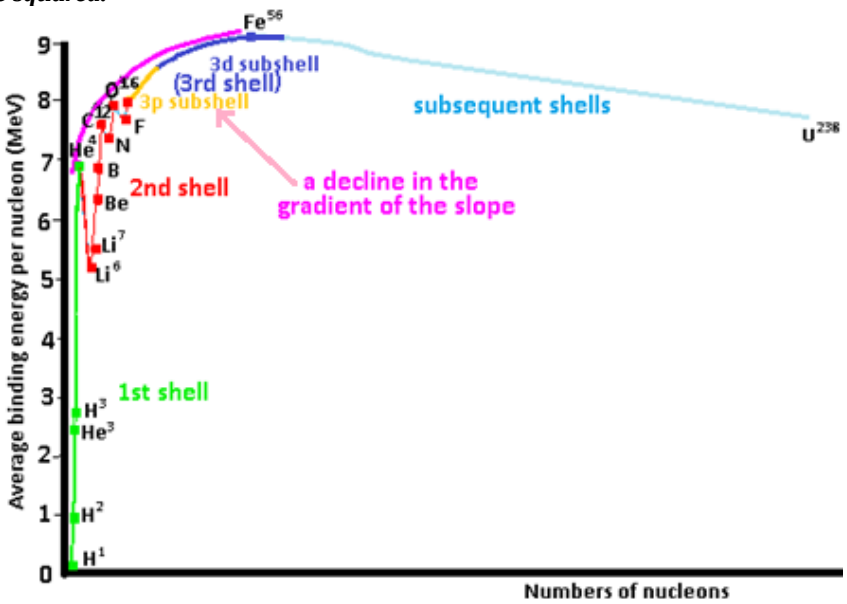


Figure 516
Average binding energy per nucleon, highlighting each of the electron shells

From the first sudden decrease (reversal) in binding energy (element of "**Li^6**"), regional intensities of charge, and binding energies, undergo gradual increases for each additional electron/proton pair [red coloured elements] up to the element of "**C^{12}**", because each electron contributes additional charge (electrical attraction) within a given volume of space/shell (fig 516). Additional charge induces substantial increases in regional intensity, binding energy, and stability of each successive element. Admittedly, increases are not as large as the disparity between "**H^1**" to "**He^4**"; however, electrons are one shell further away from the nucleus, which signifies a considerable decrease in regional intensity and Coulomb force.

The reason for the subsequent series of up and down fluctuations (reversals) in the second shell; is owing to the second shell being the first occasion that orbitals occupy adjacent parallel orbital pathways, which instigates lateral instability between paired and unpaired orbitals, because each experience different levels of like charge repulsion form each other. These like charge repulsive forces are at tangent to the spherical surface, and as a consequence bring about lateral (sideways) instability that undermines the structural integrity of the principle binding force holding an atom together.

Such reversals in binding energies are not limited to the second shell; however variations become increasingly moderated as elements move to the right of the graph; due to weakening Coulomb forces, as shells move increasingly away from the nucleus, and diminishing average percentage change per nucleon, as atomic numbers become increasingly larger.

It therefore becomes apparent that each sub-atomic particle has a very specific role in the overall binding energy and stability of an atom. The primary binding force that keeps an atom together is attributed to the combined sum of all regional Coulomb forces of electrical attraction; the strength of which is regulated by the numbers of electrons in each shell, and the radial distance of each shell away from the nucleus. This implies that there is a three-way trade-off between radial distance, the number of electrons within a shell, and the magnitude of a regional Coulomb force (intensity of charge) of electrical attraction.

The cumulative sum of these principle binding energies are supplemented by minor nucleon to nucleon binding energies, which together make-up the entirety of an atom's binding force that keeps an atom intact. However, these principle binding forces do not account for regional instabilities that are not aligned with the internally directed force of electrical attraction. Such lateral (sideways) instabilities, which are tangent to spherical shape of an atom, exist within the nucleus due to insufficient numbers of neutrons, and between paired and unpaired electrons within a receptive shell, because they promote uneven sideways tension (like charge repulsion) which subsequently undermines the effective binding energy of an element. This represents the total contribution to an element's binding energy, in which there are different levels or degrees of each of these variables.

It therefore becomes apparent that the numbers and positions of neutrons; and the numbers and positions of paired and unpaired electrons, play a significant role in the stability of an element, by undermining the overall binding energy of an element.

The general contour of an average binding energy per nucleon graph, is directly affiliated to a delicate equilibrium between inbound Coulomb forces of electrical attraction and outbound Coulomb forces of like charge repulsion, which subsequently culminates in an element's atomic configuration; whereas sudden reversals or departures from the general curvature are a direct consequence of extreme variations in the Coulomb forces of electrical attraction, and/or radical variations in the degree or level of lateral instability within the nucleus, and between paired and unpaired electrons.

That is the complete embodiment of the so-called nuclear binding energy of an element; subsequently predicting the entire curvature in the average binding energy per nucleon graph, which is inclusive of sudden downturns (reversals), and minor imperfections or deviations in binding energies that are not discernible in this graph.

In conclusion; the accumulation of charge in the second shell gradually increases the total Coulomb force and subsequent binding energies, to levels that eventually surpasses the previous shell; however, these are average Coulomb forces per nucleon, so by the third shell, any sudden drop in regional intensity (Coulomb force) as a consequence of electrons accessing the next empty shell is distributed across all resident charges, and is thereby diluted to such an extent that there is minimal decrease in average Coulomb force (binding energy); even though, from an individual stand point, it is quite substantial.

The other point of significance is that the percentage increase in average binding energy (Coulomb force) per nucleon is gradually decreasing as atomic numbers become larger, so increases in average binding energies are becoming increasingly moderated between consecutive elements, to the right of the graph, which subsequently takes on a linear appearance.

In reality; what appears to be a linear ascendency in the third shell is actually a continuation of zigzag fluctuations that are too small to be visible (indiscernible) on this graph; which are once again instigated by lateral like charge instability between paired and unpaired electrons, as electrons alternate between central and outlying flanks, in accordance to odd and even numbers of orbitals.

The gradual decrease in the curvature of the upward gradient as it extends into the third electron shell, implies that the percentage increase in binding energy is declining at a faster rate, due to weakening of the Coulomb force as shells move further from the nucleus; as compared to the rate of decline in the percentage increase in mass number; subsequently reaching a stage in which percentage decrease in binding energy eventually overtakes the percentage change in atomic number. In other words, the rate of percentage increases in binding energy and mass number are both declining for each consecutive element (apart from minor fluctuations); however, the percentage increase in binding energy is declining at a faster rate than the rate of decline in the percentage increase in mass number, so eventually the increase in binding energy (Coulomb force) becomes so small due to increasing distance of successive shells away from the nucleus, that it becomes less than the percentage increase in binding energy brought about by the increase in atomic mass of the element. That marks the point at which the upward gradient of the slope is reversed and moves progressively downwards.

However, for as long as the slope is on an upward incline, then the percentage increase in average binding energy (Coulomb force) per nucleon is still greater than the percentage increase in atomic number; thereby implying that the average binding energy per nucleon is incrementally increasing up to the element of "Fe".

Allow me to elaborate on what is a complex sequence of events. Each additional charge adds to the binding energy of an element; however, since these are average values, then the change in binding energy (Coulomb force) is divided by the numbers of nucleons. This implies that if there was (hypothetically) no change in binding energy, then the increase in atomic mass would mean that the average binding energy per nucleon would decrease. Conversely; if the percentage increase in the binding energy falls below the percentage increase (decreasing rate of change) in the numbers of nucleons; then the average binding energy will likewise undergo a reciprocal decline in proportion to the difference between the two percentage changes. This is what distinguishes between an upward or downward gradient in the curvature of the slope.

From an "SLA" perspective, a filled third electron shell exemplifies the last shell in which the percentage change in binding energy is greater than the percentage change (decrease) in numbers of nucleons; thereby typifying the optimum level of stability per proton that an element can attain; give or take small variations due lateral instability within the nucleus, and between paired and unpaired electrons. From that point onwards, each additional nucleon lowers the average binding energy per nucleon for subsequent elements, because the percentage increase in atomic mass is greater than the percentage increase in binding energy.

Given that only charged particles add to the binding energy of an element, then increases in numbers of neutrons can distort and misrepresent the binding energy so that it appears less stable.

Conversely, there are two forms of lateral instability/interference within the nucleus and between paired and unpaired electrons that can undermine the binding energy, and subsequently make an element less stable; and while protons and electrons may be interconnected, the magnitude, position, and effect of each of these lateral interferences on the stability of an element is likely to be markedly different, given that electrons are based entirely on a lateral intensity gradient, and

positioned in the outer periphery of an atom; whereas stability of protons are regulated by the relative positions of neutrons, which are very near to the centre of gravity.

Lateral interference within the nucleus and between paired and unpaired electrons is determined on an individual basis, regulated by the numbers and positions of constituent particles. In other words, orbitals are highly fluid and can switch between adjacent orbital pathways, in an effort to retain perfect symmetry at all times. This implies that odd and even numbers of orbitals alternate between central and outlying flanks (in order to retain perfect symmetry); based entirely upon whether there are odd or even numbers of orbitals within a receptive shell, and that each of these compilations has varying degrees of lateral interference, which subsequently culminates in zigzag variations in the average binding energies of consecutive elements.

The interrelationship between adjacent orbitals within an "SLA" electron configuration is near perfect; however the same cannot be said of a proton nuclear structure, for there is uncertainty with respect to physical positions of neutrons, which implies that there is a subsequent uncertainty with respect to the degree of lateral instability within the nucleus.

Zigzag variations continue throughout the entire Periodic Table group of elements that extends to end of the graph; based on varying degrees of lateral like charge interference within the nucleus and between paired and unpaired electrons, which alternate between central and outlying flanks, in accordance to odd and even numbers of orbitals. However, the variations in binding energies are progressively diluted to the right of the graph, due to weakening Coulomb forces, and decreases in percentage change as atoms become larger, that zigzag variations tend to be indiscernible as elements move to the right of the graph.

The beginning of the 4th electron shell marks a transition to a steady decline in the average binding energies per nucleon, epitomising a role reversal, in which the decline in the percentage increase in binding energy (due to shells extending further from the nucleus) has surpassed the decline in the percentage increase in atomic mass, so the increase in binding energy (Coulomb force) is less than the percentage increase in atomic number; thereby implying that the average binding energy per nucleon is declining till the end of the graph.

Note how the "SLA" (Coulomb) interpretation of atomic binding energy matches perfectly with the curvature of the average binding energy per nucleon graph, particularly in the manner with which it accurately depicts the entire range of sudden downturns (reversals) in binding energy, attributed to extreme variations in regional intensity of charge, and/or lateral interference between paired and unpaired electrons.

This is totally at odds with present interpretations that have no credible justification for any such variations in binding energies, since neutrons and protons are presumed to undergo some type of close-up nuclear binding energy; so why would increasing number of nucleons suddenly revert to a decrease in average binding force per nucleon? It makes no sense because it is based on wrong assumptions.

It is thereby concluded that atomic stability is a product of the combined sum of all electrical interactions throughout the entire atom, in which primary binding forces of electrical attraction are being undermined by like charge repulsive forces. Small atoms consequently possess far greater average Coulomb forces of attraction per charge, with minimum level of energy, due to the close proximity between opposite charges; subsequently requiring excessive levels of energy in order to overcome powerful close-quarter Coulomb forces that bind the atoms together; whereas large atoms possess relatively weak average Coulomb forces of attraction per charge, with elevated level of energy, because opposite charges are further apart; subsequently releasing energy upon fragmentation, as high-energy electrons revert to lower energy states that are closer to the nucleus.

The accuracy with which the "SLA" Coulomb-inspired atomic binding energy reflects the anticipated strengths of so-called nuclear binding energy (stability) for consecutive elements is phenomenal, once lateral instabilities from like charge repulsions have been taken into consideration.

In reality, it is somewhat difficult to accurately determine how much of an element's stability or instability is attributed to different sectors of an atomic structure; however, guidelines can be formulated on observed variations that can be attributed to specific circumstances. In any case, the general consensus from an "SLA" perspective, endorses the primary source of stability as being derived from Coulomb forces of electrical attraction, rather than an extremely powerful nucleon to nucleon binding energy.

The "SLA" Theory has once again outperformed its conservative peers, in its flawless appraisal of atomic binding energies, which ultimately adds to the overwhelming body of evidence that confirms the authenticity and legitimacy of the "SLA" Theory of Atomic Structure.

This article relating to Atomic Binding Energy is the third in a series of articles related to "SLA" Theory of Atomic and Nuclear Structure that have been published in the International Journal of Science and Research, and subsequently incorporated into a book version of the entire "SLA" research into atomic and nuclear structure, which is close-on 240 pages of analytical research, incorporates unpublished "SLA" Research that is as good as the research in these articles, but more importantly, is how it provides consistency and continuity between different segments of atomic and nuclear structure.

The three published research articles are proof of the scientific credibility of the "SLA" Theories of Atomic and Nuclear Structure, which will shortly be available for purchase from sites such as Amazon or Alibaba.
Current publications in the International Journal of Science and Research:

The Title to the book is as follows:

THE ATOM
ATOMIC AND NUCLEAR STRUCTURE

NEW RESEARCH
Based on "SLA" Atomic structure
In which the real-world challenges the hypothetical world of sub-atomic particles.
No longer are micro-particles exempt from the laws of nature.