

# MC Physics Model of Sub-Atomic Particles using Mono-Charges

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## Abstract

The existence of sub-atomic mono-charges was previously postulated based on the properties of the smallest particles known, photons [1]. In MC Physics theory, mono-charges form all matter and cause all reactive force. Mono-charges are quantized electro-static charges, in groups or 'silos', that are characterized by their charge strengths or potentials and charge type (positive + or negative -). Distribution of mono-charge properties are theorized to come from an initial Big-Bang-like event causing the earliest ultra-high kinetic energy Universe. Following the basic rules of Coulomb's Charge Force Law, progressive 'cooling' of the Universe's high kinetic energy first allowed stable joinings of only the highest attraction charge forces from only the highest strength opposite-charged type mono-charges to make Up quarks. With further progressive 'cooling', lower charge force joinings could occur to form progressively weaker quarks, then electrons and then neutrinos, plus other miscellaneous particles. Higher level composite particles, atoms and molecules were also formed from those basic mono-charges and elemental particles. The weakest strength mono-charge joinings, photons of light, were the last to stably form. From that analysis, a mono-charge based model of subatomic particles and force is proposed that does not include bosons for force interactions or virtual particles of any type, as all known particles, atoms and molecules come from joinings of available mono-charges.

**Keywords:** photon, sub-atomic particles, atomic substructure, mono-charge, monochrome, electro-static charge, charge force, atoms, quarks, nucleus, nuclei, electrons, elements

## *Development of Atomic and Sub-Atomic Models*

Humanity has always wondered what 'things' are made of and how are they made. Originally, the basic elements were thought to be only: air, water, earth and fire. As time went on our understanding went deeper, finding new smaller layers of particles, with new instruments and technologies. This is important since those new understandings led to even more advanced science and technologies in energy, chemistry and metallurgy for society's use. Therefore, to establish that 'smaller and deeper' trend, a quick review of atomic model development is in order:

In about 400 BC Democritus (or his mentor, Leucippus) developed a model built on "indivisibles" or minute and indestructible particles with shapes and forms to make the different states of matter [5].

In 1704 Sir Isaac Newton proposed a mechanical universe with small masses in motion [4]. Force, including gravity, was instant across space between objects.

In 1803 John Dalton proposed the 'Billiard Ball Model' that considered that all matter is composed of tiny spherical solid 'atoms', considered indestructible particles, that combine in different ways to make the recognized elements of the time [2][3][4].

In 1903 Nagaoka theorized a 'Saturnian' atomic model with flat rings of electrons revolving around a positively charged particle [4].

In 1904 the English physicist, J. J. Thomson, proposed the 'Plum Pudding Model' of atoms, to help explain the newly discovered electrons, as negatively-charged electrons floating within a positively charged space, which then made atoms charge neutral [3]. Electro-static force held the atom together.

In 1911 Ernst Rutherford proposed a very dense, very small and positively charged nucleus around which negatively charged electrons orbit like planets around our sun [3][4].

In 1913 the Danish physicist, Neils Bohr, proposed that multiple electron orbits were held in place by electro-static forces [3].

In 1930 Erwin Schrodinger assembled a Quantum Mechanics Model where electrons do not inhabit precise orbits, but exist as continuous 'probability clouds' or a "wave mechanics" mathematical likelihood where they may exist in a diffuse area [4].

Over the last 50+ years the current Standard Model was developed and mathematically modelled by Quantum Mechanics, Quantum Field Theory (everything is a 'field') and Quantum Chromodynamics. That overall model has been relatively successful in that several particles were predicted before they were found experimentally [6][7][8][9]. The basic groupings in the Standard Model can be seen in Figure 1 and are: quarks (6 count), leptons (6 count) and bosons (5 count). There are many anti- and virtual particles required in the model to meet all interaction requirements.

The 3 mathematical models fit only very narrow ranges of the real experimental data available- Quantum Mechanics (sub-atomic) then Quantum Field (higher sub-atomic) and General Relativity (for cosmological). However, Special Relativity's  $E=Mc^2$  mass-energy conversion relationship, an interesting kinetic energy equation based on the velocity of photons of light, is used throughout.

Each group has different properties, which can include: mass, charge, spin, color, flavor, chirality [9], left and right handed, quantum number, flavors, color charge, color confinement, weak isospin [7], and/ or other characteristics or properties. There are also several rules of engagement - fermions (quarks, leptons, protons, neutrons, most composite particles) have odd half-integer spins; while bosons (photons, gluons, Higgs?) have integer spins; Pauli Exclusion Principle to differentiate between fermions and bosons; baryons are made up of 3 quarks; mesons are made of 2 quarks; and most have anti-particles and virtual particles. The

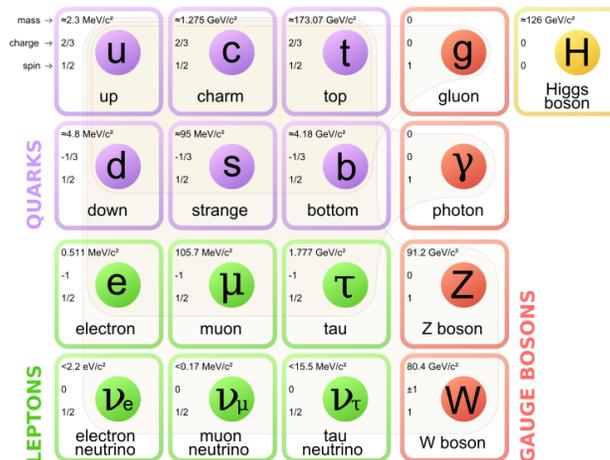
understanding of those characteristics and properties, what they actually are and what they mean, is not clearly explained, if even known.

There are four forces mediated by boson particles- nuclear strong (mediated by gluons), nuclear weak (mediated by W and Z bosons), electro-magnetic (mediated by photons) and gravitation (mediated by graviton?). Photons and gluons have energy, but no rest mass [7].

The basic assumptions and requirements imbedded in the Standard Model are:

- Photons have zero rest-mass, i.e. they are massless. Photons mediate and are, therefore associated with electro-magnetic force. There is some argument as to if photons have any mass, even while travelling, as some mathematical models consider photons as only waves or energy perturbations. This is curious since photons do have measured momentum and kinetic energy; are bent by and are affected by the force of gravity; and can be scattered. All those characteristics are considered properties of mass.
- Only massless photons bosons can travel at the speed of light. That must mean that gluons vibrate at the speed of light to achieve its 'mass'.
- Nothing can travel faster than the photons of light, even force. This has not been empirically proven, as proving such a negative is difficult.
- Relativity is based on the speed of light, per Special and General Relativity. This requirement may be only based on the fact that we have not measured anything faster than the speed of photons of light. And,
- Energy and Mass are directly inter-changeable, per  $E=M*c^2$ , an apparent kinetic energy term based on the speed of a photon of light.

**Figure 1**  
**Standard Model Constituents [6][7]**



The atomic model that comes from the current Standard Model is that:

- Atoms are made of protons and neutrons in the nucleus and
- Electrons existing/ contained in probability clouds or shells around the nucleus.

- 3) Protons are made up of 2 Up (strongest + charge) and 1 Down (strong - charge) quarks giving it a net positive +1 charge.
- 4) Quark properties are given, but not understood as to why they behave as they do or what they are made of.
- 5) Neutrons are made up of 2 Down (strong - charge) and 1Up (strong + charge) quarks. Neutrons are unstable particles with Beta-Decay processes that flip neutrons from/ to protons with additional miscellaneous energies, particles and anti- or virtual particles.
- 6) Gluons are bosons and not particles. They possess energy, but no rest-mass, and provide mediation for the strong nuclear force that keeps the protons together.
- 7) Electrons are elemental particles with a strong negative -1 charge. They are held to the nuclei by electro-static charge force. Electrons exhibit both wave and particle behavior.

Photons are not part of the atom. Per that model, the source of those photons are energy fluctuations or energy perturbations, as they are electro-magnetic fields themselves. Of all the entities in the Standard Model, only photons have a wave and particle duality existence, even though electrons and other particles can also emit EMF, scatter and show interference patterns.

Those entities and their properties in the Standard Model come from experimental observations that are interpreted and confined by various mathematical models. There appears to be no understanding of those sub-atomic entities, their properties, what causes them that behavior or property nor why they exist. MC Physics theorizes that there is an even lower, more basic and simpler sub-atomic level structure to the current Standard Model, based on the sufficient evidence of their observed behaviors in those same experiments.

### ***Mono-Charge Properties***

A prior MC Physics paper [1] postulated the existence of mono-charges based on the observed properties of the smallest entity in the Universe, the photon of light. That MC Physics paper proposed a real and physical sub-structure of photons to fit all data that included:

- A. positive, but insignificantly small, rest and travelling mass;
- B. existence of mono-charges (2 charge types and a given electro-static charge strength/potential);
- C. mono-charges as true particles with an impenetrable surface, real dimension, as they do not merge together to form one MC;
- D. inertial mass comes from a MC's absolute charge strength;
- E. a universal speed limit and relativistic inflection point that is greater than  $c$ ;
- F. electro-magnetic force fields (EMF) that are generated and propagated through space by those relativistic moving charges;
- G. basic Coulombs Law of charge force extended down into MC levels;
- H. reverting back to Newtonian concepts of instant force projection and application;
- I. EMF propagated from 3D and 2D space due to spatial compression effects of relativity;

- J. photons formed into existence by joined MCs that are emitted from atoms, accelerate to  $c$ , then rotated to frequency,  $f$ , by the excess force imposed;
- K. photons cease to exist when its MC joinings are disrupted by external forces, including those of atoms, where its MCs can then join that atom/ matter; and
- L. photons possess momentum kinetic energy from its joined MCs' mass and its linear and rotational velocities.

Those properties and new understanding of photons were then applied, at the cosmos level of the Universe, to Hubble's findings of the red-shift of light from distant galaxies and stars. A simpler cause for that effect, i.e. 'Faster-Than-Light' (FTL) gravity force acting on and slowing down the photons' frequency over billions of years' travel time, was found that does not require the difficult concept of an 'ever expanding and accelerating universe away from us in all directions' via expanding space and unfound dark matter [8]. This paper now extends that understanding and findings to all matter.

MC Physics further postulated that singular quantized electro-static charges (called "mono-charges") form all matter and cause all (reactive) force. That charge force also caused the current spatial distribution of mono-charges within the universe. Charge force follows the basic Coulomb's Law of force between charged particles,  $C_1$  and  $C_2$ , at a distance  $R$ , as  $F=C_1*C_2/R^2$  and where opposite charge types attract each other to join and form matter and like-charge types repel each other at distance,  $R$ . Induced magnetic forces also can play a role in particle and matter formation and transport. Discussion of all forces in MC Physics theory were initially covered previously [1], but will be expanded to cover all forces in a later technical paper.

Mono-charges come from the most basic universal element: electro-static charge. That electro-static charge is first quantized into equal amounts of a positive (+) or a negative (-) charge type, similar to 2 sides of the same coin. It is assumed that the sum of each charge-type is equal, therefore giving the Universe a totally balanced or neutral charge. Localized imbalances can temporarily occur. At our human level, this is similar (but extremely impractical and impossible due to the joined nature) to splitting a direct current battery or capacitor in half with each charge post, thereafter, fully and permanently kept separate from the other charge post.

Secondly, the first quantization into the 2 electro-static charge types was then further quantized into groups of highly different electro-static charge strengths or potentials, now collectively called 'mono-charges' (MCs). Those mono-charges with a common charge type and strength are grouped into silos that have various levels of given MC abundance. Within each silo the many mono-charges are considered the same, but in reality some minor variations are expected.

Thirdly, electro-static charge of each individual MC provides an inertial mass in proportion to its charge strength.

Mono-charges with quantization properties (charge type, charge strength/potential and inertial mass) and their initial (and same as current) property distribution were set in the early Universe. They do not change their quantized nature, except temporarily by relativity. That is, they do not join or merge into or become only one MC when touching and under great force.

From that observation it must be concluded that mono-charges are not dimensionless points of charge, but have an impenetrable 'surface' with a real non-zero dimension, no matter how small and insignificant. This points to another lower sub-atomic level that is a quantized dimensionless electro-static charge.

### ***Initial Distribution of Mono-Charges***

The key to matter formation and its resultant physical properties is in the order of joining and the strength of the bonding force between joined mono-charges. Per charge force rules, like-type MCs repel each other and do not directly join together to form matter, while opposite-type charges are drawn by attraction charge force to join together, to neutralize (balance) charge and form matter. Strongest, heaviest MCs generate the strongest forces and create the strongest bonds. Lightest strength MCs generate the lowest forces, forming the weakest bonds and are most easily pushed around and displaced or emitted by stronger MCs. Total charge in the known universe is assumed to be zero, but may be locally imbalanced, temporarily, by external force. This last point allows matter to have some temporary ionic charge that allows changing the properties, chemistry or metallurgy of that matter.

It is theorized that the quantization of elemental electro-magnetic charge by type and strength occurred during the earliest event in the Universe, derisively called the 'Big Bang'. The silo (groups of mono-charges with a common type and strength) data points given in Figure 2 shows that resultant initial, and assumed same as current, quantization distribution based on the empirical sub-atomic, atomic and element level evidence to date. Only the most common or abundant mono-charges are shown in that figure, but it should be understood that other MCs exist between those identified that provide specific characteristics and properties. The unscaled horizontal axis shows the range of MC charge strengths based on our known matter. The unscaled vertical axis shows the relative abundance of the silo'ed MC charge strengths by type. Both axes should be considered log-log to reflect the broad nature of the Universe.

There is no requirement that the only mono-charge strengths possible are those that we find within that graph, i.e. in our limited section of the Universe. Much higher MC strengths, outside of the graph's range, can exist to initiate black holes and collect materials for forming galaxies. Much weaker mono-charges than what we know for photons, our smallest known particle, may also exist, but are very hard to detect.

Figure 2 reflects the distribution needed to form matter as we know it: charge-type lines show the general trends of those charge strengths; fewer stronger charges are required for the many, many weaker charges; higher charge strength MCs have a slightly positive charge-type favoritism; and more lower charge strength MCs have negative charge-types. This has important implications for matter formation and forces.

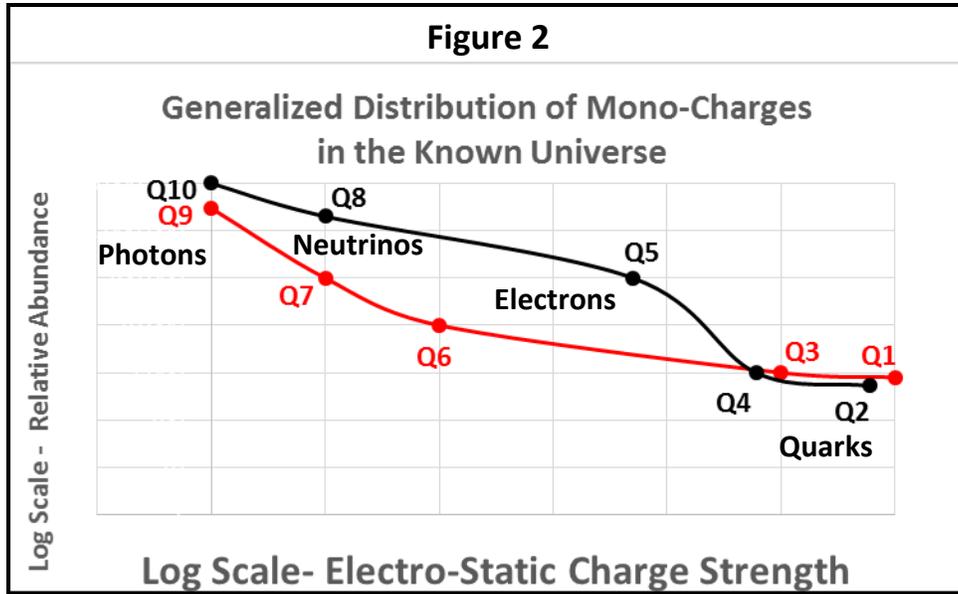
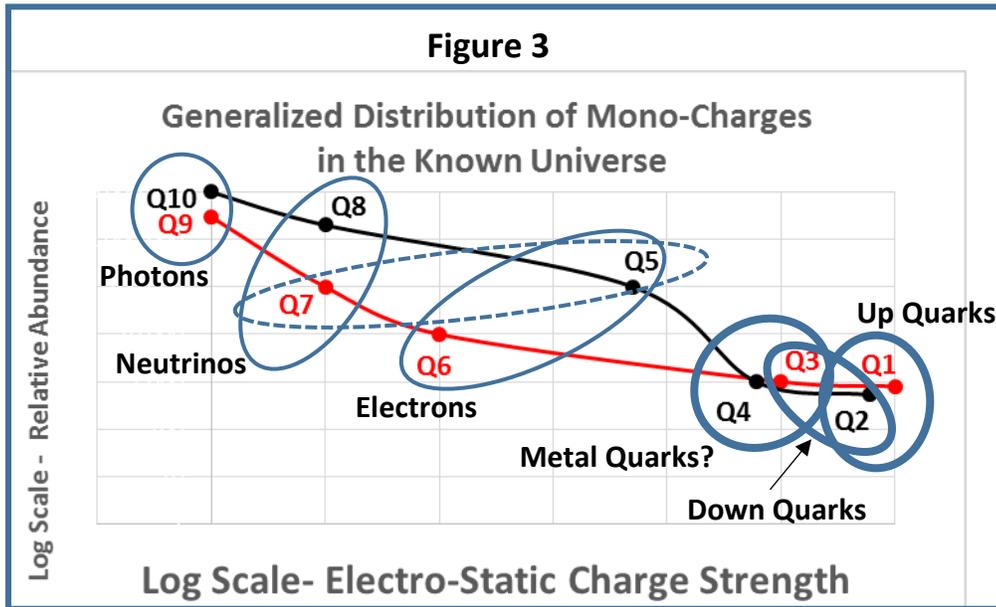


Figure 3 shows grouped silos within blue solid line ovals for most favored joinings that form the simplest Primary Elemental Particles: Up and Down Quarks, electrons, neutrinos and photons. However, per charge force rules that cause charge neutralization, it should be noted that multiple weaker MCs of one charge type can (nearly) act as one stronger charged MC of the same type (see the Q5:Q7 dashed blue oval for a mimic electron). This follows the F\*SCoTt process for matter formation that will be discussed in more detail in a later paper.



The Q4 negative mono-charge is postulated for metals to allow for a weaker Up Quark and easier electronic MC emissions and movement.

A weaker Q6 positive is postulated for electrons to provide a more neutral electrostatic charge while travelling. This can also be obtained by joinings of many lower charged MCs, as seen with the dashed blue oval. In addition, a Q6 positive joining with weaker Q8 or Q10 negatives can still form a -1 net charge particle that may be the anti-electron in the Standard Model.

After the postulated Big Bang-like event, the Universe progressively 'cooled' from ultra-high kinetic energy environment with a lot of relativistic charges flying about, that would not allow any mono-charges to stably join together. With time that transitioned into a lower kinetic environment that then allowed only the strongest MCs (Q1:Q2) to stably join and form Up quarks. If other lower charge strength mono-charges did join they were quickly torn apart by other high velocity, relativistic MCs. With further lowering of the kinetic energy, lower charge force strength joinings of MCs (Q2:Q3) could stably join to form Down quarks. With progressive 'cooling' of the universe lower strength (postulated) metal quarks (Q3:Q4), then electrons (Q5:Q6) and then neutrinos (Q7:Q8) could join together as particles. Lastly, photons (Q9:Q10) could join together in the current cool universe.

Therefore, the simplest and most abundant basic elemental particles are: photons (Q9:Q10), neutrinos (Q8:Q7), electrons (Q5:Q6) and 3 types of quarks (Q1:Q2, Q2:Q3, Q3:Q4), in that order.

Interference between like-type joined charges occurs in all higher joined composite particles, atoms and molecules. But for that matter to exist, the sum of all attraction force bondings must be greater than the sum of all repulsive forces. It was noted that joinings of multiple lower strength charges always cause weaker strength bonds than singular MC joining, also due to those interferences. The key to composite particle stability is in maximizing the distance of like-type MCs and minimizing the distance of opposite-type MCs within the particle, atom or molecule.

It should be noted at our higher molecular level of existence, that all testing and measurements are made with instruments made of joined MC matter. Therefore, that fact must be recognized in interpreting the results of all such testing.

### ***MC Physics Model of Sub-Atomic Particles***

The MC Physics Model of Sub-Atomic Particle structure and content is, therefore:

**Base Element of the Universe:** Electro-Static Charge that forms all matter and causes all reactive force.

**Primary Elements:** Quantized Base Element Charge by Charge Type (Positive + or Negative - ). This can be envisioned as two sides of one very thin, but enormous breadth coin.

**Secondary Elements- Mono-Charges:** Quantized Primary Element Charges by Charge Strength or Potential, called Mono-Charges (MCs). Same type and strength MCs are grouped into silos of many MCs of a given abundance.

From Figures 2 and 3, positive MCs are slightly more abundant in higher charge strengths, while negative MCs are slightly more abundant in lower charge strengths. There are many, many more low charge strength MCs than high charge strength MCs allowing for a net overall neutral charge in the Universe to be maintained. The rarer quantized MCs not shown in the graph provide additional joining varieties and resultant particle/matter characteristics.

**Primary Element Particles- Leptons/Baryons:** Simplest stable primary joinings of the Secondary Element Charges (MCs) with **no** internal force interferences. The most common or abundant stable MC joinings are-

*MC Baryons-* Up Quarks (Q1:Q2), Down Quarks (Q2:Q3), Metal Quarks (Q3:Q4)

*MC Leptons-* Electrons (Q5:Q6, Q6:Q7, Q6:Q9), Neutrinos (Q7:Q8) and Photons (Q9:Q10)

For MC Physics, electrons are considered a lepton due to their lower mass/ charge, ease of emission from atoms/ matter and high mobility when travelling.

**Secondary Element Particles- Mimic Element Particles:** Composite multiple joinings of one charge type that has internal repel forces that diminishes the strength and stability of the overall bond but can mimic a Primary Element Particle. The example given in Figure 3 is for electrons that can also be formed by lower strength MCs (Q6:Q7, Q6:Q9).

Another example is gluons (not a boson as in the Standard Model), which in MC Physic terms are photonic and neutrinic MCs that join larger charges as the finishing neutralization of all matter. These weakly joined MCs can be easily pushed around by higher strength charges, and even emitted, for new force joinings. In addition, there can be temporary, localized charge imbalances of matter caused by external forces.

**Primary Composite Particles- Proton+:** Stable composite joinings are made of Secondary Element Charges, Primary Element Particles and/or individual MCs of those particles. Note that all composite particles have internal like-type charges that cause repel charge forces that distances internal MCs and weakens the overall bond. MCs can internally re-arrange themselves for a higher net attraction force bond. Excess lower strength MCs can also be emitted from a joining to increase the overall net bond strength and charge balance of a particle.

The key and most abundant such Primary Composite Particles are protons. Protons are made of 2 Up Quarks (Q1:Q2) and 1 Down Quark (Q2:Q3) for a total of 6 Quarks that forms a net 1+ charged Primary Composite Particle. This means that 6 MCs with 3 different charge strengths are in a proton.

Neutrons are unstable composite joined particles that, per its Beta Decay process (either direction), contains particles and/or MC components of a proton, electron, neutrino and photonic MCs. Therefore, a neutron is just a disguised proton with additional MCs.

**Secondary Composite Particles- Atoms:** Higher level composite joinings of selected/all known MCs and particles with even weaker overall force bonding strengths to form atoms.

In MC Physics terms, the basic atom is made up of: one hydrogen atom (2 Up and 1 Down quark MCs and one electronic MC- up to 8 MCs plus weak MCs), PLUS multiples of- 3 Up quarks, 3 Down quarks, 1 electron and 1 neutrino (in nucleus), 1 electron (outside nucleus), plus other minor or weak MCs. Total of the additive multiple is 18 MCs plus photonic and neutrino MCs per stage. Isotopes are unstable joinings of those combinations with extra or deficit MCs. Again, MCs within particles, atoms and molecules will be emitted or rearrange themselves to maximize bonding strength and minimize repel force interferences for maximum stability.

**Tertiary Composite Particles- Molecules:** Higher level composite joinings of selected/all known MCs, particles and atoms for even weaker overall force bonding strengths to form molecules. The weaker bonding allows for liquids, softer solids and chemical reactions.

**Quandary+ Composite Particles- Celestial Bodies:** Higher level composite joinings of selected/all known MCs for even weaker overall force bonding strengths to form celestial bodies held together by the weakest force of gravity.

In the MC Physics Model there are no bosons, virtual particles, anti-electron, anti-neutrino or anti-anything. All matter comes from the various combinations of Secondary Elements or mono-charges. Force will be discussed separately, but it is more attuned to Newtonian versions of force across space without the need of boson interactions. Boson particle force interaction concepts get too difficult as the sub-atomic levels get smaller and below the photon level. This MC Physics understanding allows a simpler and more logical interpretation of matter formation, force projection, EMF, electricity, radiation, heat, kinetic energy, entropy and Hubble's red-shifted light from distant galaxies.

## Conclusions

Base Element Electro-Static Charge forms the basis of the proposed MC Physics Model of Sub-Atomic elements and particles that builds all matter. Base Charge was first quantized into two types (positive + and negative -), similar to the two sides of one coin. Those Charge types were further quantized by charge strength/ potential in the earliest high kinetic energy Universe to form mono-charges (MCs).

That Base Electro-Static Charge also provides charge force between MCs following the basic Coulomb Law of Charge Force now extended down into sub-atomic MC levels. As known, repel force occurs between like-charged MCs. Attraction force occurs between opposite-charged MCs causing them to come together and join to form sub-atomic element particles, higher level joined particles, atoms, molecules and higher levels of matter. Induced magnetic force can also play a role in particle transport and matter formation. MCs can be emitted or can rearrange themselves within particles to maximize attraction bonding (decreasing opposite-type charge distances) and to minimize internal repel forces (increasing like-type charge distances).

Elemental sub-atomic particles could only join together after some kinetic energy 'cooling' of the earliest Universe allowing joinings of the strongest MCs (Up and Down quarks), then by lower strength quark MCs, with further progressive cooling that allowed formation of electrons,

neutrinos and, lastly, the weakest photons. Neutrinic and photonic MCs provide the finishing charge neutralization to all matter.

The MC Physics understanding of matter and force fits the Universe seamless from the tiniest photon, through atoms and molecules, and up to the full cosmos.

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