The Natural Philosophy of Universal Matter

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1 Preface

When we consider the many things of the universe, we find they are all comprised of some sort of matter: Some of it is fairly well understood but some remain a mystery. From large sized things, such as galaxies, stars, and black holes, to medium sized things, such as planets, moons, and comets, and then to small sized things, such as atoms, quarks, and quantum matter. However some things, such as dark energy and dark matter remain a mystery.

Large objects are composed of smaller sets of matter. As we look more deeply into things, we find that galaxies are comprised of star systems, star systems may have planets, our planet has people, people have organs, organs are made of cells, cells are made of molecules, molecules are made of elements, and elements are made of smaller atomic particles. Each level of decomposition flows from larger to smaller particle levels and each resulting level seems to be made up of smaller discreet pieces. Imagine that we have some 'super-knife' that is able to separate larger things into their ever smaller, discreet smaller objects. Decomposition, then, is the methodical identification of, dissection, and separation of these discrete sets of matter.

Decomposition continues until all groups, at some point, are reduced to single, discrete particles. These discrete particles are not made up of smaller sets of matter and so ends the process of decomposition. These are particles of Universal Matter and we will label the set of all such particles as {f}.

All members of the set {f} constitute a field of such matter. This field is the whole Universe and all visible, known, and unknown things of this Universe are derived from compositions of {f}.

2 Basic Process

Members of {f} are irregular in shape, size, and are not evenly distributed within the field, that is the universe. Perturbations in the field and allows member particles of {f} to move and act independently of any or all other particles.

Any member particle of {f}, such as X, where X is in motion, may collide with another member particle of {f}, such as Y. The collision produces complex and simple results.

The complex result has two possible outcomes:

- One is that, due to the irregular shapes of the particles X and Y, the two particles may collide with each other and remain together, forming a composite particle, made up of two (or more members) of {f}. Also, the collision of X with Y may introduce rotation in the resulting composite particle; or
- The two particles X and Y may collide, separate, and so remain two discreet particles of {f}.

In either of these two outcomes, there is one additional, simple result of the collision:

- The collision may cause small pieces of either X and Y, or both, to break off from their parent particles. They become separate, individual pieces of X and/or Y. Such pieces may be labeled as 'sub-f' particles. They retain properties of their parents and energy is transferred from the parent as a result of the collision.

  As newly formed sub-f particles of {f} are created they become member particle(s) in the set {f} and as such, fill-in the spaces in and around their parenting particles forming a localized influence on neighboring particles and other sub-f particles.

Particles of {f} collide with other particles and sub-f particles forming composite particles. The sole dimension of size allows collisions and possible joining of these particles resulting in new and/or larger composite particles. The collisions and joining of particles of {f}, sub-f particles, and/or composite particles imparts a second dimension, that of rotation, to the composite particles due to kinetic energy transferred in the interaction.

Note: The following discussion focuses on a direct path from individual particles of {f}to a hydrogen atom. This should in no way be construed to say this is all or everything that does come, or can come about. The types of particles by processes made or indeed the processes discussed herein are but a few (though critically important) of the myriad possibilities performed in nature.

3 Composite Particles

3.1 General

Composite particles accumulate in size and mass by collisions with other particle members of {f} and/or other composite particles. Sub-f particles accumulate within and around composite particle as they grow.

For the sake of clarity and discussion, we will set out three attained levels of composite particle (CP) growth:

- **Level I.** (CPL1) This is the initial growth phase in building a CP (composite particle). Individual members of {f} physically join together increasing the forming particle's size.

- **Level 2.** (CPL2) Here CPL1 particles join together. The key to growth in this second level is the relative sizes and direction of rotation of the colliding CPL1 particles. We see two types of growth in CPL2 interactions: series and quantitative.

- **Level 3.** (CPL3) Finally, we see the joining of the two types of the CPL2 particles forming CPL3 particles that combine both series and quantitative into hybrid particles.

3.2 Level 1 Accumulation

This level sees existing particles of {f} joining with other {f} particles (including sub-f particles) increasing the size and mass of the forming composite particle. After reaching sufficient size and mass[1] the accumulating group of particles attain CPL1 status and the focus of {f} particle accumulation shifts from gathering other particles of {f} to collisions with other CPL1 particles and so begin building CPL2 particles.

3.3 Level 2 Beginning Development

As a CPL2 particle begins forming, two types of particle growth emerge: Series and Quantitative. Given two CPL1 particles, say X and Y, such that X collides with Y, two relationships determine the join:

- **Size**
  - Series joins find that X and Y are similarly sized particles.
  - Quantitative joins find that one of the two particles, say X, is larger than Y.
- **Direction of Rotation**
  - Series joins find X and Y rotating in the opposite direction.
  - Quantitative joins find X and Y rotating in the same direction.

3.3.1 Series Joins

Two CPL1 particles with opposing directions of rotation may begin forming a CPL2 particle. Their relative direction of rotation opposes each other but, at the point of contact, both particles are rotating in a compatible direction. Series join results are most effective when the size of each composite particle is generally equal. The compatible direction of rotation, at the point of contact, allows X to find compatible receptor geography in Y, and vice-versa, and so form a persistent series join relationship.

As X and Y continue rotating against each other, the small {f} particle members of each CPL1 particle, which are initially rotating around each of their respective particles, peel off and get caught up in the other particle's rotation. The exchange of {f} particles continue and form an independent flow of particles held jointly by X and Y. The flow of particles between and around X and Y form a figure-eight pattern and serve to solidify the series join relationship.

3.3.2 Quantitative Joins

X and Y, given their common direction of rotation, may begin forming a CPL2 quantitative particle. Though their relative direction of rotation is the same, at the point of contact they rotate in opposite directions. At the point of contact, the contacting surfaces of X and Y begin to pile up constituent members against each other.

Given that the two particles are unequal in size, the larger particle, say X, will pile up constituent particle members of —f such that they over-flow particle Y. By over-flowing the smaller particle Y the larger particle X assimilates it and they becomes a single, quantitative CPL2 particle.

[1]See the Python coded report 'sizing_output.txt' in the On-Particle-Size folder (run from main.py).

3.3.3 Join Status

CPL2 particle joining is not always successful. The interacting particles may separate and pull away from each other. Or they continue in their endeavors but are ineffectively joined and future interactions with other particles exploit the weakness and break them apart.

In either form of join, the collisions may break away sub-f particle bits and/or smaller sub-f particle groups. The broken sub-f particles may get assimilated in quantitative joins. These sub-f particles continue to accumulate in and around the forming CPL2 particles.

4 Level 2 Extended Growth

4.1 Series Particles

Additional series particle joins may occur when other CPL1 particles of opposing direction of rotation come into contact with an existing, forming CPL2 series particle. The direction of rotation of the newly interacting CPL1 particle, say X, must oppose the direction of rotation for series member Y where Y is already in series CPL2 particle. The small surface particle {f} members of the newly joined CPL1 particles will peel-off and join in the independent figure-eight flow of the existing CPL2 series join particles. Thus the series join evolves a longer figure-eight flow around and between all CPL1 members of the growing chain.

Forming series CPL2 particles often add new CPL1 particles, on either end, along its axis of rotation. Growth may also occur at a 90° intersections along this axis . Any member or members of an existing CPL2 series particle may join with any member or members of itself or another series CPL2 particle. The only requirement is that the point of contact, or re-contact must be fully compatible with all series particle rotation relationships.

Extensive CPL2 series particle growth along many points of the axis of rotation allow for viewing the matrix as a surface. With additional series joining additional surfaces may be created as new surface layers within the series join. Layer surfaces may result when a part of an existing series join comes in contact with other areas of itself and successfully completes the series join process, or when the edge or surface of one series join comes into contact with another series join and successfully completes the series join process.

Gaps may form between surface layers. The gaps may be wide, skipping many of the series members to then attach to another member. They may also be narrow, perhaps skipping a single member to then join with the next member.

4.2 Conductance

New, small CPL1 particles may come into proximity with the maturing surface layered edges of a CPL2 series join. The particle's approach may be either in the same or opposing direction of rotation of the series join and so be involved as either a series or quantitative join. The result of this interaction differs from regular CPL2 joins due to the difference in size between the approaching CPL1 particle and the established CPL2 series particles.

The CPL1 particle, say particle X, may approach a CPL2 series particle at the edge of one of its surface layers, colliding with an existing member of the CPL2, say particle Y. Y will attempt to join with X based on their directions of rotation. The join may be successful, but of interest here are failed joins. Given a collision of X with Y, X may rebound inward between the surface layers of the CPL2 particle.

X will probably not rebound parallel to any neighboring surface layers. Rather it is likely that X will collide with some other member of the CPL2 series particle. And once again X may rebound further into the series particle.

In this way X may be 'conducted' onward through the CPL2 surface layers and exit out somewhere in, between, or at the other end of the series join surface layers. The conducted path may be thought of as a flow of matter through the CPL2 layers. And so CPL2 series particles introduce a third dimension in the growth of CPL2 particles, that of conductance.

4.3 Quantitative Growth

CPL2 quantitative particles continue to gather CPL1 particles into themselves or be gathered into other forming CPL2 quantitative particles. Either behavior increases the size and mass of CPL2 quantitative particles.

The growing CPL2 quantitative particle assimilates smaller particles by over-flowing constituent surface member particles over them. After the quantitative join, the larger, united particle continues to rotate. Given a number of assimilated (smaller) particles, the over-flow particles tend to remain near, but detached from the growing particle. In this way the CPL2 particle accumulates an ever-growing cloud of particles moving in the direction of rotation.

4.4 Level 3 Hybrid Growth

The gathering behavior of quantitative join particles is not limited to interacting with other quantitative join particles, it also allows for quantitative gathering of series CPL2 particles. The process starts as described for regular quantitative joins, with both particles rotating in the same direction and, at the point of contact, the opposing directions of rotation gathers surface particles of each one against each other.

At the point of contact, the joining properties of the series CPL2 particle are different than those of a regular composite particle. The difference is due to the matrix or 'fabric' like surfaces of the CPL2 series particle. The spread-out-matrix properties of the series join particle presents as a larger size in the join, but, in this case, size is indicative of volume not mass. As the larger quantitative particle overflows the series particle, the series particle wraps and folds into the larger particle thus adding some of its conductive behaviors to the larger quantitative particle.

In this way quantitative CPL2 particles tend to evolve into hybrid CPL3 particles, combining the properties of the larger mass of a quantitative particle and the conductance of the series particle. As CPL3 particles interact with other CPL2 particles, the dimension of conductance becomes more pronounced, gaining equal footing with the existing properties of rotation and size.

5 Prime Particles

As additional CPL2 series join particles are gathered into CPL3 particles, conductive patterns emerge. The patterns are the result of conducted matter's ability to flow into, through, and out of channels that may be found in the forming particle. Areas of in-flow are receivers and areas of out-flow are emitters. These channels are a critical part of further particle maturation.

Channeled flow may form a closed circuit of conducted matter. Closed channel patterns, along with sufficient attained size and mass, elevates the CPL3 particle into next level particles: Prime or Complementary. Prime particles combine with other primes to form larger particles while complementary particles develop individually and may (later) indirectly join with prime particle groups. Channel patterns for prime particles are straight forward and may be generalized into two types: Effective and Ineffective. Channel patterns for complementary particles are more complicated and discussed below.

- **Prime Effective** Here many of the channels conduct particles into, through, and out of the Prime particle.

- **Prime Ineffective** Here only a very few channels can successfully conduct matter in/through/out the Prime.

- **Complementary Particle** See section 5.3 below.

5.1 Effective Primes

Effective primes conduct particle flow in and out of emitters and receivers. The conducted flows out from an emitter and back to a receiver forming a flow-loop. For each effective prime there are two emitter-receiver circuits such that each end of the effective prime emit conducted matter which flows back towards the receivers which are located somewhere in the middle section of the particle.

Not all conducted flow matter from an emitter will get back to its receiver. Additional conducted particles 'in the neighborhood' of the effective prime may enter the flow through the receiver and flow towards the emitter.

5.2 Ineffective Primes

Ineffective primes do not form many (if any) emitter-receiver circuits. Areas within these primes can serve as receivers and those that can serve as emitters. These areas are arranged in a haphazard fashion. Still, as we will see, these primes are critical to the building of regular matter.

5.3 Complementary Particle

Complementary particles[2] form by combining two prime particles together. The particles, two effective primes, join at their middles to form an 'X' cross. To further aid the discussion consider that the two particles, when laid across the face of a clock, find one particle's emitter end on the '12' and the other receiver end on the '6'. The receiver end of the second particle finds its receiver end on the '9' and its emitter end on the '3'.

The two particles rotate in the same direction so the join starts as a quantitative join. As conducted particles flow through the prime, some of the flow from either or both of the particles 'leak' out from their middle regions and, finding receiver channels in the other particle, form a conductive bond.

[2]The particles are 'complementary' because they ultimately form a relationship with active triple primes.

6 Paired Prime Particles

An actively conducting effective prime particle (Ep) may interact and join with an ineffective conductive prime particle (Ip (that is eye-p)). The two primes rotate in the same direction[3] and so the process begins as a quantitative join and the two particles begin to pile up constituent sub-particles up against each direction of rotation. But the new dimension of conductance modifies the regular process of a quantitative join.

Two pools of constituent particle quickly develop: One is from the scraped particles of the quantitative join; and the other is from the conducted particles of either particle. Either of the prime particles can exploit emitter or receiver channels in the other particle. The Ep, however, is much better prepared to exploit channel flows into the Ip particle.

The Ep and Ip may successfully join if the Ip has enough emitter-receiver channels, and the Ep is in the right position to emit particles into the Ip's receiver channels. The Ep then emits particles into the Ip's receiver channel(s) which then flow through and out of the Ip. Some of these out-flow particles may then be caught up in the Ep's emitter-receiver circuit. In this way the Ep can create flow circuits with the Ip. Given that there are enough of these received flow loops between the two primes, they may persistently join as a single paired prime particle[4].

Success is not guaranteed. It is often the case that the effective prime cannot find enough receiver channels in the ineffective prime: Indeed the ineffective prime may have none. Without enough purchase and/or not enough in a timely manner, the two primes join effort will fail and they will go on their separate ways. There may be some transfer of conducted particles, there may be various groups of matter broken off or lost in the collision, and, as always, the production of sub-f particles.

7 Triple Prime Particle Joining

7.1 Join Types

Triple primes join in one of two ways:

- **Active:** This is where two effective primes join to a common (middle) ineffective prime.
- **Passive:** Here two ineffective primes join to a common (middle) effective prime.

Paired primes are building blocks that must join to a third prime particle for continued development. The new, third prime particle will join with either one of the paired prime particles but not both. The join process begins in the same manner, as a quantitative join. The Ep or the Ip of the paired prime can attempt to join with either an effective (Ep) or ineffective (Ip) third prime particle. Given the paired prime notated as Ep-Ip, there are four possible joins for the third particle:

- **Ep of Ep-Ip pair attempts to join with an Ep: Fail.** When the Ep collides with an Ep, the strong conducted flows oppose each other and they rebuff each other.

- **Ep of Ep-Ip pair attempts to join with an Ip: Success.** The collision of an Ip with the Ep has much more potential. Given a successful join, the resulting triple prime is effective joined to ineffective joined to effective, or Ep - Ip - Ep (EIE).

- **Ip of Ep-Ip pair attempts to join with an Ip: Fail.** When an Ip collides with the Ip, the weak or non-existent conducted flows will not find purchase and they will rebuff each other.

- **Ip of Ep-Ip pair attempts to join with an Ep: Success.** There is much more potential when an Ip collides with Ep. Given a successful join, the resulting triple prime is ineffective joined to effective joined to ineffective, or Ip - Ep - Ip (IEI).

7.2 The Conductive Join

The conductive joins between any combination of an Ep or Ip, whether as paired or triple primes, are the substantial heart of either prime particle. The reason is that these joins suffer tremendous stress while keeping the paired or triple prime particles attached to each other. The stress might be likened to springs constantly being pushed (compression), pulled (extension), and twisted (torsion). As the spring force is applied in some direction it may then released in the other direction. The forced load amounts to stored kinetic energy and adds or subtracts mass to the paired or triple prime.

[3] The two primes, rotating in opposite directions, may also try to join (as a series join). However, this type of paired prime is not at issue here.

[4] Note: The conducted channels of the successful join have a major effect on the combined paired prime. This will be discussed at greater length in the section 7.2.

The conductive joins also adds an increased amount of conducted matter to the joins. This is due to the stretching of the conducted particle: When a CPL1 assembles there is no single particle of {f}, or sub-groups of {f} particles, that are directly connected to all other constituent particles in the accumulating CPL1 particle. Particles assembled via the processes described in this Philosophy are loosely connected, that is some constituent particles are connected only to some the other {f} particles and so form a coherent greater particle. The stress of conductive join exploits this relationship.

As the conductive join is stressed by the greater joined particles, the conducted particles are stretched-out lengthwise and thinned-down along this length. This allows for additional conducted particles to flow into the conducted flow channels and, in the same manner, be stretched and thinned. This adds to the strength of the join and increases the amount of stored kinetic energy.

8 Triple Prime Particle Joining with a Complementary Particle

Both active and passive triple primes may continue trying to join with new effective or ineffective primes, however a join between an EIE triple and a complementary particle (CmP) is of most interest. As the CmP contacts the flow shell of the of an EIE triple prime and both are rotating in the same direction, the collision begins a quantitative join. The EIE triple is quick to over-flow the CmP but the result may not be a classic scenario where the CmP is absorbed by the EIE. The paired-particle nature of the CmP may change the outcome.

To aid discussion we will still consider the clock-face example found in section 5.3 above. Now the CmP can be expressed as CP1 and CP2 with CP1 being the particle that was on the '12' and '6' and CP2 the particle on '9' and '3'. Further, for example, CP1-R will be the receiver end on the '12' and CP2-E will be the emitter lend on the '3'.

At this point the CmP finds itself tumbling, engulfed by the conducted particle flow of the EIE. As it does so, one of the CmP-pair, say CmP1, may align in the direction of the flow and its receiver end, CmP1-R, begins taking in conducted EIE flow. Then the CmP1-E end starts emitting the flow back into the main EIE conducted particle flow stream. While CmP1 remains anchored in the primary flow direction, CmP2 finds enough flow to construct its own conducted flow circuit perpendicular to CmP1. The CmP-pair continues their receiver-emitter circuits as they tumble around the EIE.

The conducted flow of EIE matter through the CmP allows it to resist the quantitative pull that the EIE triple particle. The reason for this is that the emitter flow of the CmP's two particles, especially CmP1 (in this example). The emitted flows of the CmP are emitted outwards in the EIE stream and some of the emitted flow is sent inwards towards the EIE triple prime. The EIE triple prime emitters push back against the CmP emitters creating a pressure that pushes the CmP outwards away from the EIE.

At play in this example scenario is a passive partner that helps to keep the CmP from the quantitative pull of the EIE: Sub-Particles of {f}. These energetic subparticles remain in and around the EIE and apply an outward-push in all directions. This action serves to:

- Add space to the triple-prime. The sub-particles occur at all levels in the building of a triple-prime and, by remaining inside the structure, serve to keep the primes light-and-airy. In this way the subparticles facilitate repairing internal wear-and-tear of constituent particles.
- Add loft to the triple-prime's conductive flow. This helps to keep the conductive flow from succumbing to quantitative pull of the whole structure.

The quantitative join action of the EIE exerts a pulling pressure on the CmP, which, at a critical point, due to the CmP's conducted EIE matter, is able to escape the pull and the energy from the sub-particles serves as a spring sending the CmP outwards in the direction of the larger flow pattern.

The CmP, however, is able to remain in the conductive flow stream of the EIE triple-particle as the conducted receiver-emitter flows of the the CmP serve to anchor the CmP in the flow. Given that the EIE triple has developed a full-flow pattern all the way around itself, the CmP will tumble in the flow and around the EIE tripe particle.

The flow pattern of the EIE triple manages the CmP. However, the EIE's process and effort to quantitatively join with the CmP remains active. The EIE triple continues its quantitative join process efforts, ever trying to pull the CmP into itself. The EIE ever fails and succeeds only in springing the CmP back along the stream of its conductive flow particles. The actions of the EIE are persistent and unresolvable: The CmP remains tumbling in the flow of the EIE triple and the EIE triple particle cannot stop trying to quantitatively pull the CmP into itself.

The CmP and the EIE form a persistent and stable atomic particle: Hydrogen. The EIE triple particle with its two effective prime particles on each end of the ineffective prime particle, form the proton nucleus[5]. The complementary particle, ever tumbling in the EIE conducted flow, is the electron.

[5]Note: The IEI triple prime particle combination forms a neutron. Please refer to the Structure of Elements worksheet for details on their part in building atoms.