Aether Physics

Quantum mechanics with a twist

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Introduction

All theories that invoke the aether as a physical phenomenon centre around the fact that vacuum space has a number of properties that are hard to explain without the existence of a medium. If vacuum space is a void, how is it possible for objects to attract or repel each other through magnetism, gravity and the electric force? How can light have wave-like properties if there's no medium?

Vacuum space can produce photons and neutrinos. Given a sufficiently strong electric field, vacuum space becomes a conductor. In addition to photons and neutrinos, we get electrons and positrons. Far from being a void, vacuum space appears to be the source of all things and all forces.

The theory presented in this book models the aether as a mix of low energy photons and neutrinos. We come to the early conclusion that aether and space are interchangeable concepts. We also find a way to unite relativity and quantum physics.

Each chapter builds on every previous chapter. However, the impatient reader may nevertheless want to jump around and home in on particular phenomena of interest. If so, here's where various topics are discussed and explained in terms of the theory presented in this book:

- **Fundamentals**: distance, time, dimensions, space, particle quanta, quantum entanglement
- **Four stable particles**: electron, proton, neutrino, photon, free neutron decay, energy, nuclear strong force, nuclear weak force
- **The aether**: composition of the aether, reference frames, pilot waves, double slit experiment, energies and vibrations, the speed of light
- **Optics**: reflection, polarization, refraction, diffraction
- **Inertial matter**: electron-positron pair production, life cycle of protons, minimum sizes and uncertainties
- **Kinetics**: energy transfers, time and inertia, kinetic energy, potential energy, pilot waves as memory, the arrow of time, Newton's cradle, angular acceleration, free-falling objects, speed limit of inertial matter, relative motion and light
- **Electron orbits**: resonant electron orbits, energy transfers, chemical bonds
- **The electric force**: force communicated by the aether, Coulomb's law, electric conditions in and around the atomic nucleus
- **Gravity**: gravity as an imbalance in the electric force, gravity and capacitance, gravity and light, the Mercury anomaly
- **Magnetism**: electric currents, Ampère's right-hand grip rule, the structured photon, ferro-fluids, the Faraday effect, magnetic force, twist of currents
- **Summary**: how concepts presented in this book relate to standard physical quantities and formulas

Fundamentals

The basic idea presented and defended in this book is that a strict particle model of physics can account for the universe as we know it. All physical phenomena can be explained in terms of particles and motion. Nothing happens without direct interaction, and no particle quantum can be created or destroyed. There are no mysterious variables that can only be understood in mathematical terms. Everything is strictly physical in a kinetic sense of the word.

At the lowest level, everything is particles knocking into each other to produce force and hooking up to each other to create structures. The sub-atomic isn't an unfathomable complex of unearthly vibrations and energies. Rather, it's a stripped down version of what we experience as reality in our everyday lives.

What follows is an incremental approach to this model. We start with the premise that all things derive in some way from particles existing in a void. From this we build our complete theory by gradually introducing concepts from real world observations and experiments.

We introduce nothing new and unheard of. Apart from the fundamental premise of our theory, everything relates to known particles and phenomena. Every explanation follows logically from the basics. Every physical phenomenon relates back to a common set of fundamentals. No part of our theory is disjunct from other parts. We discover that all physical phenomena can be explained using our basic set of rules.

Let us therefore start with the theoretical framework and move on from this to real world experiments and observations.

The nothing and the something

A nothing is by definition without properties. A nothing has no extent, has no position, has no time. It's void of any and all qualities. A something on the other hand has at least one property. From this alone, we know that space, however empty it may be, is still a something, and so is time. Space has dimensions and extent, and time has direction and duration.

Time and distance

Time and distance have no meaning without any reference to clocks and rulers. For time and distance to exist, there must be motion and extent.

We perceive time because things move. Likewise for distance. It too is a relative measure. We measure things in relation to ourselves or some other ruler. Without things, there are no distances and no time, only a void where nothing exists and nothing ever happens.

Time duration and the arrow of time

Time duration is a relative measure of how long something takes to complete. The arrow of time, on the other hand, is the direction of time. The fact that things happen sequentially is due to the arrow of time.

To illustrate the difference between the arrow of time and time duration, imagine a universe in which all motion stops, including our biological functions. Let us further imagine that this state persists for aeons as measured by a God clock. Then, everything starts moving normally again. As far as we're concerned, nothing unusual happened. We've been brought forward by the arrow of time. The fact that it took aeons to go from one tick to another tick on our clocks, never registered with anyone.

Time, as far as we're concerned, is unaffected by any glitch in the God clock. Time is relative motion, detectable by our biological being, our clocks, and the universe at large. The arrow of time is the sequence of events, while time itself is relative speeds. This will be explained in further details in the chapter on kinetics.

The void

A void is an infinity of nothing. It has no dimensions. It has no extent. It has no time. As such, it mustn't be confused with empty space, which has both dimensions and extent. Two objects placed in empty space can be separated by any distance. However, two objects placed into a void will be in physical contact with each other regardless of where they are placed. This is because a void, contrary to space, is nothing. With nothing separating two objects, they must be in contact. The only way to separate two objects in a void is to encapsulate one of them inside a third object.

If there is any kind of gap in the encapsulation of an object residing in a void, any texture that the object may have, small enough to brush into the gap, will be able to touch an outside object. This is because the gap itself is void of distance. It doesn't matter how thick the wall of the encapsulation is, if there's a gap, even the shortest filament will be able to reach out and touch an outside object.

If we fill a void with a bunch of spherical balls, we'll end up with little gaps everywhere. These gaps are dimensionless voids, so any texture that the balls may have will reach out and brush into other balls with no regards to distance. This is contrary to our physical existence at the macro level. However, evidence suggests that the void is real, and that space is full of tiny gaps.

Experimental physics has demonstrated that subatomic particles that have been entangled through direct contact with each other, will remain entangled even when separated in space by a considerable distance. This strange behaviour seems to defy the idea that things have to be in physical contact in order to interact. However, if space is full of tiny gaps, and these gaps are voids, all we need in order to explain the phenomenon of quantum entanglement is for our particles to have textures fine enough to interact through these gaps.

Space

Space is an aether filled void. Since a void has no properties, we must conclude that space and aether are two sides of the same thing.

Particle quanta

A particle is anything that comes as a small package. It may be a bundle of strings. It may be a droplet. It may be a grain. It may spin or twist. It may be possible to subdivide further. None of this matter. As long as it comes in a neat little package, it's a particle.

A particle quantum has the additional quality that any subdivision of it will add nothing to our understanding. The particle quantum is not necessarily the physical limit of subdivisions. Rather, it's the logical limit beyond which further subdivisions are meaningless.

For the purpose of our physics, particle quanta can neither be created nor destroyed. They are as eternal as the void.

Unlike the void, our particle quanta come with a set of properties. They are:

- **Dimensions**: Particle quanta have 3 dimensions.
- **Size**: Particle quanta have size. They have surface area. They have diameter. Particle quanta may or may not be spherical. However, for simplicity we will deal with them as if they are perfect spheres.
- **Motion**: Particle quanta can move.
- **Texture**: Particle quanta come in 3 types, each with its own texture. The 3 possible textures

are:

- Abrasive
- Woolly
- Mixed (part abrasive and part woolly)

A lone particle in a void

With the above in mind, we can consider a lone particle in a void. Since the void is an infinity of nothing, the only thing with any properties in this imagined universe is the particle itself. All attributes refer to the particle, not the void. The void is still an infinity of nothing, even as we place a particle in it.

From this, we see that it's not the void that has properties. It's the particle. All that can be known about this tiny universe is derived directly from the particle. Our notion of space is not derived from the void, but from particles.

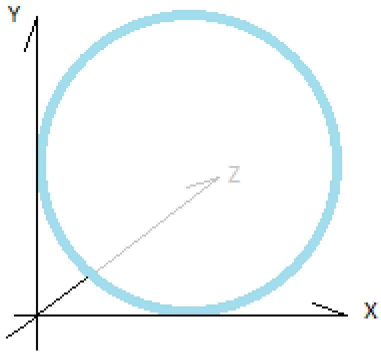


Illustration 1: The 3 dimensions of space, derived directly from the particle

Particles have diameter and circumference. They can therefore function as rulers. For reasons that will become clear later, the circumference of an electron is our real world unit of length.

Two particles in a void

Let us now imagine a second particle. The void is just as ready to accept this as it was in accepting the first one. The void is an infinity of nothing. It has no restrictions. Whatever we put into it is fine with it.

Note that our two particles will necessarily be directly adjacent to each other. This is because the void in which they are placed have no dimensions of its own. No matter where we place our two particles, they will always be in direct physical contact because there's nothing separating them.

Our second particle may be of identical size, or different size from the first one. Either way the notion of relative sizes arises. We can arbitrarily choose one of the two particles as our reference, and measure the other particle relative to it. We can now make precise statements about distance and bearing of the second particle relative to our first one.

We can also detect motion. We can give one or both of our particles a push, making them roll around each other. This motion is not very informative. There's no way to say how fast our particles are moving because we have no reference speed. We have no clock. It's only when we introduce a third particle that it becomes possible to make statements related to how fast things are moving.

Three particles in a void

When we add a third particle to our void, the concept of time arises, again as a relative measure. We arbitrarily choose one particle to represent our unit of length, and a second particle to represent our unit of speed. Every time our second particle circles our first, we have a unit of time. This constitutes a clock where a unit of time can be defined as follows:

1 unit of time = 1 unit of length / 1 unit of speed

Now, we can make the following precise statements about our third particle:

- We can locate its position in terms of unit length and bearing in 3 dimensions.
- We can measure its speed in terms of unit lengths per unit time.

A multitude of particles in a void

Let us now proceed to put a multitude of particles into our void. As already noted, every particle must necessarily be in physical contact with its neighbouring particles. This means that if one particle moves, neighbouring particles must accommodate for this. They must either allow neighbouring particles to flow through themselves, or they must move with the flow.

Real world particles that can move at varying speeds, independent of the speed of aether particles, are known as particles of inertial matter. They allow aether particles to flow through themselves.

However, aether particles are opaque to other aether particles and must therefore move at the same speed as other aether particles. They move neither slower nor faster than the speed allowed by this collective property. This speed is what we refer to as the speed of light.

Limits of our theory

The only premise of our theory is that all physical concepts are in some way related to particles and their properties. We have no explanation as to why particles have dimensions, extent and texture. Nor do we present any explanation for why there's anything at all. This book is not a cosmology. We present no explanation for existence itself.

Four stable particles

We have now arrived at a point where we can use our theoretical base to interpret real world experiment and observations. Our first task will be to describe the four stable particles that make up the entirety of the universe.

These particles are:

- The proton
- The electron
- The neutrino
- The photon

All other particles are either unstable, and in some way related to the above list, or an assembly of the above. A model that describes the above list of particles is therefore essential for our understanding of all particles.

To aid us in this, we'll consider the phenomenon of free neutron decay, and the phenomenon of electron-positron pair production:

Free neutron decay

The particle quanta described in this book are based on Morton Spears' particle quanta, used by him in his work on gravity. His thinking was based on data available at his time. In particular the relative masses of the proton, neutron and electron. These are measures that have changed since he wrote his books back in the 1990's. However, there's still general agreement that the proton is smaller than the neutron by a single electron and an anti-neutrino, which is all we need in order to make our calculations.

When Spears realized that the difference in mass between a proton and a neutron could be expressed as a ratio of 2177 to 2180, he drew the straight forward conclusion that the difference between a proton and a neutron must be 3 particle quanta, 1 positive and 2 negative. Furthermore, the fact that the neutron has an overall neutral charge was interpreted to mean that a neutron consists of 1090 positive quanta and 1090 negative quanta. The fact that the proton has a positive charge of 1 was interpreted to mean that it's composed of 1089 positive quanta and 1088 negative quanta.

From this we can find out what the 3 remaining particle quanta may be by considering the phenomenon of free neutron decay, in which a neutron, removed from an atomic nucleus, decays into a proton, an electron and an anti-neutrino within about 15 minutes.

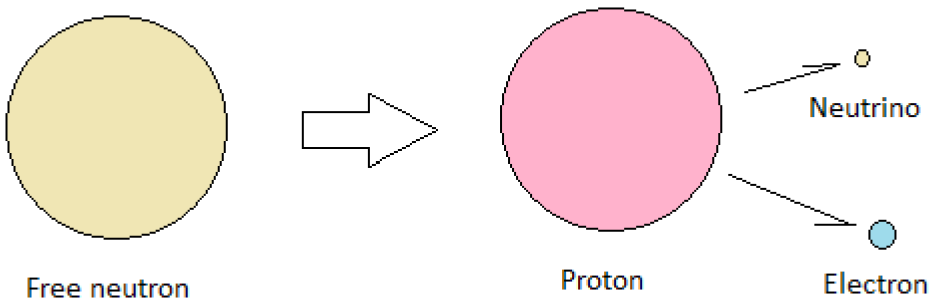


Illustration 2: Free neutron decay

One way we can interpret this is to assume that an electron consists of a single negative quantum, and the neutrino is an assembly of one negative and one positive quantum. However, the electron is generally understood to be larger than a neutrino. It's therefore logical to conclude that the electron is constituted of 3 particle quanta: 2 negative and 1 positive. The neutrino becomes in this way something separate from the original assembly. It must have come from the aether rather than the neutron. Being smaller than the electron, we can conclude that the neutrino must be a single neutral quantum.

We can further conclude that the neutron isn't a fundamental particle, but an assembly of 1 proton and 1 electron. This assembly is only stable inside the atomic nucleus. This in turn leaves us with three stable particles. They are:

- The proton
- The electron
- The neutrino

Left unaccounted for, we have the photon. However, once we consider the phenomenon of electron-positron pair production, the constituent parts of the photon come out clearly defined.

Electron-positron pair production

When high energy photons, such as gamma-rays come into close contact with large charged particles, they sometimes disappear spontaneously into nothing but an electron and a positron. At the very moment that the photon disappears, an electron-positron pair comes into existence.

The way we explain this in terms of our strict particle model, where no particle quanta can be created or destroyed, is that the photon is ripped apart:

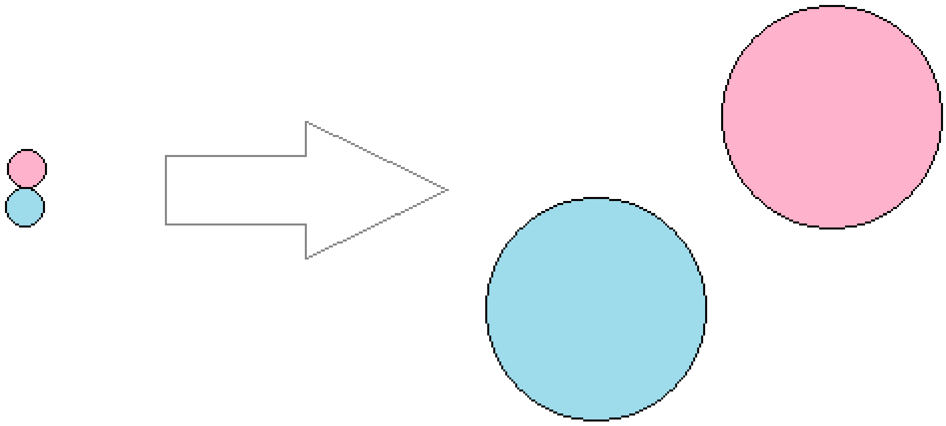


Illustration 3: Electron-positron pair production from a photon

We conclude that the particle quanta making up the electron and the positron are the same particle quanta that made up the original photon. Given that the electron and positron have identical mass, but opposite charge, we can further conclude that the positron is made up of 1 negative quantum and 2 positive quanta. Since the electron is made up of 1 positive quantum and 2 negative quanta, we get that the total assembly for a photon is 3 positive quanta and 3 negative quanta.

Our four stable particles have thus been explained in terms of particle quanta:

- Protons consist of 1089 positive quanta and 1088 negative quanta, a total of 2177.
- Electrons consist of 1 positive quantum and 2 negative quanta, a total of 3.
- Neutrinos consist of 1 neutral quantum.
- Photons consists of 3 positive quanta and 3 negative quanta, a total of 6.

Real world particle quanta

All of this gives support to our model. Morton Spears' particle quanta correspond neatly to our three theoretical quanta as follows:

- Abrasive quanta are positive (+)
- Woolly quanta are negative (-)
- Mixed quanta are neutral (0)

For illustration purposes, we can use blue for negative particle quanta, red for positive particle quanta, and beige for neutral particle quanta:

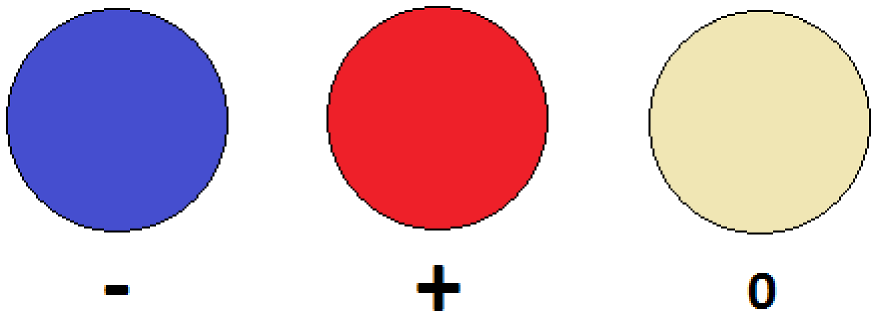


Illustration 4: Three particle quanta: woolly, abrasive and mixed

Our theory doesn't require any further explanation of this arrangement. However, I'm inclined to think that particle quanta are bundles of paired strings. Negative quanta consist of two woolly strings bundled together. Positive quanta consist of two abrasive strings. Neutral quanta consist of one woolly and one abrasive string. If this is the arrangement, and the distribution is random, we can expect there to be twice as many neutrinos as there are either positive or negative quanta. This would mean that there is a superabundance of neutrinos in the universe.

The assignment of woolly texture to negative particle quanta, and abrasive texture to positive quanta is not arbitrary. Rather, this assignment is essential in order to explain the enormous size of the proton relative to the electron.

The size of protons

Compared to the electron, the proton is surprisingly large, and its size seems arbitrary. Latest figures from experimental science has the proton 1836 times more massive than the electron. In terms of its constituent electrons and positrons used in our theory, it's more than 600 times as large. Either way, the proton is huge.

The reason for the difference between size in terms of mass and size in terms of constituent parts is that mass includes binding energy, while constituent parts don't. Hence, we have a mass that's 3 times larger than the building blocks would have had without the addition of binding energy. However, this doesn't explain why protons are as big as they are. To understand this in terms of our theory, we have to consider the effect of texture on particle assemblies.

Electrons are negatively charged and therefore predominantly woolly, while protons are positively charged and therefore predominantly abrasive. Abrasive textures are slightly more reactive than woolly textures. The analogy that springs to mind is Velcro. Anyone who has toyed with Velcro knows that woolly strips don't react with other woolly strips. However, abrasive strips do react ever so slightly with other abrasive strips. Similarly, woolly electrons don't combine with other negatively charged particles. Protons on the other hand are able to react weakly with other positive particles. This allows positively charged particles to assemble into larger structures than negatively charged particles.

A logical consequence of this is that the proton may under certain conditions be able to gobble up both an electron and a positron, growing a bit in the process. If so, protons may have originally started out fairly small, but grown over time to their current size. As it turns out, this appears to be the case. About fifty years ago, the astronomer Halton Arp made the remarkable observation that young astronomic structures appear to be constituted of atoms that are lighter than corresponding atoms in older structures. This means that we have observational support for our suggestion that protons grow larger over time.

Energy

Sticking with our theory, we must take the position that energy is a property of particle quanta. This is especially true since we know that neutrinos, consisting of single neutral particle quanta, are capable of carrying energy. Energy is therefore something fundamental, requiring no complex assembly or structure to exist.

As stated at the beginning of this book, particle quanta have four fundamental properties. They are their 3 dimensions, their size, motion and texture. Additionally, we can propose vibration and spin as fundamental.

Neutrinos don't speed up or slow down when given extra energy, so energy cannot be speed. Dismissing the idea that dimensions or texture may have anything to do with energy, we are left with spin, vibration or size as top contenders. Noting that large particles, such as protons, are known to carry more energy than smaller particles such as electrons and photons, our prime candidate becomes size.

For reasons that will become clear in our chapter on kinetics, we choose surface areas of particles as our definition of energy. From this, we get that any change in surface areas of subatomic particles equate to a change in energy.

With this definition of energy, we immediately get an explanation for binding energy, and why this translates into more inertia.

The proton is three times more massive than its constituent parts because these parts are stretched out in such a way that their surface area become three times what they are when not assembled into protons.

Keeping things together

From the above analysis, a number of aspects related to our theory have transpired.

Implicit in our above argument has been the idea of affinity between positive and negative particles. Assemblies are formed due to the natural affinity between woolly and abrasive particle quanta. Velcro is the macro-world analogy that best fits this idea.

Conventional physics invokes a nuclear strong force in order to explain particle assemblies. This short range force doesn't exist in the model proposed in this book. Rather, we explain all short range affinities in terms of textures, which by definition must be short range.

While woolly and abrasive particle quanta react strongly with each other, mixed particle quanta don't. Mixed particle quanta, known to us as neutrinos, don't take part in assemblies.

Being a mix of woolly and abrasive textures, neutrinos carry footprints of what they have most recently been in contact with. Neutrinos that have recently been in contact with a woolly particle will be more abrasive than average. Conversely, a neutrino that has recently been in contact with an abrasive particle is more woolly than average. The more abrasive or woolly an assembly is, the bigger and more pronounced are the footprints left on neutrinos after collisions. Note that only neutrinos have this property. Woolly particles remain woolly, no matter what. The same goes for abrasive particles.

This is why neutrinos come in different charges and charge intensities, while protons, electrons and photons don't.

The aether

Photons have the peculiar property that they seem to appear out of nowhere. All that's needed is to heat a suitable material to a high enough temperature, and it starts to glow. But the heated material is made up of protons and electrons. There are no photons in the material, so where do the photons come from?

We propose that photons originate in the aether. Energy is transferred from the heated material to the aether in such a way that visible photons appear.

The mechanism for this is either one in which photons are produced on the fly from particle quanta, or one in which energy makes pre-existing photons visible. The more reasonable of these is the latter. It's also the one that best explains a range of other phenomena encountered later in this book.

Since we know that neutrinos also have this peculiar tendency to appear out of nowhere, we can conclude that the aether is a mix of low energy photons and neutrinos. From our theory, we must also conclude that the aether is so dense that no particle is ever out of contact with its adjacent neighbours. With every particle in the aether moving at the speed of light, it's extremely fluid as well.

Aether particles are by definition everywhere. They are space itself. They are extremely small and carry virtually no energy. Directly observable photons and neutrinos, on the other hand, are rare. For clarity, we'll refer to low energy photons and neutrinos in the aether as zero-point particles whenever appropriate.

Reference frames

Another property of the aether is that it has no absolute reference point. Every particle in it travels at the speed of light relative to its surroundings. The aether is so fluid that any structure acts as a local reference frame. The aether inside a car travelling down the highway, has the car as its reference frame. The aether in a forest, has the forest as its reference frame. Earth as a whole, drags the aether with it as it turns. The solar system in turn, is another reference frame. This spans the entire size hierarchy from the subatomic to the galactic and beyond.

Relative to the local reference frame, the aether moves with equal number of particles in every direction. Furthermore, the local reference frame sets the speed of its particles in such a way that when the forward speed of the local frame, relative to the outside frame, is added to the local speed of the aether, we get the speed of the aether outside the local frame.

This means that the aether inside a speeding train is slower than the aether outside of it. The aether inside a rocket moving at close to the speed of light is close to standstill relative to the aether outside of it.

To allow for this, the aether must be tolerant of differences in speeds between frames. However, it's extremely intolerant when it comes to dissenting member particles inside a frame. It behaves like a mob of wimps, ganging up on anything smaller than itself, while quickly conforming to anything bigger than itself.

There's no explanation for this behaviour in the theory presented here. However, this behaviour is required in order to explain a number of phenomena described later. We must therefore use the above description of the aether as a premise as we progress through the rest of this book.

A feature of this model is that all reference frames have some higher reference frame that can be viewed as static compared to itself. Viewed from such a top, every reference frame contained in it will have an aether that moves slower than its own. The degree to which the reference frames contained within the top reference have slower moving aether depends on their relative speeds.

Since the particles in the aether move in all directions, the most natural analogy we have is a gas in which fast moving particles are hot and slow moving particles are cold. Similarly, we can describe fast moving aether as hot and slow moving aether as cold. The aether inside the above mentioned rocket ship is in other words cold relative to its external reference frame.

Pilot waves

We can now explain the phenomenon of light in terms of the aether and energy as size. When a suitable material is heated, electrons in that material kick low energy photons, everywhere available in the aether, one or more notches up in energy.

The more energy a particle carries, the larger it is, and the more it interacts with the aether.

This allows for pilot waves to build up around energetic particles. The pilot waves are comprised of zero-point photons and neutrinos that travel along straighter paths than their more energetic counter parts. Wave-fronts develop, similar to those in front of ships moving through water.

Once established, pilot waves don't assert pressure on moving particles unless there's a change in speed or direction. This is due to the fluid nature of the aether, and explains why things aren't constantly slowed down by these wave-fronts.

Pilot waves are at their most intense close to their host particle and diminish into nothing at a distance. This means that a host particle is never very far from the extremities of its pilot wave. However, relative to the tiny size of the host particle, pilot waves cover vast distances. This can be deduced from analysing the double slit experiment in light of this model.

The double slit experiment

Consider the set-up of the double slit experiment:

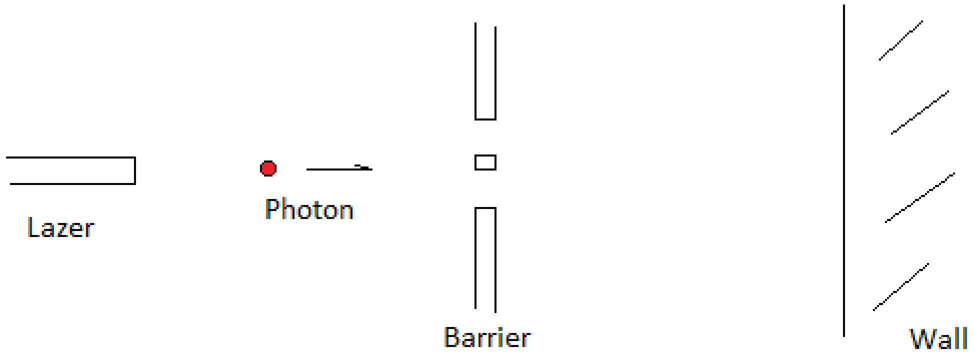


Illustration 5: Set-up of the double slit experiment

Now, consider what's registered on the light sensitive far wall as we pass one photon at the time through the barrier:

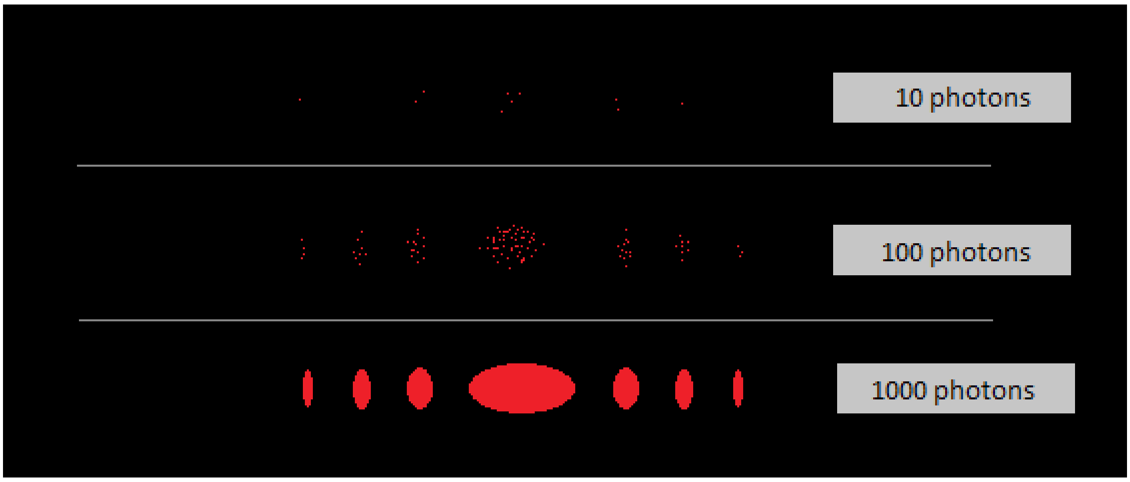


Illustration 6: Building up an interference pattern

Each photon leaves a mark on the light sensitive wall, proving that photons manifest themselves as particles. At first, little can be seen of the interference pattern. However, for each additional photon passed through the barrier the pattern becomes more defined until it finally becomes a clear and undeniable wave pattern. Each photon must therefore have interfered with itself in some way.

Our explanation for this is that the pilot wave associated with each photon produces an interference pattern at the far side of the barrier as it cuts through both openings. This interference pattern alters the path of the photon in such a way that it can only reach certain areas of the far wall.

This is similar to what would happen if a boat were to pass through one of two adjacent openings into a bay. While the boat passes through only one of the openings, its pilot wave passes through both, creating an interference pattern in the waters inside the bay. The boat will thus experience self-interference similar to that experienced by a photon passing though a double slit barrier.

A small boat will be more affected by self-interference than a big boat. This corresponds to the difference in interference patterns produced by red and blue light. Red photons have less energy than blue photons. They are therefore smaller than blue photons. Hence, they are more affected by self-interference than blue photons. That's why red photons produce wider interference patterns than blue ones.

Keeping in mind that the two slits in the barrier of the double slit experiment can be far enough apart to be seen as separate lines with our naked eyes, it's clear that pilot waves are enormous relative to the particles that cause them. Photons are generally believed to be smaller than electrons, which are so small that we have never been able to see them, even with the most powerful microscope. The difference in size between particle and associated pilot wave is therefore in the orders of millions, if not more.

Size, vibrations and the speed of light

Going with our assumption that there's a superabundance of neutrinos in the universe, we can conclude that the aether is mainly zero-point neutrinos, and that it's the vibrational speed of these neutrinos that determine the speed of light.

We arrive at this conclusion by noting that collisions between photons and neutrinos in the aether happen all the time, and that these collisions must be friction-less. Otherwise, there will be loss of energy.

Friction-less collisions can only occur if they happen in elastic harmony, so photons travelling through the aether must move at a speed that corresponds to the vibrational speed of the aether. If they move faster or slower than this speed, there will be loss of energy. Hence, any deviation from the speed dictated by the aether will be corrected by the aether.

Furthermore, low energies are associated with low vibrational speeds, so zero-point neutrinos vibrate at their lowest possible pitch by definition. The size of zero-point neutrinos, their base harmonic, and the speed of light are therefore related. Photons and energetic neutrinos all travel at a speed that corresponds to the vibrational speed of zero-point neutrinos in the aether.

Energy transfers to and from neutrinos must also be in harmony with the aether. A neutrino cannot vibrate out of tune with its neighbours, so it cannot have a size that's incompatible with its base harmonic. Its size, and therefore its energy, has to be a whole number multiple of its size as a zero-point neutrino.

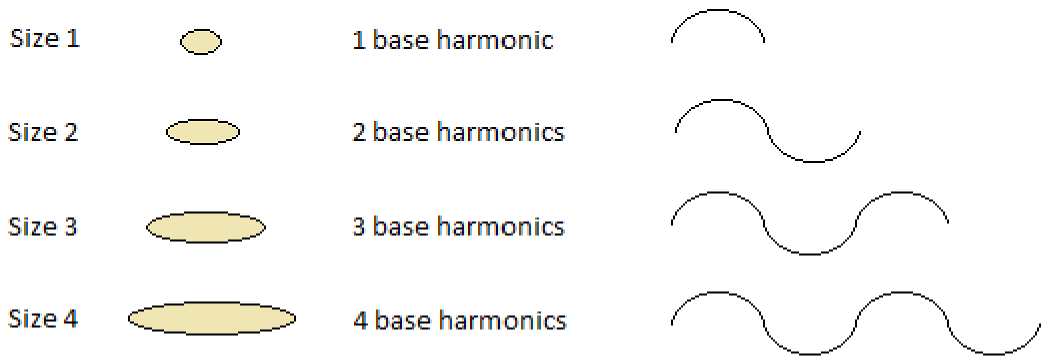


Illustration 7: Relationship between particle size and harmonics

Energy transfers to and from neutrinos must therefore be quantized, and the same must be true for photons, because photons are equally beholden to the aether. The energy of photons and energetic neutrinos must be some whole number multiple of the zero-point neutrino.

Since all energy transfers are facilitated by photons or neutrinos, all energy transfers are quantized. This may seem strange, because the world appears to be continuous both in quantity and in energy. There are no visible gaps in the energy spectre of white light. We push energy onto things in any arbitrary quantity.

But the continuous scaling of energy and matter is only apparent. When we go down to the subatomic level, we find gaps and discrete jumps everywhere. Matter is quantized into particles and energy is quantized into resonant frequencies.

The smaller things get, the bigger are the relative jumps. The first jump in energy for a zero-point neutrino is 100%, as illustrated above. The next jump is 50%. The next after that is 33%. Once we're at the macro level, the relative jumps from one energy level to another are minuscule to the point of appearing to be continuous.

However, in certain cases, we are again reminded of the quantized nature of things, even at the macro level. Light spectra of gases such as hydrogen and neon are narrow and defined. But this doesn't have anything directly to do with zero-point neutrinos. Rather, it has to do with electron orbits, which will be explained later in this book.

Optics

We have now reached a point where we can explain phenomena of optics in terms of our theory. The phenomena we'll look into are reflection, polarization, refraction and diffraction.

Reflection

In one of his crime novels, Henry Berg makes the observation that there's something profoundly strange about mirrors. How is it that a surface made up of atoms can perfectly reflect photons that are smaller than even an electron? From the perspective of a photon, an atom is like a mountain. The surface of a mirror is anything but flat. Yet, all photons striking a mirror leave at an equal and opposite angle, with no energy lost.

The answer to this riddle is that photons never strike the mirror. The pilot wave that accompanies every photon acts like a cushion, and it's off of this cushion that the photon bounces.

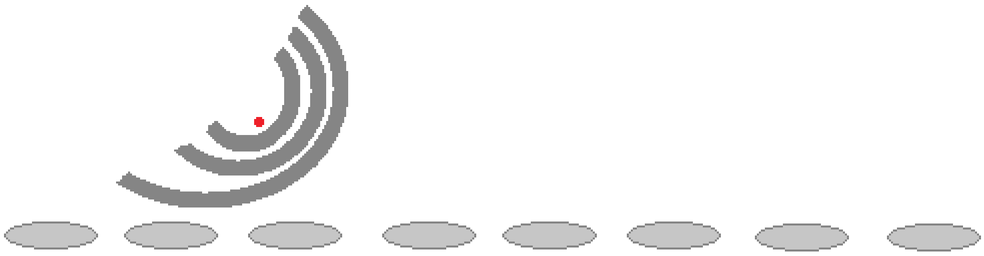


Illustration 8: Photon with pilot wave striking a reflective surface of atoms

While photons are tiny, the pilot waves surrounding photons are much bigger than atoms. They can easily even out a tolerably smooth surface without upsetting their host particle. Each photon sees a perfectly smooth cushion. They bounce off of this, unaffected by underlying irregularities in the surface of the mirror.

The phenomenon of reflection can in this way be seen as supporting evidence for the existence of pilot waves.

Polarization through reflection

Light reflected off a mirror at an angle ends up polarized. This means that every photon must have an axis along which it's oriented. Otherwise, no polarization is possible.

We can further conclude that photons end up aligning in parallel with the underlying surface when hit against the compressed cushions of their pilot waves.

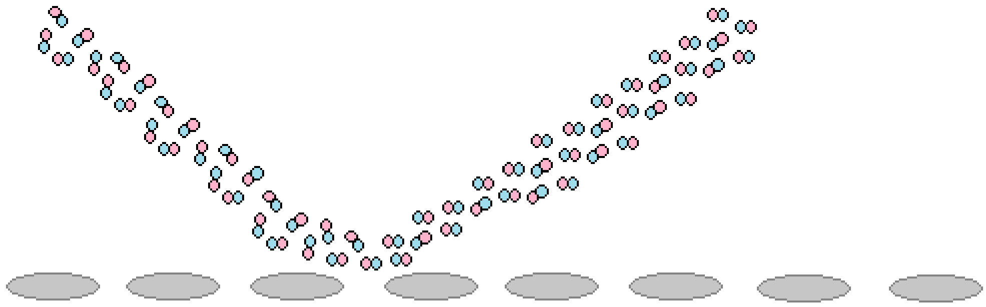


Illustration 9: Photons, passing from left to right, being polarized on reflection

Note that the orientation of the aligned photons is random when polarized in this way. On average, there are just as many photons oriented left to right as right to left.

This fits well with what we have thus far concluded about the photon, namely that it's an assembly corresponding to an electron and a positron. Assuming that the arrangement of particle quanta in electrons and positrons are directly reflected in photons, we end up with a two orb model of the photon, making them in essence tiny sticks, as illustrated above.

Transparent media

Henry Berg's observations about mirrors apply just as much to transparent media. Without the help of pilot waves to smooth things out, photons would crash into electrons and atomic nuclei on their way through glass and water. Even air would be impossible to navigate. Photons would scatter, and their energies would be absorbed. However, once we include pilot waves in our analysis, things become a lot easier to explain.

Pilot waves smooth out irregularities that would otherwise lead to scatter. They act like dynamic cushions, guiding photons through the atomic lattice of transparent media.

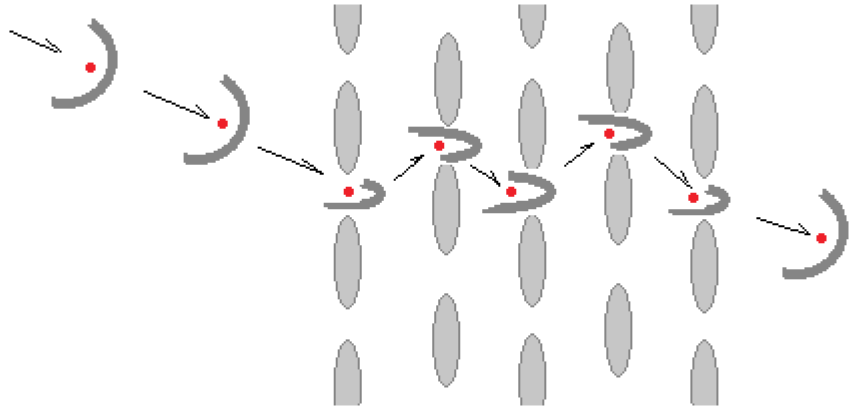


Illustration 10: Pilot wave guiding a photon through the atomic lattice of a transparent medium

This process greatly distorts the shape of the pilot wave. It goes from being a flat wave-front to an elongated sock-like shape. This process requires photons to have a minimum of energy. They have to be big enough to do this. Very small photons are too much affected by their pilot waves to assert this kind of control over them. As a result, low energy photons get reflected by glass.

On the other hand, high energy photons are so big that their pilot waves have little control over them. High energy photons crash into atoms. They scatter, and their energies get absorbed.

This explains why glass is only transparent to photons in a certain range of energies. Glass is opaque to photons outside the visible spectrum, both to the high and low energy side.

Another thing to note is that all photons that make it through a transparent medium travel the same overall path. However, large photons roll form side to side while small photons stay safely in the middle of their pilot waves. As a consequence, small photons travel in a more direct line than their larger counterparts. This is why small (red) photons get through transparent media in less time than large (blue) photons.

Finally, we should note that the path through the medium is in a different direction from the path through air. The density of atoms in the medium makes the overall path through it more acute than the path on entry and exit. This phenomenon is referred to as refraction, and the degree to which this happen is referred to as the refraction index.

To understand why a photon's angle of entry into a sheet of plane glass is exactly equal to its angle of exit, we must once again consider the pilot wave. In simple terms, we can say that the process of exit is an exact opposite of entry. Instead of being compressed, the pilot wave expands. The various parts that were compressed on entry expand in a complementary manner on exit.

This is always the case for plane glass, where entry and exit surfaces are in parallel with each other. Furthermore, there's no diffraction. Light doesn't break into different colours. Nor is there any diffraction when the angle of exit is somewhat equal to that of entry. Pilot waves have the ability to maintain coherence between photons even when there's a slight difference in entry and exit angles.

However, in the case of a prism, where the surface met by the photon on entry has a very different angle from the one met on exit, we get diffraction. Photons don't only change their direction, they do so to a lesser or greater degree depending on their energy.

When diffraction happens, red photons diffract less than blue photons. This is because red photons make smaller rolls into glass, and hence smaller rolls out of glass than blue photons. When the exit angle is so different from that of entry that pilot waves fail to maintain coherence between photons, blue photons veer off to the side to a greater degree than the smaller red photons.

When the roll into glass is greatly different from the roll out of glass, we get a situation where we have to add the initial roll to the final roll. All photons end up redirected, but big photons are redirected more than small ones.

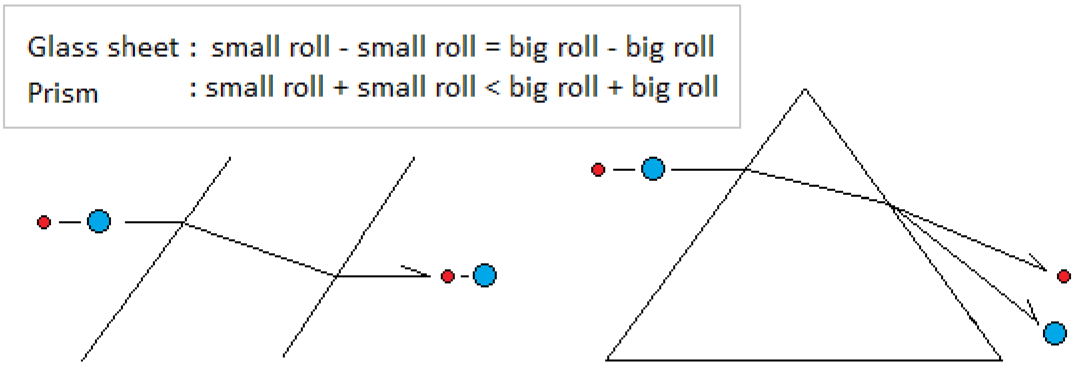


Illustration 11: Path of photons through a plane glass sheet compared to a prism

This explains why prisms diffract white light into different colours while plane glass sheets don't diffract light in any way. It also explains why diffraction of light happens in its entirety at exit from a prism. There's no diffraction on entry.

Inertial matter

Returning to our definition of the aether, we can now explain how inertial matter comes into existence. We can also explore the electron and proton in more detail.

Electron-positron pair production

Photons sometimes pop into an electron-positron pair. The more energetic a photon is, the more likely this is to happen. However, vacuum space will produce electron-positron pairs if under sufficient electrical stress, which means that even zero-point photons can be torn apart.

This indicates that photons are dielectric assemblies, with one part corresponding to an electron and the other part corresponding to a positron.

Sticking with our definition of energy as size, we can say that any increase in size from photon to resulting electron-positron pair is due to added energy. In cases where photons are highly energetic, the size difference is small. However, sparks and flashes of lightning are generally associated with electron-positron pair production. Energy is an important ingredient, so the resulting electron-positron pairs are almost always larger than the photons that produced them.

Beyond this, the transformation has some notable aspects:

- There's a dramatic slow down in speed
- Non-inertial matter is turned into inertial matter that can move at variable speeds
- There's no known intermediary state

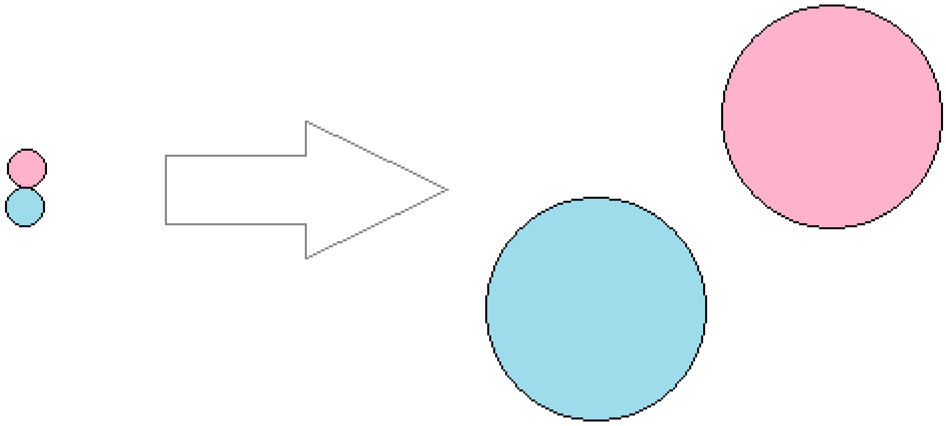


Illustration 12: Electron-positron pair production

The only way something can move freely within the constraints of the aether is by letting the aether travel freely trough it. There's no intermediate state in this, and hence no intermediate state in electron-positron pair production.

The process isn't merely a matter of tearing photons apart, it involves a phase change as well. Photons, opaque to the aether, are turned into electron-positron pairs that are transparent to the aether.

It should be noted that photons remain opaque to the aether regardless of their size. Gamma-rays can be as large as the electron-positron pairs that they produce. However, they remain opaque to the aether as long as they remain in their photon state. Why this is so is not currently explained by our theory.

Life cycle of protons

We now have a mechanism for the production of electron-positron pairs. However, if this was the end of our story, we wouldn't end up with the universe we know. We would end up with an empty universe, filled only with radiation, because electron-positron pairs don't form atoms. They annihilate into gamma-rays. For atoms to form, we need protons.

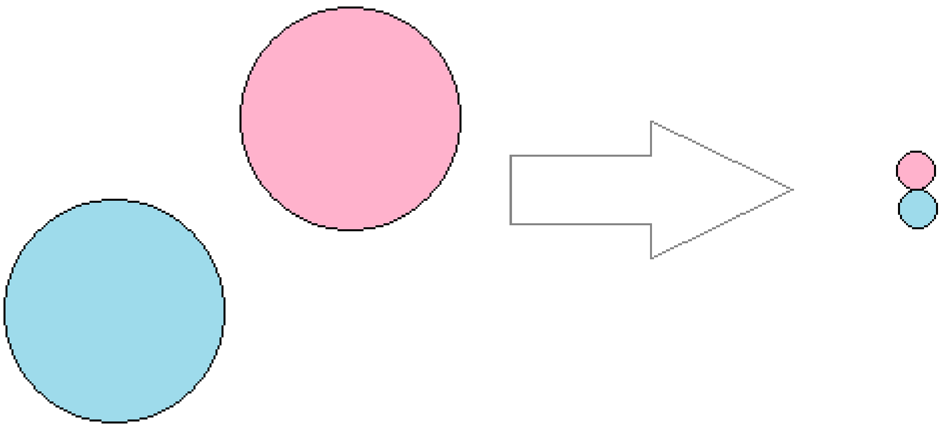


Illustration 13: Electron-positron annihilation

We don't have an exact mechanism for how protons are formed, but we do have an explanation for how and why they exist. The proton is larger than the electron because positively charged particles interact constructively with each other while negatively charged particles don't. It's therefore possible to assemble large positively charged particles that are stable. This was explained in the chapter on four stable particles.

Proton creation must necessarily happen immediately after electron-positron pair creation. Otherwise, all positrons will be lost to subsequent annihilation. It's therefore reasonable to suggest that protons are created in the same environment that electron-positron pairs are created. Intense electric stress doesn't only create electron-positron pairs, it creates protons as well.

Paul Leader, who came up with this idea, points to the centre of galaxies as places where protons are created. The reason for this is that the centre of galaxies tend to emit large quantities of gamma-rays. Positrons that fail to form into protons recombine with electrons to produce gamma-ray radiation. Gamma-rays are therefore a sign of proton creation.

Paul Leader further suggests that protons gain mass over time, as suggested by Halton Arp in his work. This gives an alternative explanation for red-shift of quasars (intrinsic red-shift). It also helps explain why galaxies rotate the way they do (modified Newtonian dynamics).

Protons become larger over time through mass condensation. However, this process cannot continue indefinitely. This is especially true if the universe is eternal. Protons must ultimately be destroyed and returned to the aether from where they came.

Paul Leader suggests that protons start off small at the centre of galaxies, that they become larger as they progress out to the outer reaches of galaxies, and that they evaporate back into photons, electrons and positrons at the cold and dark extremes of these structures.

Assuming that charge separation keeps some electrons and positrons from recombining, electrical currents will form. These will eventually grow sufficiently large to start anew the process of galaxy formation and associated proton production.

This is not as speculative as it may seem. Protons are constantly being smashed to bits in our atmosphere. Protons that are destroyed in this way split into proton fragments called pions.

Pions invariably decay into photons, electrons, positrons and various flavours of neutrinos. This sometimes happens through an intermediate particle called a muon. However, the end result is always the same. A smashed proton evaporates into various types of radiation in less than a second.

Minimum sizes and uncertainties

Before we go on to explain the phenomenon of inertia, let us first relate our theoretical framework concerning distances and time to the real world.

The first thing to note is that we, and everything we directly interact with, are made up of inertial matter. This has consequences when it comes to how we measure things, not because of any technological shortcomings, but because of real world limits.

Suppose we want to measure distance. To do this, we'll need a ruler. Such a ruler must naturally be made of inertial matter. Otherwise, it would fly about at the speed of light. The smallest possible bit of stable inertial matter that we can use as a ruler, at least in theory, is therefore the electron.

To measure time as precisely as theoretically possible, we take the electron, and define a tick of our super-precise clock as the time it takes a photon to traverse its circumference. The reason we cannot arbitrarily choose a shorter distance is that our clock must necessarily register the tick. Something physical has to happen to the electron. It has to go from one state to another. For this to happen, energy has to be moved into or out of the electron. Either way, the process involves the entire electron.

We now have our real world unit length and unit time, corresponding to the theoretical unit length and unit time described at the start of this book. No distance shorter than 1 unit length can ever be measured with certainty. Similarly, no time shorter than 1 unit time can ever be pinned down. Our unit distance and unit time are:

- 1 unit distance = the circumference of an electron
- 1 unit time = 1 unit distance / speed of light

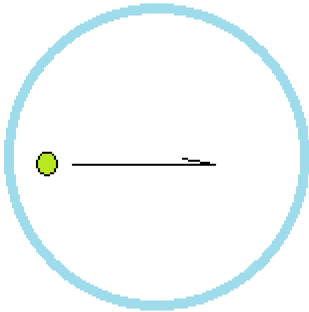


Illustration 14: Photon traversing the circumference of an electron

In our physical existence, there's a limit to how precise we can be. There is therefore an inescapable uncertainty related to everything. Since we have no way to pin down exactly where and when things happen, we cannot make any predictions with absolute certainty.

Furthermore, things that happen faster than 1 unit time, cannot be registered in any way as being anything but instantaneous. No matter how we try to measure such super-fast events, we end up with missing information about the state of things between each tick of our clock.

This doesn't mean that nothing takes place in the intermediate time. It only means that whatever takes place cannot in any way be properly measured or registered. While it's possible to spot an intermediate state, quite by chance, such states cannot be reliably interpreted. They will be indistinguishable from random noise.

On a final note, we must at all times keep in mind that the unit length and unit time described here are real physical entities, with real physical implications. All forces and energies are implicated by this. When we later in this book investigate phenomena related to time and space, it's important to remember that there's no difference between measured time and physical time.

If our unit time speeds up or slows down relative to other clocks in other locations, we're dealing with different reference frames. The laws of physics remain unchanged by this. Local measurement will discover no change to our environment, even if time seems to be grinding to a halt as seen from some external reference frame.

Kinetics

The laws of motion have been well defined ever since Newton wrote his book on physics almost 400 years ago. Very little was left to describe after that. However, Newton never proposed a physical model for what was going on. His physics is entirely mathematical. No underlying mechanics is explained. He left this intentionally for others to explore.

Taking up Newton's challenge, we'll now investigate various phenomena related to motion and relate them to our model.

Since we have as one of our premises that what's going on at the subatomic is a direct reflection of what's going on at the macro level, we can use a steel ball as an analogy for an electron, proton, atom or any other particle of inertial mass.

With this in mind, let's investigate the laws of motion in light of our model where everything has to be explained in terms of particles with 3 dimensions, size, motion and texture:

Pressures, tensions and impulses

Starting with our steel ball, we note that it doesn't move if we put it carefully on a plane tabletop. To make it move, we have to apply force to it, and the force has to be applied unevenly. There has to be a net direction to the force. If evenly applied, there's pressure or tension in the ball, but no motion. Any energy passed onto the ball is immediately lost when force is evenly released after first having been evenly applied. However, when applied unevenly, the results is both motion and a change in energy.

From observations, we reach two conclusions:

- Force has to be unevenly applied for an object to absorb energy.
- Motion caused in this manner is always in the direction of force.

This can be explained in terms of our theory as follows:

1. An impulse applied to a steel ball will result in a pressure wave progressing through the ball.
2. When the pressure wave reaches the far end of the steel ball, the ball expands by a tiny bit in the direction of the pressure wave.
3. The centre of mass is moved a tiny bit to the far end of the ball.
4. The ball moves in response to the change to its centre of mass.
5. The ball's motion makes the pressure wave's return journey, relative to the aether, shorter than its forward journey.
6. The difference between forward and return journey causes the ball to grow more at the far end than at the end of the impulse.
7. The shape is restored, but the ball is larger by a tiny bit, and the induced motion is not cancelled.
8. Without any new impulse, the ball continues in its new state, slightly larger and moving in the direction of the impulse that set it going.

Time and inertia

Adding energy to an electron involves a pressure wave that has to first traverse its surface from one end to the other, and then return back to the point of the original impulse in order to restore its shape.

Assuming that the pressure wave moves at the speed of light, we get that it takes one half unit time to make the forward journey. The return journey takes another half unit time. This means that it always takes one unit time to complete an energy transfer onto or off of an electron. Our unit time is in other words something more than mere convention. It's tied directly to energy transfers in the real world. Measured time and physical time is one and the same thing.

Inertia is conventionally described as a resistance to change. But it can also be seen as time-delay inherent in energy transfer onto inertial matter. This time-delay is tiny for an electron. But for a steel ball the process has to involve all its constituent particles in order to complete. This requires more time. More energy is also required because there are more particles over which to distribute the energy. Inertia is more noticeable. In the case of trucks, ships and air-crafts, inertia becomes very noticeable.

Inertia is generally thought of as exclusively confined to inertial matter because photons and neutrinos never change their speed. However, photons and neutrinos can change direction, and we have already concluded that this happens reluctantly. Large photons veer off to the side on their meandering trajectory through glass. This is for the same reason that steel balls do so when rolling down a curvy slide. We can therefore conclude that inertia is not strictly confined to inertial matter. Rather, inertial matter exhibit this phenomenon more fully due to its ability to move freely and unhindered by the aether.

Since a change in direction can happen without any energy being added or subtracted, we note that inertia is not only about energy transfers. There's something else going on as well.

Pilot waves as memory

Returning to the steel ball that we've set in motion with an impulse, we see that it's again in equilibrium. It's slightly larger as it moves at a steady speed in the direction of the impulse. It has more energy. To speed it up further, another impulse has to be given in the same direction as the first one. To slow it down, stop it, or reverse the direction of motion, an impulse must be given in the other direction. But how does the ball know whether the next impulse is adding or subtracting energy? Where is the memory of the prior impulse stored?

The answer to this is that the local reference frame, in combination with pilot waves, constitute memory. Every particle in the ball has a pilot wave associated with it which directly reflects the direction of motion. When an impulse is in the direction of the associated pilot waves, it adds energy. When an impulse is in the opposite direction, it subtracts. If sufficiently forceful, the impulse stops the ball, or reverses its direction.

If the second impulse is of identical force and of opposite direction to the first one, we get the following sequence of events:

1. The impulse result in a pressure wave, progressing through the ball in the opposite direction of motion.
2. When the pressure wave reaches the far end of the steel ball, the ball expands by a tiny bit in the direction of the pressure wave.
3. The centre of mass is moved a tiny bit to the far end of the ball, relative to the impulse.
4. The ball changes its motion in response to the change to its centre of mass.
5. The change in motion triggers the pilot wave associated with the ball's original motion to assists in shrinking the ball at the side of the impulse.
6. The shape is restored. The ball is smaller by a tiny bit, and the original motion is cancelled.
7. Without any new impulse, the ball remains in its new state, at rest and restored to its original size.

If the second impulse is less than the first one, the ball slows down without stopping. If greater than the first impulse, the ball reverses direction. The mechanism is the same in all cases. The differences in outcomes depend on the degree to which the impulses influence the ball and associated pilot waves.

Pilot Waves and the Arrow of Time

Pilot waves constitute memory. They dictate the direction in which energy is transferred. At any given moment, pilot waves define the state of a system, and dictate the further development of that system in a predictable manner. There's a forward direction implied in this, and it's this forward direction that we know as the arrow of time.

One way to visualize this is to imagine a single particle with an associated pilot wave. The leading end of this pilot wave represents the particle's immediate future, because that's where its energy is headed. The trailing end of the pilot wave represents the particle's immediate past, because that's where its energy came from. With everything, including our consciousness, being driven forward by energy flow, we end up perceiving time as something perpetually moving forward.

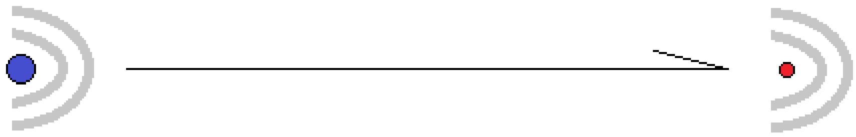


Illustration 15: The arrow of time

Pilot Waves as Time

Entropy has been suggested as time because it has direction. Drop a glass on the floor, and it’s evident which way time flows, namely from order to disorder. However, this way of looking at time doesn’t work for processes where there’s no change in entropy.

Processes with no energy loss can be filmed and run backwards. It looks correct either way. But this is only because we are unable to capture pilot waves on film. If we could, we would see that no process is without direction, and that time has nothing to do with entropy. Even if there’s no energy loss, we have the pilot waves to tell us which frame of film comes before or after any other frame.

The only particles that have no pilot waves associated with them are zero-point particles in the aether. It can therefore be argued that the aether has no time of its own. It transmits and directs time, but time itself is local to each particle.

Each particle interacts with other particles in a time-frame that's local to itself. However, particles coordinate their pilot waves with each other. They produce wave fronts and resonant structures. Time is thus coordinated through all systems, yielding a notion of universal time. Atomic time, in the form of single particles and their pilot waves, combine to produce universal time in much the same way that these particles combine into grand structures and systems that include our bodies and the universe at large.

Newton's cradle

We can now proceed to explain Newton's cradle in terms of our theory:

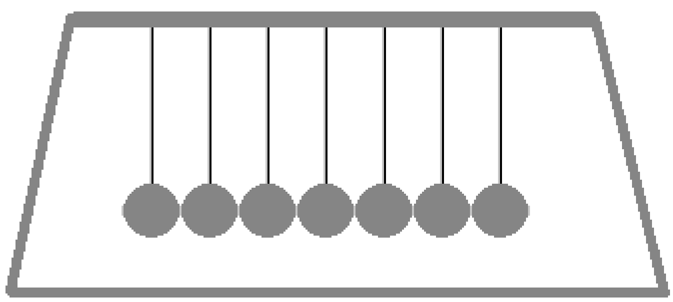


Illustration 16: Newton's cradle

In this set-up, we have seven steel balls suspended by strings from a steel frame. The balls are in contact with each other, but just barely.

If we swing the left ball up to the left and let it go, it swings down. When it knocks into the second ball, the rightmost ball swings up before coming down again. When the rightmost ball knocks into its neighbour, the leftmost ball swings up. The five balls between the outer left and outer right balls don't move.

If we do the experiment with two balls instead of one, the two rightmost balls move up in response to the collision. The three balls in the middle remain stationary.

Doing the experiment with three balls ends up with only the middle one remaining stationary.

In all three cases, we have a situation in which the balls act as if they were a single pendulum. However, there is a tiny delay between the moment of impact and the response at the other side of the set-up. The bigger and heavier the balls, the more noticeable is the delay.

From our theory, this time-delay is inertia. Energy is propagated through the set-up, and this takes time.

As for the transfer of motion from one ball to the other, we have the following explanation:

The incoming ball is a tiny bit bigger than the other balls. It has more energy. When it hits its immediate neighbour, the effect is twofold:

- The ball in motion receives an impulse from the stationary ball. This impulse is in the opposite direction of its motion. From our theory, we have that it becomes smaller, with a shift of its centre of mass opposite to its motion.
- The stationary ball receives an equal and opposite impulse from the ball in motion. It becomes slightly larger, with a shift of its centre of mass in the direction of the impulse received.

The differences in sizes are too small to be measured. However, this happens so quickly that it has the effect of stopping the moving ball and starting the stationary ball. We have the following picture, grossly exaggerated for the purpose of illustration:

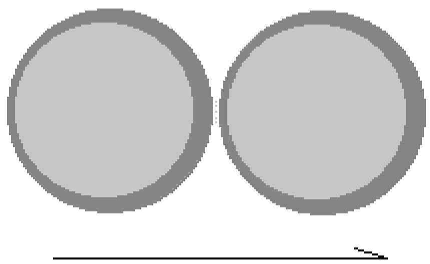


Illustration 17: Left ball hitting the right ball

Before impact, the left ball is in motion. It has the full size of both shades of grey. The right ball is stationary. It is only the size of the light grey shade. After impact, the right ball has the full size, while the left ball is reduced to the size of its light grey area. The left ball has its centre of mass moved sufficiently to the left to make it stop. The right ball has its centre of mass moved sufficiently to the right to take on all the energy and motion of the left ball.

This transfer of size progresses through the train of balls like a pressure wave until the final ball is reached. This final ball progresses in the direction of impact, swings up to the right before coming back down to repeat the process from the opposite direction.

For two or three balls, the same logic applies. However, there is in these cases a train of energetic balls that send a train of shock waves through the set-up. When this train reaches the other end, two or three balls are set moving, depending on how many were swung in from the other side.

It should be noted that Newton's cradle is an idealized system in which every ball is equal to every other ball. This set-up allows for perfect energy transfers. All the energy of an incoming ball is yielded to the next. In all other cases, less than all energy is yielded. In cases where there is a great difference in mass between elastic objects, hardly any energy is transferred between them.

Massive objects will continue to move, despite crashing into a multitude of smaller objects. Small objects will bounce off big ones, with hardly any change to their energy as they do so. This explains why a bullet can be shot through air with very little loss of energy, despite displacing volumes of air that add up to many times the weight of the bullet itself.

This too is due to inertia. Small elastic objects are simply too quick. They bounce off of bigger objects before much of any energy has been transferred. Conversely, large elastic objects are too slow to yield much of any energy to smaller objects that they knock into.

Angular acceleration

Our examples so far have pertained to impulses. We have seen that changes in motion have been accompanied by changes in energy. However, not all changes in motion correspond to changes in energy. An example of this is angular acceleration.

Unlike linear acceleration, angular acceleration requires no supply of energy. Why this is so is not self evident, because both types of acceleration include applied pressure or tension over time. However, by consulting our initial analysis of how pressure and tensions act to transfer energy onto an object, we find the explanation for the difference.

In the case of angular acceleration, force is applied evenly. This is in contrast to linear acceleration, where force is applied unevenly. From prior analysis, we know that transfer of energy requires uneven application of force. Therefore, no energy can be transferred through angular acceleration. We get tension or pressure, but no change in energy.

This can be illustrated as follows, again grossly exaggerated for the purpose of illustration:

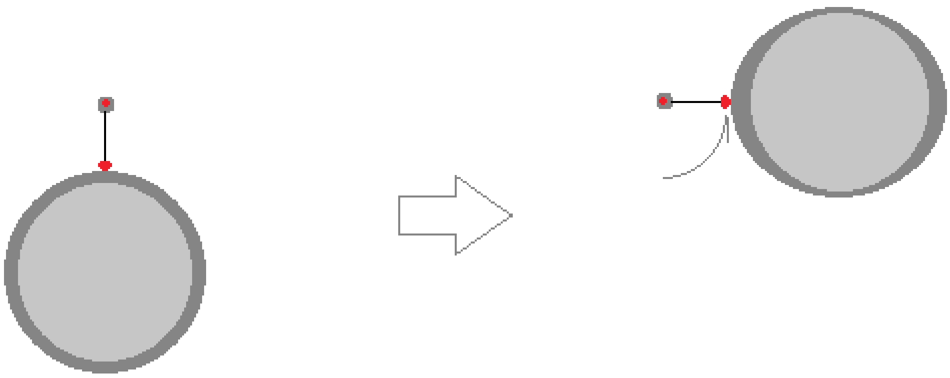


Illustration 18: Angular acceleration

1. A steel ball moves from left to right with no force applied to it, until an anchor connected to a frictionless pivot is attached to it.
2. This induces an evenly distributed tension throughout the ball.
3. The ball spins around the pivot in a permanently tense state.

Angular acceleration requires a continuous redirection of associated pilot waves. This requires no energy, only tension. Hence the permanently tense state with no transfer of energy. Note that this too takes time. This too is inertia.

If we subsequently cut the wire, the tension is released as evenly as it was induced. Again, there's no transfer of energy. The body continues in a straight line perpendicular to the prior anchor point:

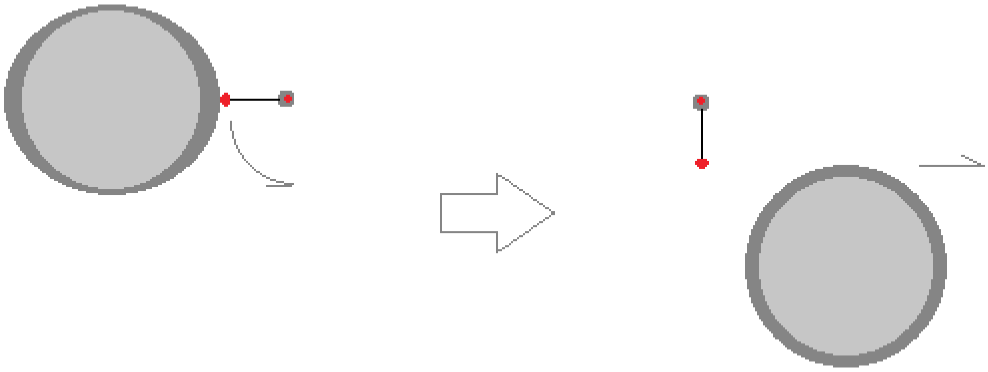


Illustration 19: Continued forward motion after cutting the wire

Note that the dual bulging during rotation is equivalent to what Earth experiences under the influence of gravity from the Sun and the Moon. The joint forces of the Sun and the Moon induce angular momentum that manifests itself as two tidal bulges, one on each side of our planet. This is no coincidence. This dual bulging in response to angular acceleration happens at all levels, from the cosmic to the subatomic.

Free-falling objects

Free-falling objects represent another example of acceleration with no accompanying change in energy. This can best be understood in terms of an example:

Consider a steel ball at rest on a floor of wet sand. To suspend it from a beam directly above this floor, we push the ball up. This process involves uneven pressure and therefore some distortion to the ball. Energy is transferred from us to the ball.

When we attach the ball by wire to the beam, we get a situation as follows, again grossly exaggerated for the purpose of illustration:

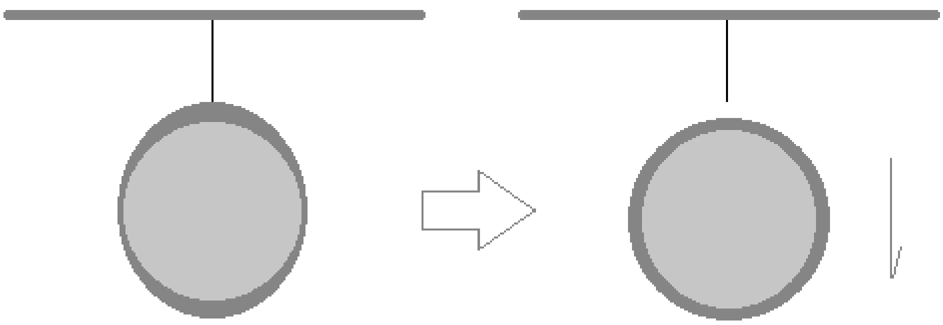


Illustration 20: Suspended steel ball before and after the wire is cut

There is tension in the ball as it hangs from the beam. However, the tension is equally distributed. No energy is being transferred. Things are merely distorted.

The energy we added to the ball as we lifted it up is illustrated as a dark grey area. This energy equals the potential difference between the situation on the floor and the situation when the ball hangs above the floor. In the real world, of course, there's no segregation between this potential energy and the rest of the ball. Energy doesn't come in different flavours. All energy is size. The fact that we can calculate the exact amount of energy that will be transferred to the wet sand once we cut the wire doesn't mean that reality operates with different types of energies.

When the wire is cut, there's no longer any tension in the ball. The release happens evenly. There's no transfer of energy. The ball is not in any way distorted as it falls, so no energy can be passed onto or off of it in the process.

Energy in the ball remains constant until it hits the floor. The entirety of the energy we pushed into the ball in order to attach it to the beam is released as a displacement of the wet sand.

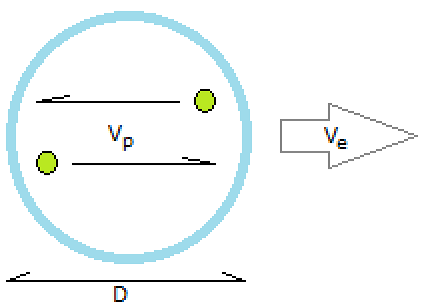
It should be noted that this logic applies to all field forces, be it electrical, gravitational or magnetic. In cases where acceleration happens without distortion, no energy is added or removed. What exactly causes this type of acceleration will be explained later in this book.

Speed limit of inertial matter

Sustained forward acceleration by impulse requires a sustained force. The object under acceleration must be continuously distorted in such a way that its centre of mass is continuously moved forward relative to its former self. It grows over time. However, it will never grow by much. It will hit a different problem long before it becomes significantly bigger than its original self.

As an object speeds up, the forward pressure wave of an energy impulse slows down. When an object is close to the speed of light, the forward impulse is reduced to almost a standstill. This is because the pressure wave moves with the aether. The forward motion of the object must be subtracted from the speed of the aether to arrive at the speed of the pressure wave. This is the same calculation that we do in order to calculate the speed of the aether inside an object.

At speeds very close to the speed of light, the time required to transport energy onto an object under acceleration goes to infinity. No matter how hard we push, the object never reaches light speed, because the final energy transfer required will never complete. This can be calculated as follows:



D = dimension of particle

V_p = speed of photon

V_e = speed of particle

$$T = \frac{D}{V_p + V_e} + \frac{D}{V_p - V_e}$$

T = Time required for a photon to traverse a particle

Illustration 21: Time required to push energy onto a particle

The time required to push energy onto a particle is the sum of the time required to complete the forward pressure wave and the time required to complete the returning pressure wave. Only when this whole process is completed do we have a complete transfer of energy.

This process involves the speed of the aether relative to the particle, which is calculated by subtracting the speed of the particle for the forward pressure wave, and adding the speed of the particle to the return pressure wave. The time required for the forward pressure wave to complete will tend towards infinity as the speed of the particle approaches light speed.

This applies to all particles of inertial matter, including the electron. Observed from outside, the unit time of a speeding electron is more sluggish than our local time. Furthermore, time inside the electron is equally slow.

Scaling this up to a spaceship moving close to the speed of light, we notice a dramatic slow down of all activities inside the spaceship as we look in. However, astronauts on the inside see no change in anything. When they check their clocks and rulers, everything is as it has always been. One unit time is still the time it takes a photon to move around the circumference of an electron. What they cannot in any way detect inside their spaceship is the fact that the aether has slowed down. It's only when they look out into the surrounding space that they see that something dramatic has happened. Everything outside moves about at a frantic pace.

Relative motion and light

The clocks onboard the spaceship move slower than outside. All energy transfers happen at a slower rate. Time itself has slowed down. However, it's not only the speed of things that are different inside and outside the spaceship. The astronauts onboard the spaceship notice that light from all directions is bluer than normal, except for light coming into their spaceship directly from behind.

Outside observers, on the other hand, see all light emanating from the spaceship as redder than normal, with the only exception being light coming directly from the front of the spaceship.

Using our heat analogy, we can say that the aether inside the spaceship is cold relative to the aether outside. A photon coming into the spaceship from the front comes in hot. It has to slow down in order to conform to the colder aether inside.

This applies to all photons coming into the spaceship from outside, with the only exception being photons coming in from behind. Photons coming in from that direction require no slowing down to adapt to the cold aether. This is because the speed of the aether outside the spaceship is exactly equal to the speed of the spaceship plus the speed of the aether inside the spaceship. When a photon comes in from behind, we have to subtract the speed of the spaceship to get its new speed inside the spaceship. This new speed, is exactly the same speed as the aether inside, so no slowing down is required.

Conversely, viewed from outside, it's photons coming out of the spaceship to the front that require no speeding up. In all other directions, photons have to speed up in order to conform to the hotter aether on the outside. Photons coming out of the spaceship come out cold relative to the outside aether.

Now, we have to propose a rule in order to progress with our analysis. We're not yet in a position to explain this rule so we have to consider it one of our axioms for now. This rule goes as follows:

- When photons have to slow down, they become correspondingly bluer (larger).
- When photons have to speed up, they become correspondingly redder (smaller).

This means that our astronauts see light entering their spaceship from the front as bluer than normal. Turning towards the back of their ship, they see outside light progressively less blue until all blue-shift disappears straight out to the back.

Conversely, outside observers see no red-shift in light coming out from the front of the spaceship. However, light coming out of it is increasingly red-shifted as we shift our vantage point towards the back of the spaceship.

We can conclude that relative motions cause red-shifts and blue-shifts. This is similar to Einstein's conclusion without being identical. Our interpretation is based on motion relative to an outside reference frame that can be viewed as static. Einstein doesn't do this. Using Einstein's solution, we get red-shift as something exclusively associated with receding objects. This is different from our solution, which yields red-shift for any object moving faster than the observer relative to a common outside reference frame. Red-shifts are in our case signs of relative speeds. All speeding objects become red-shifted as long as they're not moving right at the observer.

This has some cosmological consequences. The relative abundance of red-shift we observe in the universe may not be a sign of expansion. It may simply mean that we live on a planet that is at relative rest compared to our external reference frame. Most other objects around us are moving faster than us. Only those moving slower come with blue-shifted light.

Electron orbits

We are now in a position to propose an alternative to the accepted idea that electrons hover mysteriously above atomic nuclei. In our physics, where everything happens through direct kinetic interaction, we suggest that electrons do not hover. They bounce:

The bouncing electron

The fact that a free neutron will decay into a proton, electron and anti-neutrino within fifteen minutes tells us that the affinity between protons and electrons is relatively weak. A proton cannot hold onto an electron for very long, and it's close to impossible to attach an electron to a proton.

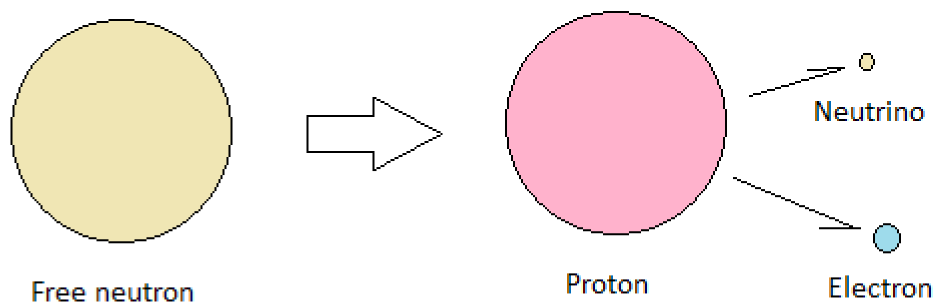


Illustration 22: Free neutron decay

If a stray electron bumps into a proton, it will bounce rather than stick. If the bounce is energetic enough, the stray electron continues its journey, leaving the proton behind.

However, if the bounce is too weak to escape the electric field of the proton, the electron comes down again for a second bounce. Unable to escape the electric field, and equally unable to stick to the proton, the stray electron becomes a captive of the proton. Without any added energy, it's stuck bouncing up and down on the proton. This logic goes for all atomic nuclei because all atomic nuclei carry positive charge. They are all largely abrasive.

Keeping in mind that atomic nuclei are assemblies of protons and electrons, we get that every atomic nuclei has a resonant frequency. This means that any electron captured by an atomic nucleus must bounce at harmonics corresponding to the nucleus' resonant frequency. Any deviation will be forced back into harmony. Electrons at their lowest energy level, bounce at the resonant frequency of the atomic nucleus. For every vibration of the nucleus, the electron makes a bounce. The next energy level is at the next harmonic, allowing the nucleus to vibrate twice for every bounce. Then we have the next level, where the nucleus vibrates three times for each bounce, and so on until we reach escape velocity.

This explains why captured electrons resonate at discrete energy levels, and why these energy levels are different for different atomic nuclei. It also explains why captured electrons are more likely to be found in certain regions of space relative to the nucleus than other regions.

For atoms with more than two protons in their nuclei, there's not enough room for all of the electrons to bounce directly off of the nucleus. Only two electrons can do this. Additional electrons bounce off of the repelling electric fields that exist between electrons. These electrons are attracted by the nucleus, but repelled by their fellow electrons. What we get is an atomic nucleus with electrons neatly spaced out in various regions so that every electron is as close as possible to the atomic nucleus and at the same time as far away as possible from their fellow electrons.

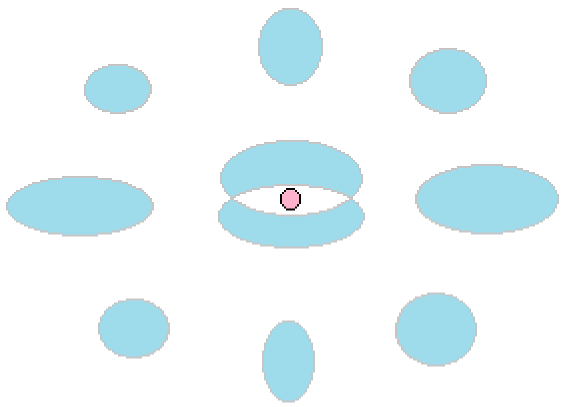


Illustration 23: Atomic nucleus with net charge of 10, surrounded by 10 bouncing electrons = Neon

Every electron bounces about with a frequency dictated by the atomic nucleus. The inner two electrons bounce directly off of the nucleus. The outer electrons bounce off the electric fields of the electrons closer to the nucleus. Together, this forms a harmonic structure, capable of absorbing end releasing energy in discrete quanta.

A high energy particle that crashes into one of the bouncing electrons will transmit energy to the electron. If the energy transmitted is a little too much, the stray jacket of allowed harmonics will force the superfluous energy into the nucleus. The electron will go up any number of energy levels, depending on how much energy is transferred from the particle to the electron.

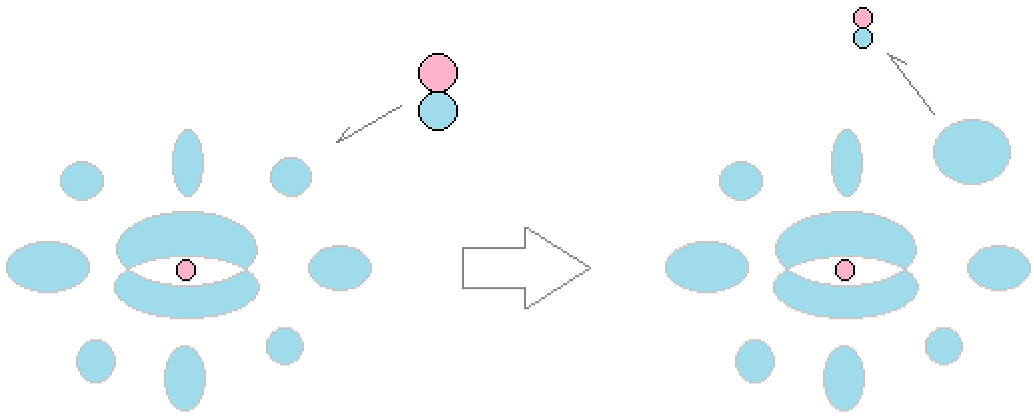


Illustration 24: Neon absorbing energy from an energetic photon

When the energetic electron at some later time knocks into a low energy photon, everywhere available in the aether, the opposite happens. The photon is kicked up in energy by the energetic electron, and the electron returns to its low energy state.

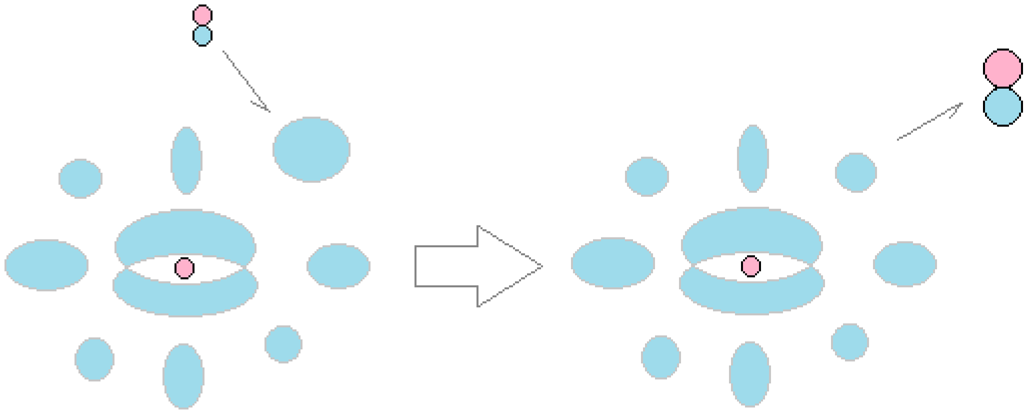


Illustration 25: Neon yielding energy to a low energy photon, thus producing light

This is how neon lighting works. However, this isn't the only way light can be produced. White light is produced differently. White light contains all sorts of energies. Electrons producing white light are therefore randomly yielding energy to photons. This is different from pure neon light, which only comes in narrow and well defined energy spectra.

Chemical bonds

Chemical bonds are formed when atoms find efficient ways to arrange their electrons. In cases where such arrangements are more efficient than the original arrangement, energy is released. Otherwise, energy is consumed in order to produce the arrangement. The subatomic particles involved grow or shrink accordingly.

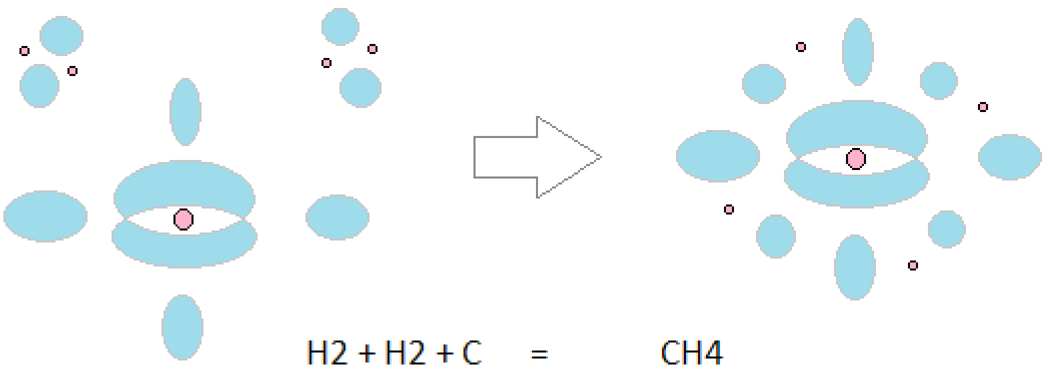


Illustration 26: Two hydrogen molecules and a carbon atom combine to form methane

The electric force

To understand the electric force, gravity and magnetism, we must return to our definition of the aether, because it's the aether that makes action at a distance possible.

We have to keep in mind that the aether is so dense that every particle in it is in physical contact with every neighbouring particle. This means that if we can manipulate the aether between two surfaces in such a way that some of its particles leave this field, we get tension, forcing the surfaces together. Conversely, if we can manipulate the aether in such a way that particles get sucked into this field, there will be pressure, forcing the surfaces apart. Unless we re-establish equilibrium, there will be tension or pressure, depending on the situation.

Let us further consider what we have said about textures of particles, and the fact that neutrinos are of mixed texture. Neutrinos receive footprints of whatever surface they were last in contact with. This is information that neutrinos take with them as they return back into the field.

Now, consider what happens when a neutrino with a woolly footprint comes in contact with a neutrino with an abrasive footprint. There is a degree of affinity between the two neutrinos. They latch onto each other.

On the other hand, if two neutrinos of identical texture collide, there is no affinity. This means that collisions between equally charged neutrinos are different from collisions of differently charged neutrinos. From this, we can make the following claim based on observation:

Neutrinos of opposite charge collide in such a way that they have a tendency to leave the field, and neutrinos of identical charge collide in such a way that they have a tendency to stay in the field.

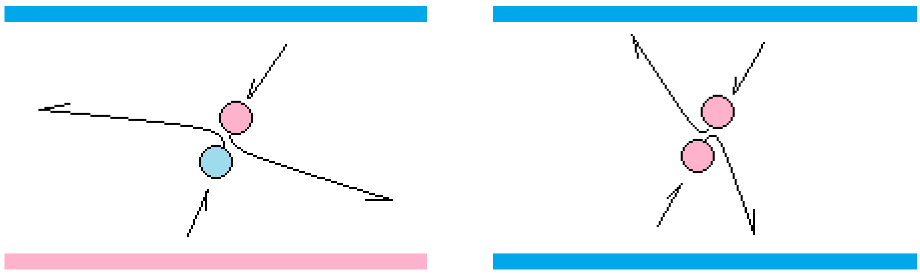


Illustration 27: Collision of differently charged neutrinos compared to collision of equally charged neutrinos

Surfaces of opposite charge attract each other, and surfaces of same charge repel each other, because neutrinos in the aether tend to vacate the field when differently charged, and accumulate when equally charged.

A consequence of this is that there must be electric pressure inside electrons and protons. The walls inside electrons are predominantly negatively charged, and the walls inside protons are predominantly positively charged. In both cases we have a situation in which neutrinos will tend to stay inside. This makes electrons and protons inflated and bouncy, as required for the bouncing electron hypothesis.

On a final note, the relationship between the aether and space must not be forgotten. Space is an aether filled void. When we manipulate the aether, we are manipulating space itself.

Coulomb's law as availability, probability and geometry

Let us now consider Coulomb's law to see if we can arrive at this by applying what we have discussed so far.

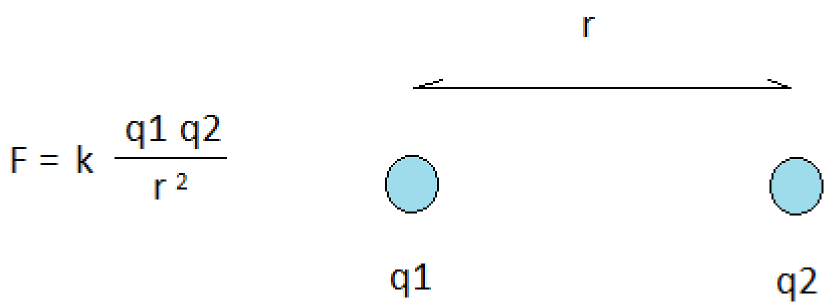


Illustration 28: Coulomb's law

Coulomb's law states that the force of attraction or repulsion between two point charges, q1 and q2, can be calculated from the strength of the charges themselves, the distance separating them, r, and a constant k. The formula states that the force F equals k multiplied by the product of q1 and q2, divided by the square of r.

This can be related to our theory as follows:

1. Let k represent the general availability of neutrinos in the aether.
2. Let q1 and q2 represent the probability of collisions between charged neutrinos.
3. Let r represent the diminishing chance of collisions with distance.

While point 1 requires no further explanation, we need to explain point 2 and 3. It isn't immediately clear why q1 should be multiplied by q2, nor why r should be squared.

When it comes to q1 and q2, we have to keep in mind that footprints left on neutrinos are directly related to the charge on the point charges. Q1 and q2 are proxy values for how full the aether is of charged neutrinos.

Furthermore, we have to recognize that collisions are probabilistic events. Such events are calculated using multiplication. When we are talking about very large numbers of collisions, the way we calculate the grand total is also by multiplication. Q1 must therefore be multiplied by q2 in order to give us a value reflecting the overall number of collisions.

When it comes to the distance r, we have to recognize that charged neutrinos are more densely distributed close to the point charges, and that this distribution tapers off by the square of the distance. This is the inverse square law, which can be derived directly from geometry.

From this, we can now calculate the overall number of neutrino collisions by multiplying k with the product of q1 and q2, divided by the square of r. Keeping in mind that it is neutrino collisions that produce force by pumping aether into or out of the field between charges, we have arrived at Coulomb's law:

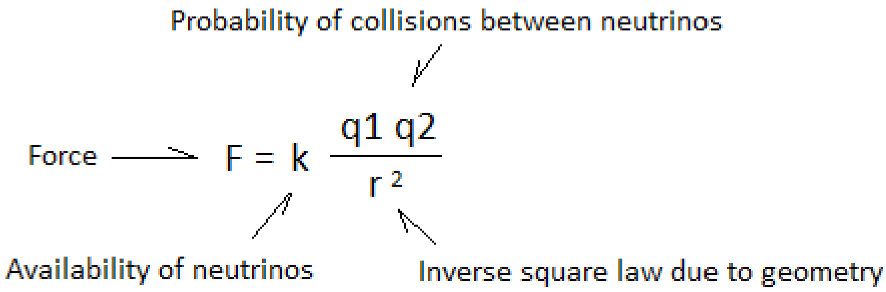


Illustration 29: Coulomb's law explained

From this it's clear that it's possible to see Coulomb's law as an expression related to the aether and the probability of collisions happening in it.

We can also conclude that Coulomb's law must break down at extremely short distances. This is because this law relates to collisions in the aether. When the distance between two point charges goes to zero, the number of neutrinos between them go to zero as well.

This explains why electrons are only loosely attracted to atomic nuclei when they are in physical contact. With no aether to provide an electric force between the two particles, there's only their respective textures that keep them together.

The electric force at the surface of a charged particle isn't infinite nor close to infinite. It's zero. Very close to the surface it's near zero. Peak strength of the electric force is at some distance, and we have to move beyond this point for the force to behave fully according to Coulomb's law.

Electric conditions in and around the atomic nucleus

Having concluded that the electric force falls to zero in the immediate vicinity of charged particles, we can further conclude that there's no need for a nuclear strong force to keep atomic nuclei from falling apart. All that's required is the short range weak force that we have modelled as texture.

When we pair this with Morton Spears' simple model of the proton, it becomes even more apparent that there's no need for anything beyond this short range weak force. We need only consider the electric conditions in and around the atomic nucleus to see why this is so.

Morton Spears models the proton as an assembly of 2177 positive and negative particle quanta. 1089 are positive and 1088 are negative. The difference of one positive charge constitutes less than 0.05% of the total number of charged particles. This means that from up close, the proton appears to be nearly neutral. There's close to equal distribution of positive and negative quanta. We have to move away from the proton in order for the overall charge of plus 1 to be registered.

This is in contrast to the electron, which is an assembly of 1 positive and 2 negative charges. This means that an electron attached to a proton will appear from up close as a highly charged negative point on a vast and largely neutral surface.

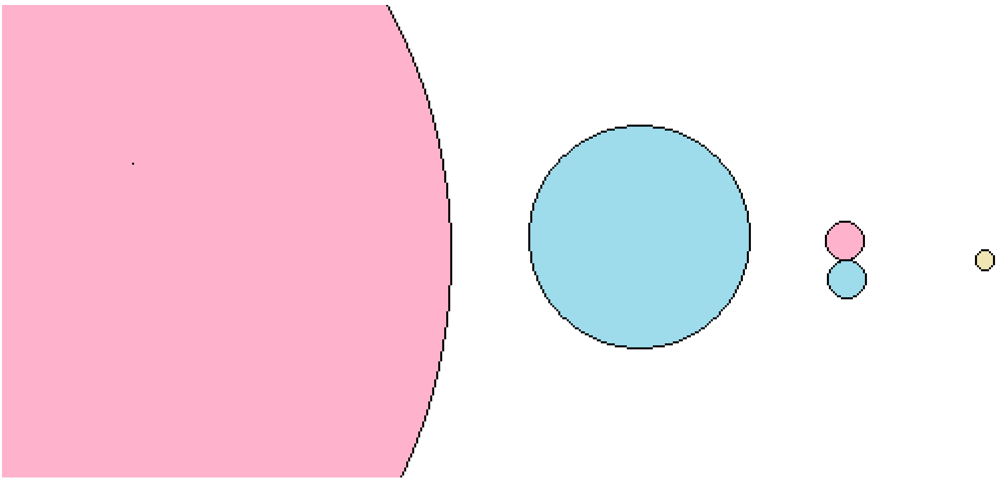


Illustration 30: Proton, electron, photon and neutrino

This means that the electron can perform two different functions inside the atomic nucleus. The electron can stick to protons due to the short range effect of texture, and it can draw protons towards it due to the electric force.

Having already concluded that the neutron is a proton with an electron attached to it, we can now use a proton-electron model of atomic nuclei to explain how they hang together despite having an overall positive charge.

The proton-electron model of the atomic nucleus uses no neutrons. Instead of neutrons it uses protons with an electron stuck to them, and we get assemblies like the ones illustrated below:

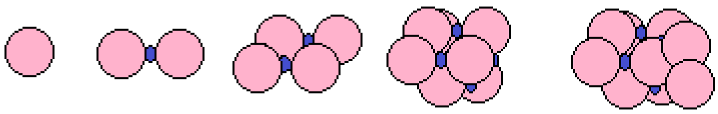


Illustration 31: Atomic nuclei of hydrogen, deuterium, helium, lithium and beryllium

Deuterium is a simple assembly in which two protons are held together by a single electron. The mechanism here is the short range force that we've been modelling as texture.

Helium is an assembly of two deuterium nuclei kept together by the electric force. The electron in each deuterium nucleus draws on the protons of their adjacent deuterium nucleus. The helium nucleus is in this way kept together by a combination of texture and the electric force.

Larger nuclei are similarly held together by a combination of texture and electric force.

Note that two deuterium nuclei will repel each other from a distance. They have to get close enough for the electric force of the protons to fade towards zero in order to form helium atoms. This is the challenge scientists have wrestled with for decades in their quest for controlled nuclear fusion.

Note also that we have an explanation for why tritium is a rare and radioactive particle while helium-3 is a stable isotope of helium. The extra electron in the tritium assembly is ejected due to electric repulsion between electrons, and we're left with the stable configuration of a deuterium nucleus and a proton drawn onto it by the single remaining electron.

We also have an explanation for why the tetraneutron is extremely short lived. Electrons eject other electrons from nuclear assemblies if there are too many of them. There's strong electric repulsion between electrons inside the nucleus, and at the same time little electric repulsion between protons.

Morton Spears model of the proton makes it possible to imagine two protons sticking together without an electron. Negative patches on one proton connects with positive patches on the other, and visa versa. However, this never happens. The electric repulsion between protons is weak, but not as weak as the short range force we've modelled as texture.

On a final note, we can point out that both the nuclear strong force and the nuclear weak force are explained by this model. They are both manifestations of particle texture.

Gravity

Gravity is due to an imbalance in the electric force. The source of this imbalance lies in the difference between woolly on woolly and abrasive on abrasive interactions. While there's no affinity between two woolly surfaces, there is a tiny bit of affinity between two abrasive surfaces.

It follows from this that there are in fact more than two types of collisions taking place between neutrinos in the aether.

We have collisions between:

1. Abrasive and woolly neutrinos (resulting in attraction)
2. Abrasive and abrasive neutrinos (resulting in repulsion)
3. Woolly and woolly neutrinos (resulting in repulsion)

The effect of the two last types are almost, but not quite, identical. There's a difference due to the fact that abrasive surfaces interact ever so slightly with other abrasive surfaces. The slight interaction between abrasive surfaces result in a tiny imperfection in collisions between neutrinos carrying abrasive footprints.

A consequence of this is that the repelling force communicated by neutrinos carrying abrasive footprints is a tiny bit weaker than the repelling force communicated by neutrinos with woolly footprints.

When we add up all the different types of neutrino collisions taking place between two neutral bodies, we get that repulsion comes out a tiny bit weaker than attraction. We end up with a tiny attracting force.

Neutrinos are so small that they can pass through planets and stars. Many collide with particles deep inside such bodies, and carry this information with them back into space.

Every astronomic body has in this way a cloud of neutrinos around them that carry information about the total number of charged particles that they are made up of.

The grand total of information-carrying neutrinos from such bodies is gigantic, so even a tiny discrepancy between attraction and repulsion adds up to a considerable force.

This force, which we have arrived at purely on basis of theory, is what we call gravity. It's due to a tiny imbalance in the electric force, which explains why Newton's universal law of gravity looks so much like Coulomb's law:

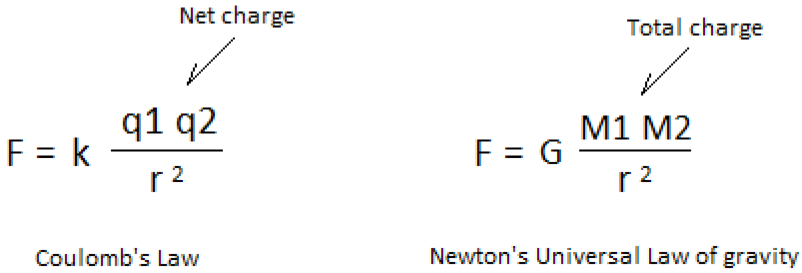


Illustration 32: Coulomb's law compared to Newton's law

Coulomb's law ignores the tiny discrepancy between electric attraction and electric repulsion, and for good reasons. The discrepancy is in the order of a trillionth of a trillionth. Newton's law, on the other hand, is all about the discrepancy. Inertial mass is Newton's proxy value for the total number of positive and negative charge quanta in a body, and G is a proxy for k.

It should be noted that the logic used here to explain gravity is the same that was used to explain the enormous size of protons relative to electrons. Both phenomena are due to the difference between woolly on woolly and abrasive on abrasive interaction. Two seemingly unrelated phenomena have thus been explained by a single principle of theory.

Gravity and capacitance

The model presented here sees gravity as a function of total charge. The more charged particles there are in a body, the more gravity there is.

Neutrinos carry information about the total charge of a body into space where this information is communicated into gravitational force in collisions with neutrinos coming from other bodies. However, the information is not solely about how many charged particles a body consists of. It's also about how electrically stressed these particles are.

Consider the following illustration of an uncharged capacitor to the left and a charged capacitor to the right:

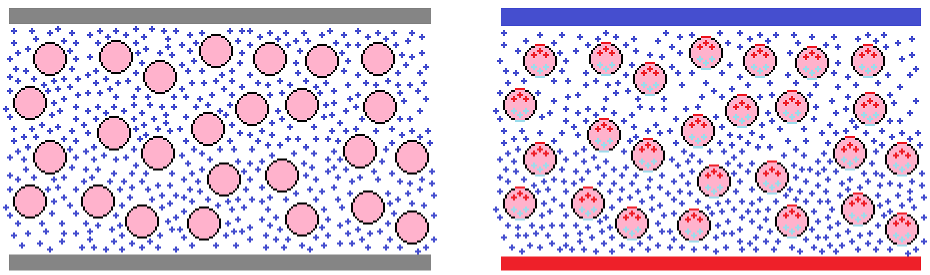


Illustration 33: Uncharged and charged capacitors

The electrical stress of the charged capacitor pulls on every atom in the dielectric. We get more acutely positive and negative areas. The neutrinos that bump into these stressed atoms are more heavily impacted. They bounce back into space with more pronounced footprints than they would have had if they had bounced off of the dielectric in the uncharged capacitor.

This translates into more pronounced collisions in the aether, and hence a stronger gravitational force.

Charged bodies exert a stronger gravitational pull than uncharged bodies. This difference is only noticeable for large bodies, so we don't have laboratory evidence for this. However, There's a whole range of real world anomalies that can be explained with this model.

The difference in gravity between Mars and Earth is conventionally explained by suggesting that Earth has a super-massive core. This is problematic, because it's unclear what this super-massive material might be. A difference in charge seems like a more level headed explanation.

There are gravity anomalies on Earth that correspond to fault lines and mountain ranges. Areas with much geological activity have stronger gravity than areas with little geological activity. There's no good explanation for this in conventional geology. However, we can explain this by suggesting that fault lines and other geologically active areas are more electrically charged than more restive areas.

We can explain why comets have weaker gravity than their rocky surface suggests. They are small, with little capacitance. They lack the extra gravitational force that comes with capacitance.

The implications of this is that spherical astronomical bodies may be hollow. There's no need for super-massive cores if capacitance plays a role in gravity. This is especially true because hollow spheres make good capacitors.

This can in turn be used to defend the position that Earth is expanding, and that surface gravity is increasing due to this expansion.

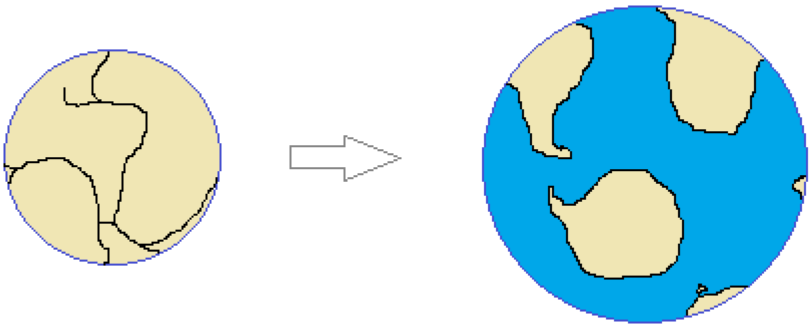


Illustration 34: Expanding Earth, seen from the South Pole

The interested reader may want to read my book titled Universe of Particles for more on this.

Gravity and light

According to our theory, gravity is a force that operates on neutral particles made up of dielectric matter. Also according to our theory, photons are compact assemblies of 3 positive and 3 negative particle quanta. This makes them a special type of dielectric matter, and hence sensitive to gravity. A photon travelling past a massive body will experience a tug. There will be a tiny angular acceleration. This will have no impact on the energy of the photon, nor will it have any impact on its speed. It will simply make the photon curve around the object.

From theory, we can also note that photons moving in towards a massive body retain their energy, as do photons moving away from such a body. While massive bodies tug on incoming and outgoing photons, gravity doesn't change their energy. However, a local observer on the surface of a massive body will register the energy of photons as greater than what is reported for the same photons by an observer in space.

To understand this, we have to keep in mind that the aether is made up of a mix of neutrinos and photons. While photons are dielectric, neutrinos aren't, so gravity pulls on photons, but not on neutrinos. This makes the aether close to massive bodies richer in photons than the aether farther away.

With more photons in the aether, there must be correspondingly fewer neutrinos. The aether is so dense that no particle can be introduced without other particles being expelled. This in turn affects the electric force close to massive bodies. Observed from space, the electric force is reduced due to fewer available neutrinos.

With a reduced electric force, the size of electrons and protons goes down. The reduced number of neutrinos inside these particles reduce their internal pressure, and hence their diameters and circumferences.

All of this can be detected by an observer in space. However, it cannot in any way be detected locally. This is because a reduced circumference of the electron corresponds to a reduction in the local unit length, and hence also a speeding up of local clocks.

Since everything in our physics relates back to particle quanta with 3 dimensions, size, motion and texture, all measurements related to speeds, distances, forces and energies remains constant when we try to measure them, regardless of whether me make our measurements in space or on the surface of a massive body. The laws of physics remain everywhere the same when measured locally.

The speed of light will be measured to have the exact same value everywhere. This is because the reduced size of our rulers on the surface of massive bodies are correspondingly matched with faster clocks. One time unit remains the time it takes a photon to traverse an electron, no matter what size the electron has. This in turn, affects processes of energy transfers in such a way that they too are locally measured to be unchanged.

A similar effect kicks in when we try to measure the electric force with a local set of measuring tools. The number of neutrinos in the local environment will always and everywhere affect unit length in such a way that the constant k remains constant. It's only when an outside observer looks at the measurements, using an outside ruler and outside clock that differences can be detected.

With two observers, one in space and one at the surface of a massive body, we can detect differences. If we beam in some light from space of a given energy intensity, it will be registered by a local observer as somewhat bluer on the surface than in space, not because any energy was accumulated on the way in from space, but because photons are measured to be bigger and more energetic by local rulers and clocks at the surface.

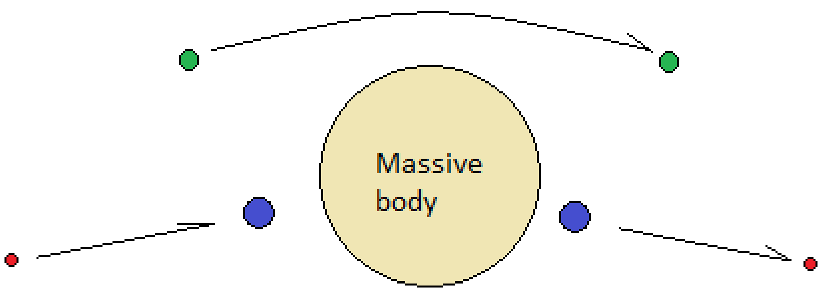


Illustration 35: Photons measured by two observers, one in space and one at the surface

Photons are not hollow. They don't change in size in response to the composition of the aether. However, our unit length is the circumference of an electron, which does change in size depending on the composition of the aether. This makes photons appear bigger to an observer at the surface where neutrinos are fewer and rulers are shorter as a consequence.

Consequently a photon can do more work on Earth than in space. All inertial matter is smaller on the surface of planets, and hence easier to accelerate than out in space. While this effect is tiny in the vicinity of Earth, it's relatively easy to detect close to the Sun.

The Mercury anomaly

Mercury, located close to the Sun, makes its rounds around the Sun faster than expected when measured with a clock on Earth. This anomaly has been known for centuries. It was a great puzzle until Einstein came along with his curved space-time. However, we don't have to resort to this trick in order to solve the puzzle.

Having concluded that clocks speed up in the vicinity of massive bodies, we get that the anomaly is only an anomaly because clocks on Mercury move faster than clocks on Earth. Measured with a clock on Mercury, it's all the other planets that are slow.

Instead of curved space-time, we have an aether that varies in composition relative to where we are in relation to massive bodies.

Magnetism

We can now apply our theory to phenomena related to electric currents and their associated magnetic fields. From this we arrive at a complete model of the photon as well as an explanation for what magnetism is and how it works. We also find an explanation for why there's a twist to electric currents.

Electric currents

Electric currents can be defined as charges in motion. We can induce electric currents in wires by setting electrons moving. There are electric currents in our atmosphere, because our atmosphere has charge gradient as well as motion in the form of winds. For the same reason, we have electric currents in space. There are currents of charged particles everywhere.

An interesting feature of electric currents is that they always come with a circular magnetic field around them, and this circular field is in the same direction regardless of how the electric current is constituted. A positive ion moving from right to left produces the exact same magnetic field a negative ion of the same size moving from left to right.

From this, we've established a convention in which the direction of a current is defined as the direction a positive ion would have to travel in order to produce the observed magnetic field. As a consequence, all electric currents caused by electrons in motion are by definition in the opposite direction of the electron flow.

The established rule is that if we curve the fingers of our right hand in the direction of the magnetic field, our thumb points in the direction of the current. Conversely, if we point our right hand thumb in the direction of a current, our fingers curve in the direction of the magnetic field. This rule is called Ampère's right-hand grip rule in honour of its inventor.

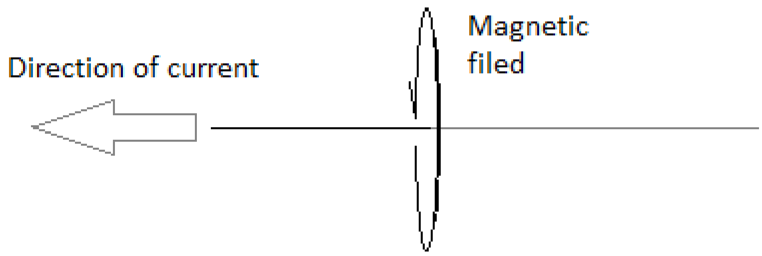


Illustration 36: Ampère's right-hand grip rule

Seen in context of our theory, the magnetic field must be a product of the aether, which is constituted of low energy photons and neutrinos. Furthermore, the complexity of the behaviour suggests that we are dealing with photons, rather than neutrinos.

Adding to our suspicions, we have the discovery by Michael Faraday in 1845 that magnetic fields polarize visible light. Magnetic fields are demonstrably associated with the photon. We can even go so far as to suggest that magnetic fields are photons polarized in such a way that they all line up with their orbs pointing in the same direction, because if we apply this assumption to our theory, we get an explanation for Ampère's right-hand grip rule.

All that's required is one more assumption about the photon. The two orbs of the photons must be connected in such a way that when one spins in one direction, the other spins in the opposite direction:

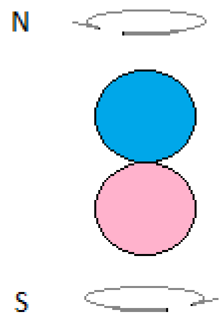


Illustration 37: Proposed model of photon

With this in mind, it's now possible to arrive at Ampère's right-hand grip rule directly from our theory. To do this, let us first consider what happens when we move a positive ion from right to left through the aether, and then compare this to what happens when we move a negative ion from left to right.

The aether is so dense that every particle in it is always in direct contact with all its neighbours. This means that our positive ion will constantly brush into low energy photons as it travels from right to left.

Our positive ion has a predominantly abrasive texture, so it tends to grab onto the woolly orbs of photons, setting these orbs spinning while simultaneously dragging the photons' woolly orbs into alignment:

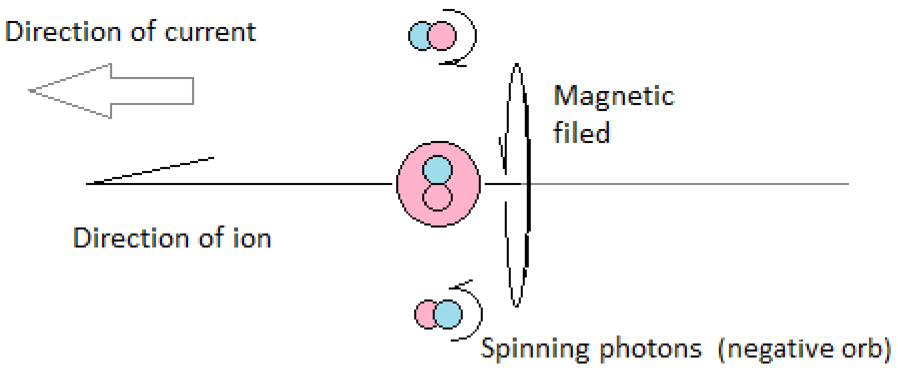


Illustration 38: Effect of positive ion on photons in the aether as it moves from right to left

Negative orbs of photons are set spinning in such a way that if we look at them from above, they spin counter-clockwise as illustrated with the bottom photon in the above illustration. The negative orbs are also in alignment with the ion's direction of motion.

Let us now compare this to a negative ion moving in the opposite direction:

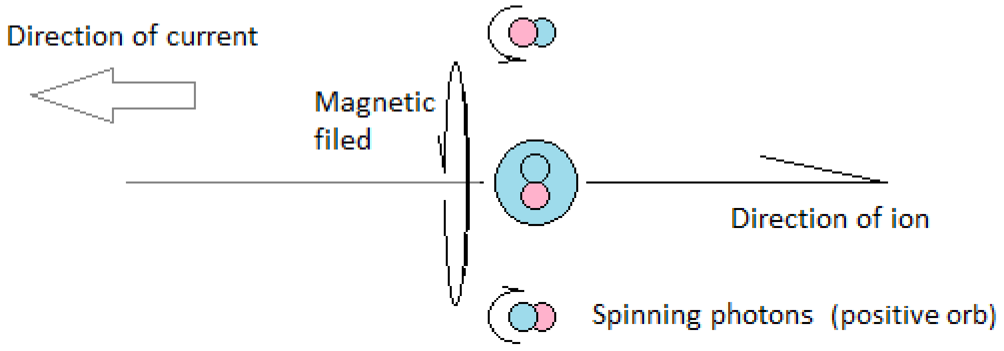


Illustration 39: Effect of negative ion on photons in the aether as it moves from left to right

In this case, it's the abrasive ends of photons that are set spinning, and it's the abrasive ends that are dragged into alignment with the ion's direction of motion. Seen from above the positive orbs, the spin is counter-clockwise as illustrated with the top photon in the above illustration.

Since the spin of the negative orb is equal and opposite, we get that the spin of the negative orb, as seen from above the positive orb is clockwise. But if we flip our vantage point to be above the negative orb, we see the negative orb spinning counter-clockwise, exactly as was the case for our positive ion moving from right to left. We also see that the alignment of the negative orbs are the same in both cases.

The orbs of magnetized photons are always set spinning counter-clockwise when viewed from above, regardless of how spin is induced. However, the orientation of photons depend both on the ion's direction of movement and charge. Positive and negative ions must therefore move in opposite directions in order to induce identical magnetic fields.

From theory, including our assumption about the photon, we've arrived at Ampère's right-hand grip rule. We can conclude that magnetism is polarized photons in the aether, with coordinated spin and orientation.

Magnetic force

When discussing magnets and magnetism, it's important to keep in mind that there's no net flow anywhere. What we have is coordinated spin and orientation of photons in the aether. Photons that happen to pass trough a magnet, come out polarized. This rubs off on neighbouring photons as they pass by. They in turn, rub off their polarization on other photons. The whole space around a magnet gets polarized in this way, with the strongest polarization above each pole of the magnet.

The entirety of the field doesn't come directly from the magnet, but by a relatively small number of photons rubbing off their polarization onto neighbouring photons after first having passed through the magnet. This is visibly evident in ferro-fluids, with their peaks and troughs.

The fact that photons don't have to pass through a magnet to be polarized has been known since Faraday performed his experiment:

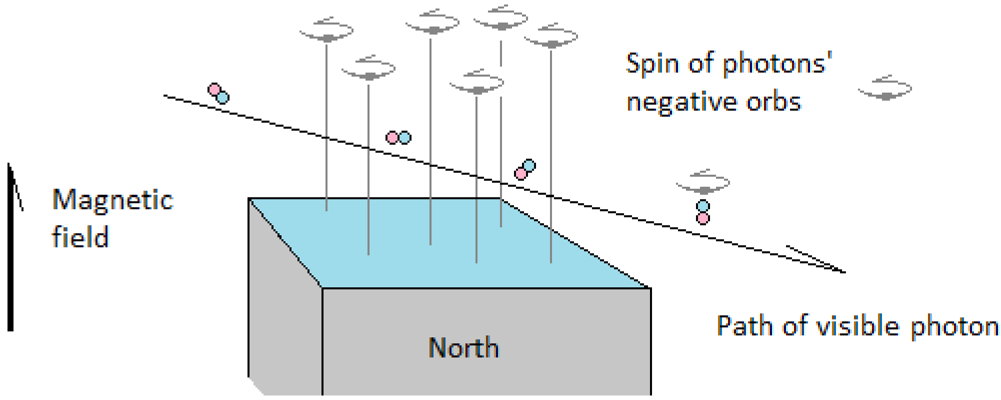


Illustration 40: Visible light polarized by a magnetic field

Uncoordinated photons passing through a magnetic field come out polarized. We propose that this happens to low energy photons present in the aether in the exact same way as it does for visible light.

By introducing a second magnet, we can play around with the magnetic force that arises between magnets. This force is also due to particle collisions. However, in this case we're talking about photons, not neutrinos as was the case for the electric force and gravity. But the general mechanism is the same.

Photons passing through magnets come out well coordinated and spinning. In the case of two magnets facing each other with opposite polarity, we get abrasive head on collisions. This has the overall tendency of pushing photons out of the field. The density of the aether between the magnets is reduced. This in turn draws the magnets together.

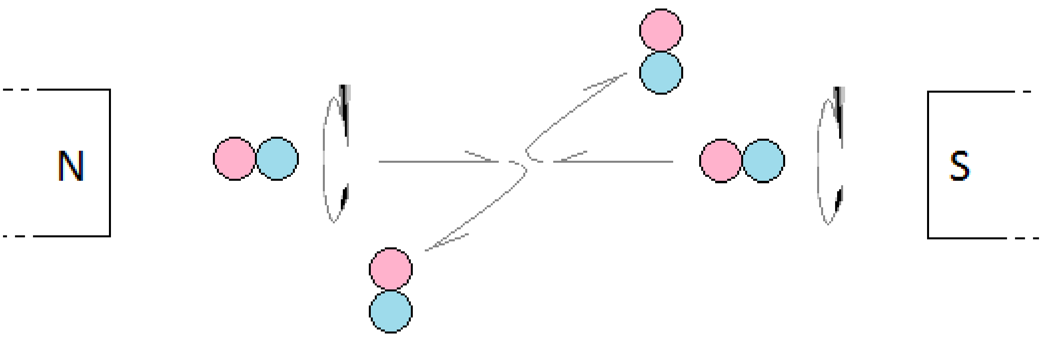


Illustration 41: Magnetic attraction due to photons vacating the field

On the other hand, when two magnets face each other with same polarity, we get non-abrasive collisions. Photons will tend to stay in the field, building up pressure in the aether, which in turn pushes the magnets apart:

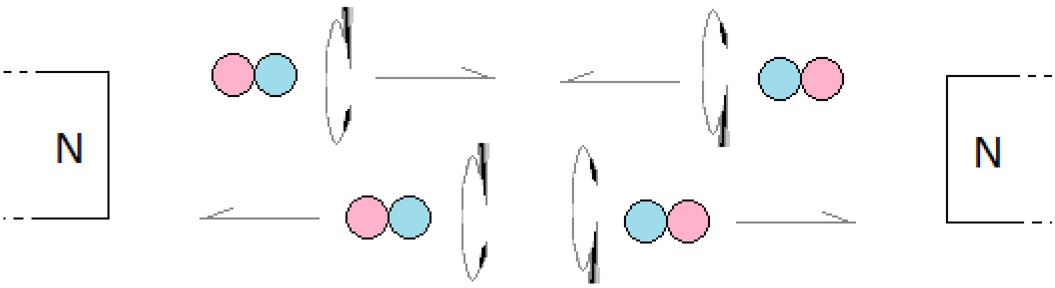


Illustration 42: Magnetic repulsion due to photons staying in the field

Why electric currents come with a twist

Magnets can be used to induce currents into wires, and separate charges in gases. Conversely, charge separation results in electric currents, and electric currents induce magnetism. What we have is a fractal relationship between magnetism and electricity. Small currents, with correspondingly small magnetic fields, self organize into larger currents and fields. Grand currents with enormous electric fields fall apart into smaller currents with smaller electric fields. This is going on everywhere, from the minutest of cells and microbes to galaxies and galaxy clusters.

There's no top or bottom in this hierarchy. It's all part of one giant cosmic whole. However, there's a small imbalance in it. When magnetized photons separate charges, sending positive ions one way, and electrons and negative ions the other way, the slight affinity that exist between two abrasive textures comes into play. We find that the mechanism that explained the relative size difference between electrons and protons, and also the gravitational force, can be used to explain why electric currents twist.

To understand this, let us first apply our theory to the phenomenon of charge separation and induction of electric currents by the use of a magnet:

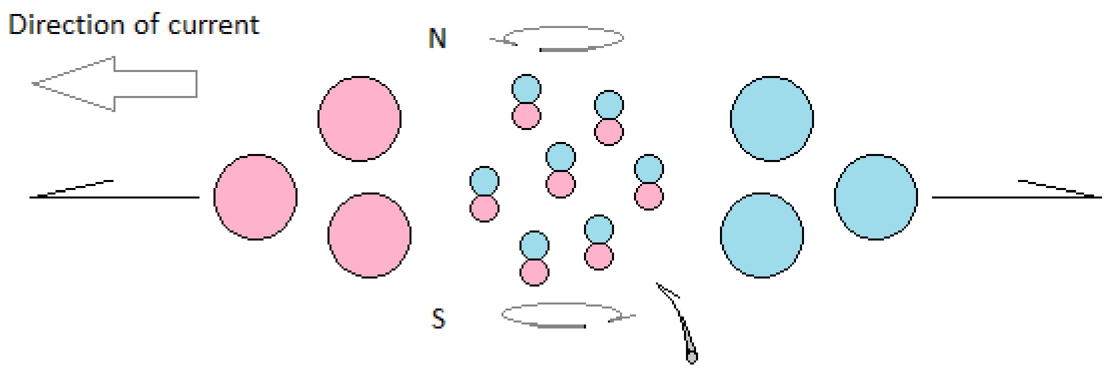


Illustration 43: Charge separation by swiping a magnet forward

The photons in the illustration are oriented according to the north seeking pole of a magnet. When swiped away from us, into the paper, the photons' negative orbs drive positively charged particles to the left. Correspondingly, the photons' positive orbs drive negatively charged particles to the right. This is due to the combined effect of the photons' spin and the direction of the swipe. The resulting current is in this case to the left, as can be confirmed by applying Ampère's right hand grip rule.

However, positively charged particles will be pushed a tiny bit less hard to the left, compared to negatively charged particles to the right. This is because abrasive surfaces don't rub as smoothly against each other as woolly surfaces. The abrasive orbs of photons interfere destructively in the transfer of energy from the swipe to positively charged particles.

With no corresponding destructive interference in the transfer of energy onto negative particles, we get a tiny imbalance. To compensate for this, positively charged particles move in straighter lines than negatively charged particles, and it's this compensation that induces an overall twist.

Due to self-interference through magnetism, even electric currents consisting solely of electrons end up with a twist. The induced magnetic field around wires reflect back to the current of electrons, which in turn start to twist due to the tiny difference describe above.

Again, we're talking about a trillionth of a trillionth degree in difference. This isn’t something that's easily detected directly through measurements of force. However, it becomes visible on large scales.

Summary

Having tested our model against major physical phenomena, and found it to hold up logically under scrutiny, our next step is to formalize the theory. We need to hook it up to established physical concepts and formulas.

What follows is some initial work to that end.

Note that every definition presented in this summary refers back to some earlier definition. The only exception being the fundamentals that act as our axioms. At no point do we need to incorporate anything external to our theory in order to make our explanations. Everything is directly or indirectly derived from the fundamentals.

Fundamentals

Particle quantum = Fundamental building block of all things

Extent = Attribute of particle quanta

Dimensions = Attribute of particle quanta. There are 3 dimensions.

Particle texture = Attribute of particle quanta: woolly, abrasive and mixed.

Motion = Attribute of particle quanta

Relative measures

Length = Extent in one dimension. Always measured relative to something else.

Area = Extent in two dimensions. Always measured relative to something else.

Volume = Extent in three dimensions. Always measured relative to something else.

Smallest measurable distance = Circumference of an electron

Time = Relative measure of motion. Always measured relative to something else.

Smallest measurable time unit = Circumference of electron / speed of light

Instantaneous action - Anything happening faster than the smallest measurable time unit

Subatomic particles

Neutrino = A single particle quantum of mixed texture

Electron = Assembly of 2 woolly particle quanta and 1 abrasive particle quantum

Positron = Assembly of 2 abrasive particle quanta and 1 woolly particle quantum

Photon = Assembly of 1 electron and 1 positron

Proton = Assembly of 1089 abrasive particle quanta and 1088 woolly particle quanta

Neutron = Assembly of 1 electron and 1 proton

Basic concepts

Energy = Surface areas of subatomic particles

Aether = Mix of low energy neutrinos and photons

Space = Aether

Pilot wave = Pressure wave in the aether. All particles except aether particles have associated pilot waves.

Arrow of time = Direction of pilot waves

Inertia (at relative rest) = Circumference of subatomic particle / speed of light

Inertia (when adjusted for relative speed) =
(Circumference of subatomic particle / 2 (speed of light + relative speed)) +
(Circumference of subatomic particle / 2 (speed of light - relative speed))

Inertial mass (at relative rest) = Newtonian abstraction proportional to surface area of subatomic particles.

With both energy and inertial mass related to surface areas of subatomic particles, we have an explanation for why there's an energy equivalence: $\mathbf{E = mc^2}$.

Force

Newtonian abstraction pertaining to pressure or tension. Force is related to acceleration through the formula **F = ma**

Short range forces = Direct interactions through particle textures

Impulse = Force applied directly to a body as opposed to indirectly through manipulation of the aether

Field forces

Electric force = High and low pressure areas in the aether caused by neutrino collisions

Gravity = High and low pressure areas in the aether caused by an imbalance in the electric force

Gravitational mass = Newtonian abstraction proportional to surface area of subatomic particles. Inertial and gravitational mass are equivalent because both are functions of size at the subatomic.

Magnetism = polarized photons

Magnetic force = High and low pressure areas in the aether caused by polarized photon collisions

Work

Newtonian abstraction for energy transfer

Work only happens when a body is accelerated by impulse in the direction of the applied force.

No work is done to a body accelerated by a field force before it crashes into something. This is because field forces are manipulation of the aether rather than direct impulses. Only if a field force is accompanied by an impulse is there any work done to the accelerated body.

Work doesn't happen instantaneously but at the speed of light. The time delay experienced is what we call inertia.

The formula for work is $\mathbf{W = Fd}$.

Force can be expressed as $\mathbf{F = ma}$.

When we make the substitution, we get $\mathbf{W = mad}$, which yields a time component because $\mathbf{a = d/t^2}$.

We get $\mathbf{W = md^2/t^2}$.

This relates Newton's definition of work to our definition of energy and the way energy is distributed.

Using the energy equivalence $\mathbf{E = mc^2}$, we can substitute $\mathbf{m}$ for $\mathbf{E/c^2}$.

This yields $\mathbf{W = Ed^2/t^2c^2}$

We have an expression that relates work to distance **d** at the macro level and distance **tc** traversed by aether particles at the micro level.

Coulomb's law

Coulomb's law is an expression that relates force to the probability of aether particles colliding in the space between two charged points. It can be arrived at purely based on probability theory and the inverse square law as derived from geometry.

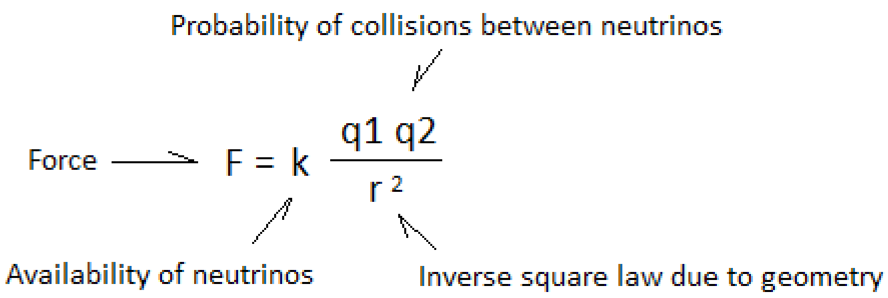


Illustration 44: Coulomb's law explained

Newton's universal law of gravity

Gravity is an imbalance in the electric force. This force is therefore of the same form as Coulomb's law. However, instead of expressing the force between two charged points, Newton's formula express the aggregate effect of the imbalance. Gravitational mass is a proxy for the total number of charged particle quanta constituting a gravitational body.

Net charge

$$F = k \frac{q1\ q2}{r^2}$$

Coulomb's Law

Total charge

$$F = G \frac{M1\ M2}{r^2}$$

Newton's Universal Law of gravity

Illustration 45: Comparing Coulomb's law to Newton's universal law of gravity

Conclusion

Our model has been demonstrated to hold under scrutiny. Our analysis hasn't revealed anything that gives us reason to abandon it. On the contrary, it conforms well to reality.

There are two paths forwards from here. One leads towards mathematical formulas and further nailing down of details. The other leads to a wider analysis, broadening the scope of the theory.

The mathematically inclined may fine enjoyment in deriving the various well established formulas from the principles laid out in this book. In this respect, we've only scratched the surface in our analysis. There's no lack of formulas to analyse further.

Those with a philosophical inclination can use our theory as a model for wider interpretations. My previous book, Universe of Particles, may serve as inspiration in this respect. It enumerates several phenomena that call for alternative explanations from what's currently accepted dogma.

There's also pure theoretical work that can be done. There may be other ways to interpret physics from a strict particle perspective that yields equal or better results. Comments and suggestions in this respect are always welcome.

I hope you have enjoyed this analysis, and that you will keep this theory in mind as a plausible alternative to conventional theories.

Acknowledgements

It was a remark made by Onar Åm back in 2016 that prompted me to embark on this grand tour of physics. He pointed out that Earth appears to be expanding. On discovering that this is true, I started searching for an explanation. One thing led to another. A few years later, I arrived at the theory presented in this book.

The work of Morton Spears and Halton Arp provided the hints I needed. Their combined insights suggested a strict particle model of reality, and I decided therefore to pursue this avenue of investigation.

Input from Wallace Thornhill, Peter Woodhead, Andrew Johnson, Freddie Thornton, Martin Nygaard, Henry Berg, Steve Whetstone, Alistair Riddoch, Franck Vallée, Michael Roffe, Michael Heikkinen and others, helped me formulate my ideas into the theory presented in this book.

Paul G Leader has since caught onto my ideas. He has formulated his own theory based on a structured neutrino model, and some of his work has in turn fed back into my theory.

I owe great thanks to all these people. Without their help and inputs, this book would not have come about.