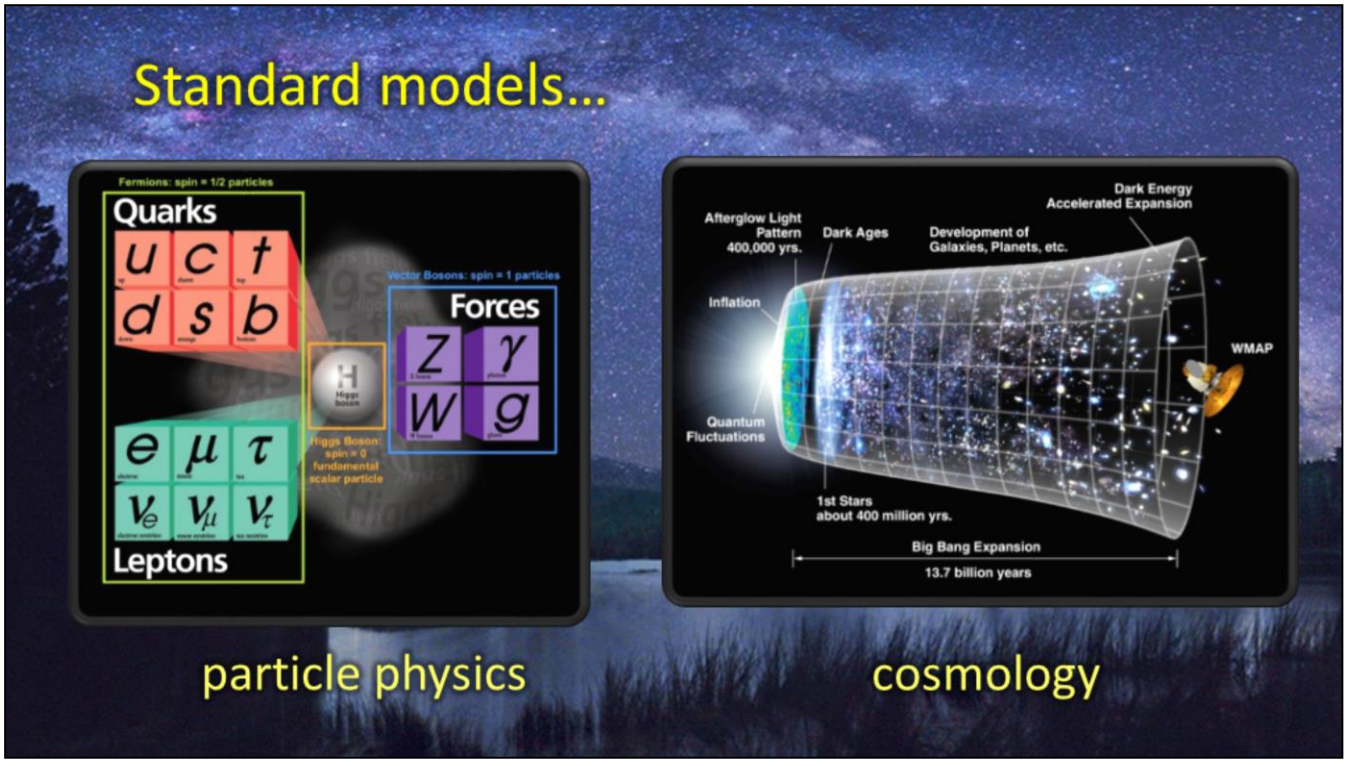
Exploding Dark Islands

> **Exploring the connection between segregata, ultimata, and gravita's surprising big bang.**

For those not familiar with these Urantia Book terms – **segregata**, **ultimata** and **gravita** – hopefully over the next 40 minutes or so, these terms will become not only familiar, but **intriguing**!

Speaking of familiar things,



… here's a snapshot of those two **standard models** that scientists currently use: one for particle physics, and one for cosmology.

Now with regard to **physics**, the question we're exploring this weekend is this:

> "Does the Urantia Book offer anything, anything at all, that might help **to explain**, or even **to extend**, these standard models that native science has evolved?"

What I'd like to do in this session is not to present a finished statement or model for peer review.

What I'd like to do is simply to show how **neatly** certain parts of the Urantia Book story fit in with what scientists currently believe.

Ok, so what's all this about exploding dark Islands?

To an astrophysicist, the Urantia Book implies something outrageous: that what we call a **black hole**… can explode.

Problem is, to make a (stellar mass) black hole explode we'd need two things:

1. we'd need… **new foundations** for particle physics, and
2. we'd need… some **fresh ideas** about space and time.

As we'll see, this Urantia Book appears to provide both.

Here's the plan: we'll begin with a quick review of the Urantia Book's **unique foundations** for physics. Then we'll look at what these foundations mean for **mass and matter**.

With this background in place, we'll take a fresh look at the most extreme type of Urantia Book **dark island**, those so-called "**black holes in space**", and see how they might explode.

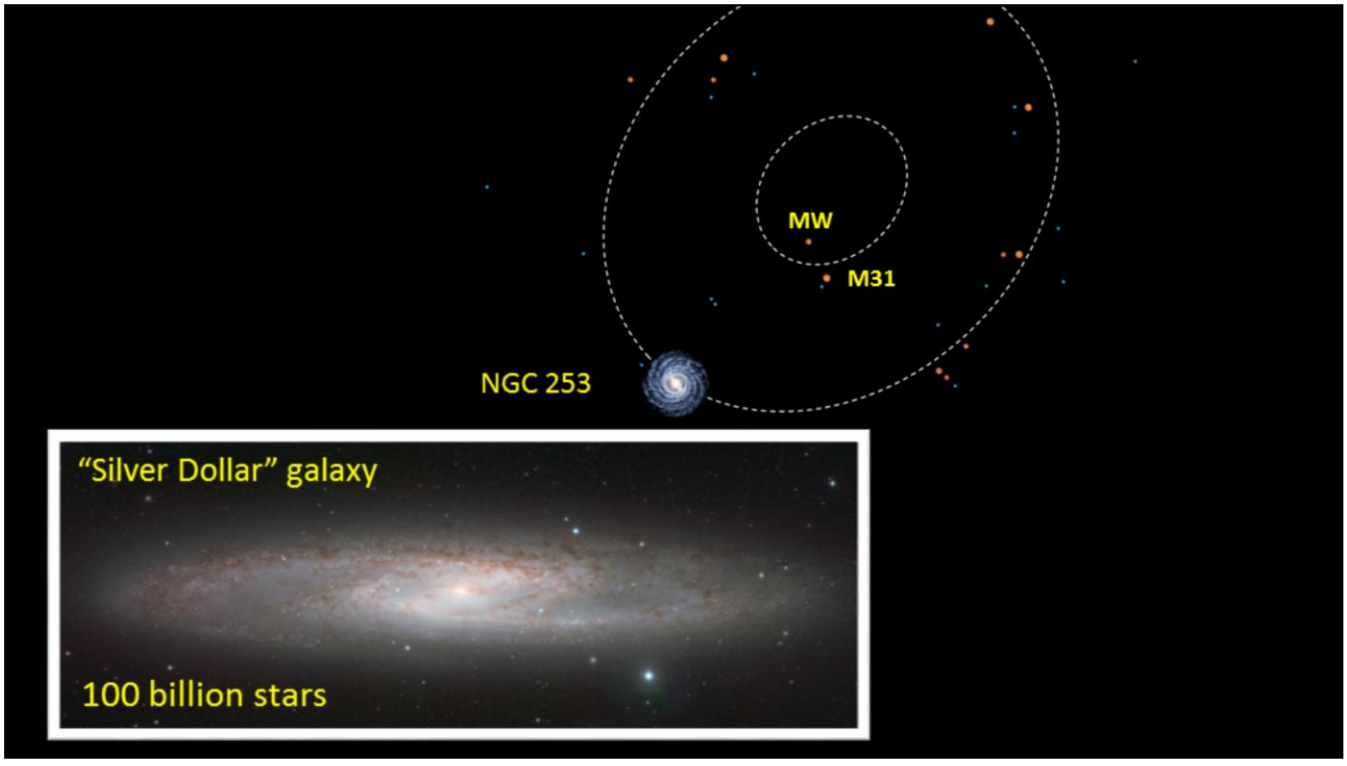
Finally, I'll mention some surprising implications for Orvonton, our ancient superuniverse.

As we work through all this, keep in mind those "**limitations of revelation**" discussed in paper 101 section 4. As the revelators explain, they were constrained by what we might call a "**prime directive**" : things which we can discover for ourselves, we must discover for ourselves.

But what about things that human science can **never** prove, like Planck-scale interactions, or the global shape of space?

If something is **not discoverable**, do those limitations apply?

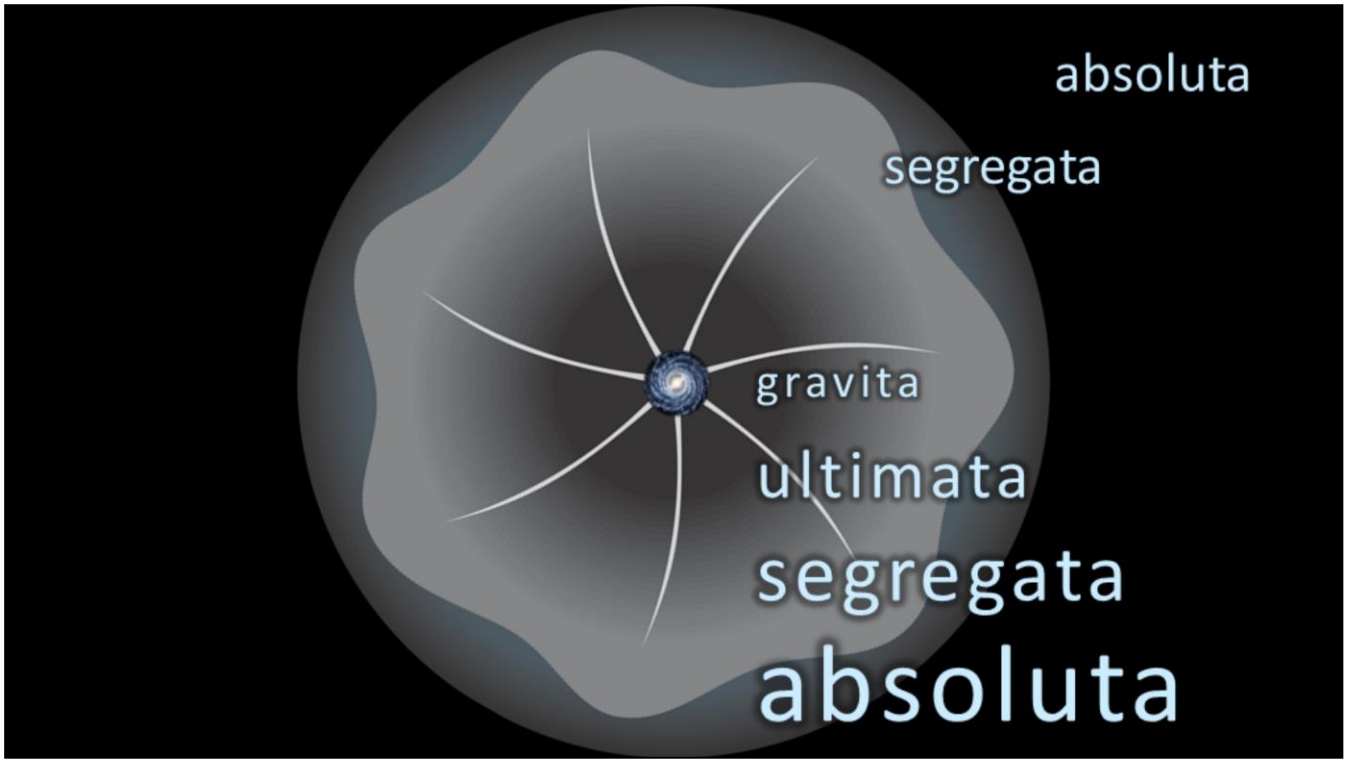
Let's begin with those foundations.



A good way to get a feel for Urantia Book physics is with a standard spiral galaxy.

For example, here's the famous "Silver Dollar", a galaxy of 100 billion stars, 10 million light years away.

When we look at such a thing – with **electromagnetic** telescopes – we see something like [**this**] : a flat disk of stars, here seen almost edge on.

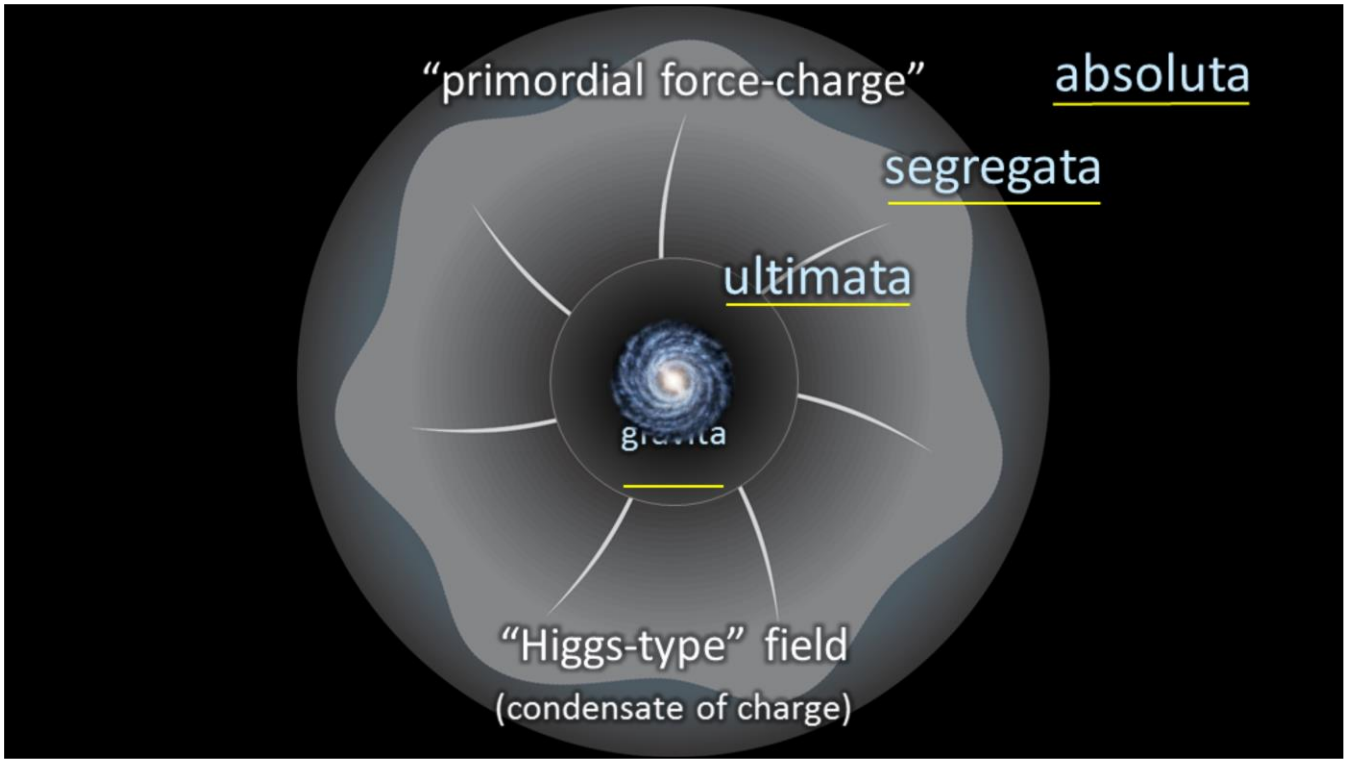


This visible galaxy, this tiny spiral of electromagnetically bright stuff, is what the Urantia Book calls **gravita**, standard model stuff like atoms and photons.

But the Urantia Book **adds** a few things to this picture…

… and introduces "**force organizers**" who spin up vast cyclones of **segregata**, condensed from **absoluta**.

As the story goes, it's within these isolated islands of **segregata**…



… that so-called "**associate force organizers**" evolve halos of **ultimata**,

from which "**power directors**" arrange **gravita**, the standard-model stuff from which stars and galaxies are made.

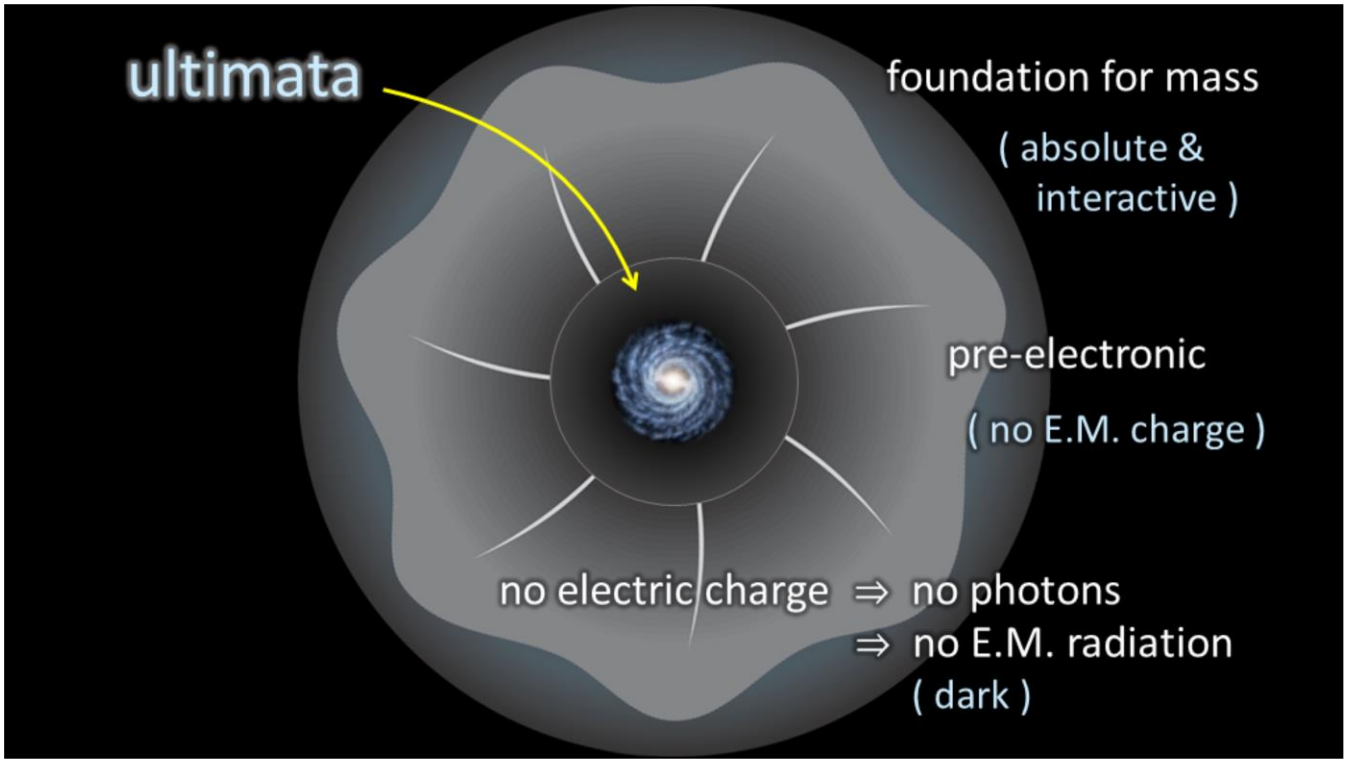
Here we see how these Urantia Book terms fit in:

- **gravita** is built from **ultimata**,
- ultimata evolves in **segregata**, and
- segregata is condensed from **absoluta**.

A couple of things to note:

[**First**], segregata is described as a "**primordial force-charge**", condensed from a global potential.

In modern terms, we'd call this a "**Higgs-type**" field (or condensate of charge).



And [**second**], in the Urantia Book scheme, ultimata is the **foundation** for **mass** – both the so-called **absolute** and **interactive** kinds.

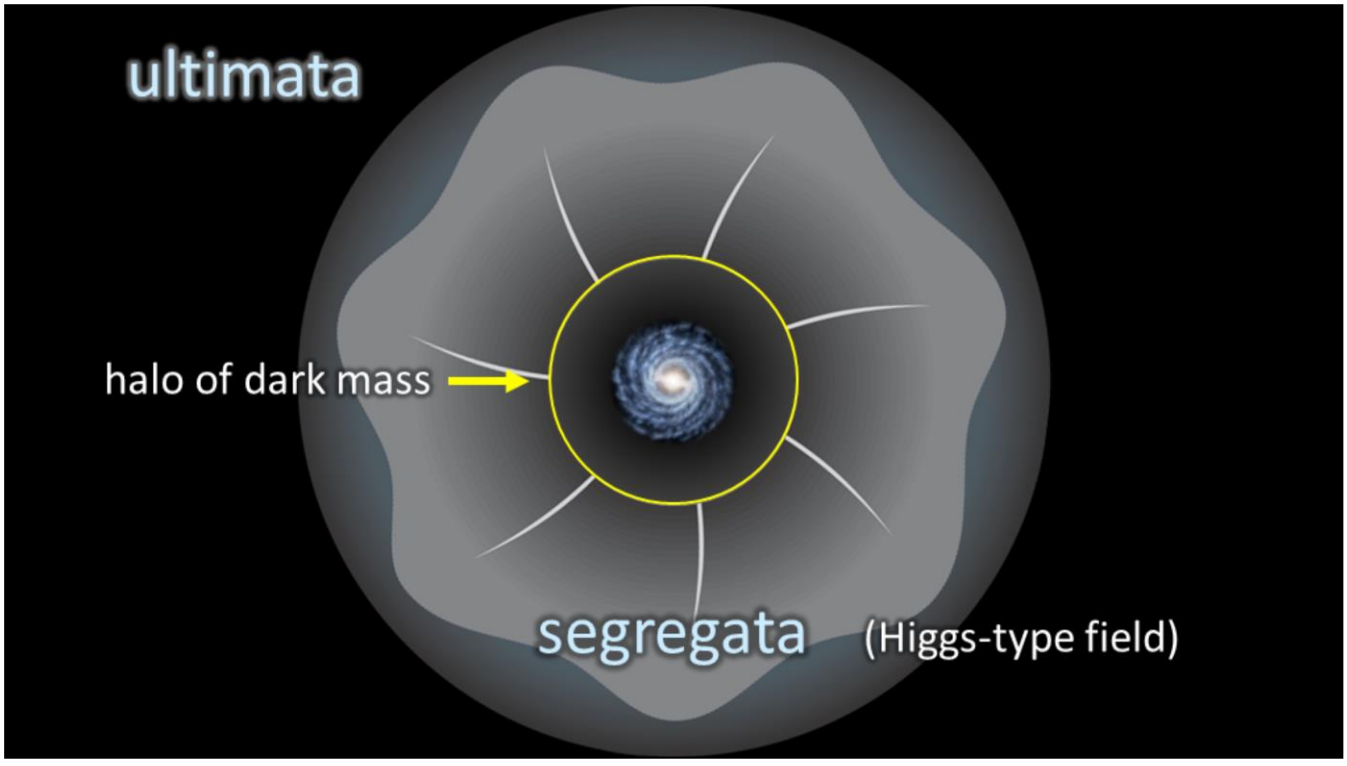
So a halo of ultimata must be **massive**.

But ultimata is also **pre-electronic**, so this halo has no electric charge.

But no electric charge means…

- **no photons**
- **no electromagnetic radiation**

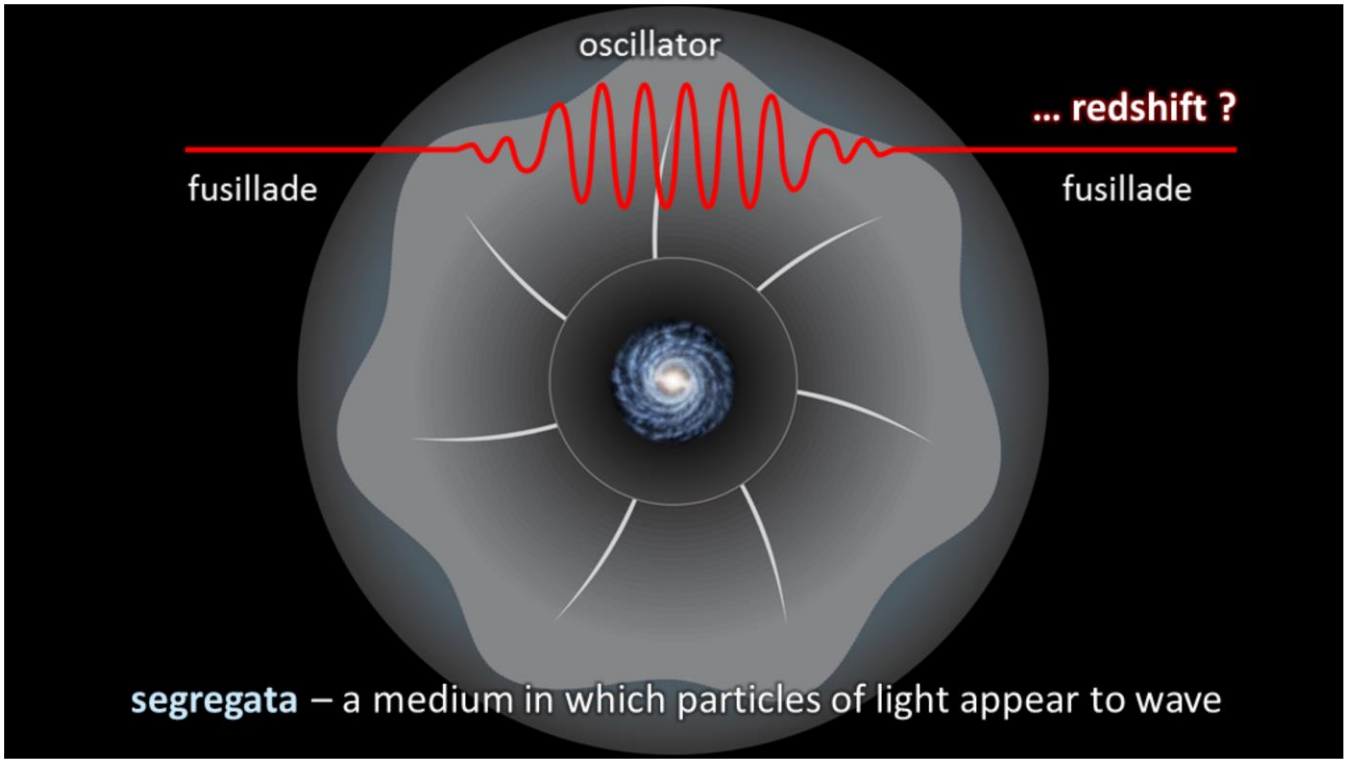
So this halo is **dark**.



What we have here is a tiny spiral of fluffy stars, embedded in a vast halo of **dark mass**, exactly what our standard models of cosmology need (and now assume) but can't explain.

So in this simple picture we find the foundations of standard model physics:

- ultimata serving as the **dark mass** required by cosmology, and
- segregata, serving as that condensate of charge (or **Higgs-type** field) that allows particle physics work.



So while [**this**] is what astronomers currently observe, something more like [**this**] is what a Solitary Messenger might see, "as they pass by..."

And one more thing. In papers 41 and 42, [they write] that particles of light move through open space as fusillades, or little bullets.

But when ploughing through these cyclones of segregata (or **primordial charge**) their path through space starts to wiggle.

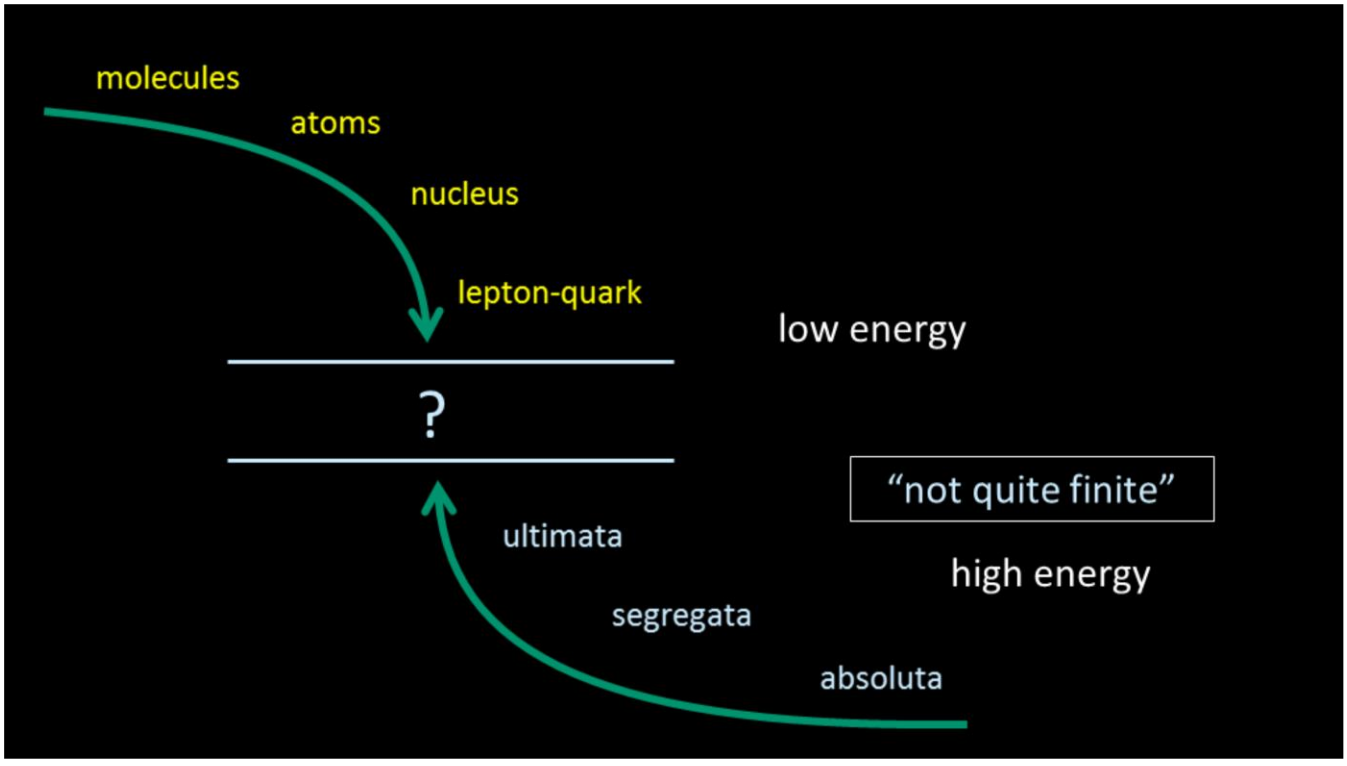
As we'll see, in the Urantia Book story, segregata serves as a <u>medium in which particles of light appear to wave</u>.

… a medium in which **<u>particles</u>** of light appear to **<u>wave</u>**.

At this point I won't mention **red-shift**, but thereby hangs a tale.

Ok, so that's a quick look at the unique foundations on which the Urantia Book's scientific story sits.

Let's see what this means for mass and matter.



As we know, everyday stuff is made from molecules, molecules are built from atoms, and atoms are complex things built from tiny parts. These tiny parts are called leptons and quarks, which are thought to be **elementary**, that is to say, not made from smaller parts.

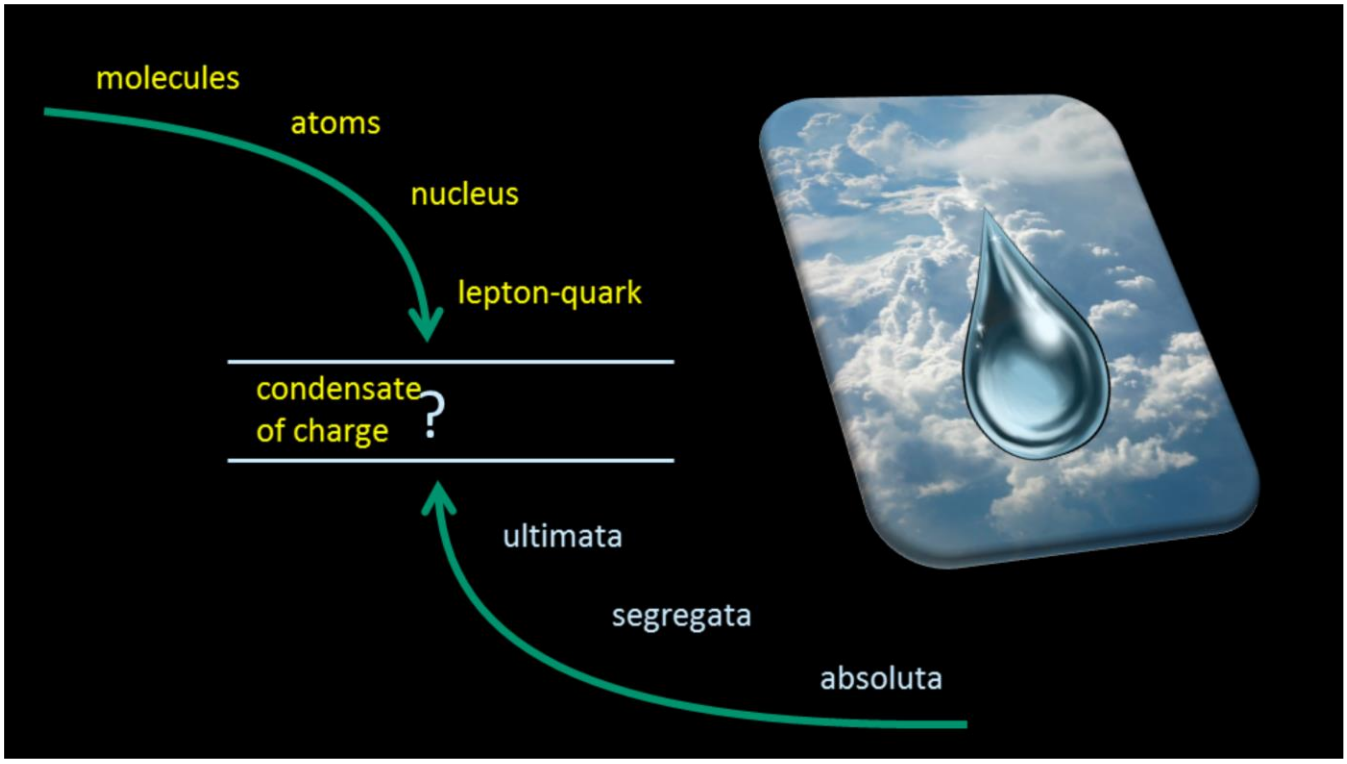
Scientists call this scheme "the standard model", and it describes most things we see really well. But in particle physics, all this is thought of as "**low energy**" stuff. Which implies another "**high energy**" domain…

Which is where the Urantia Book comes in. The Urantia Book approaches this standard model from the other – high energy – side, introducing those **ancestral** levels of **not quite finite** stuff.

In the middle here, between what we can measure and what's been revealed, we have "**a region of interest**".

It's interesting to **scientists** – they want to know more about leptons and quarks. It's interesting to UB readers – we want to know how **ultimatons** fit in.

Ok, so what do we know.



We know that for the standard model to work as advertised, this "**region of interest**" needs to be filled with something called

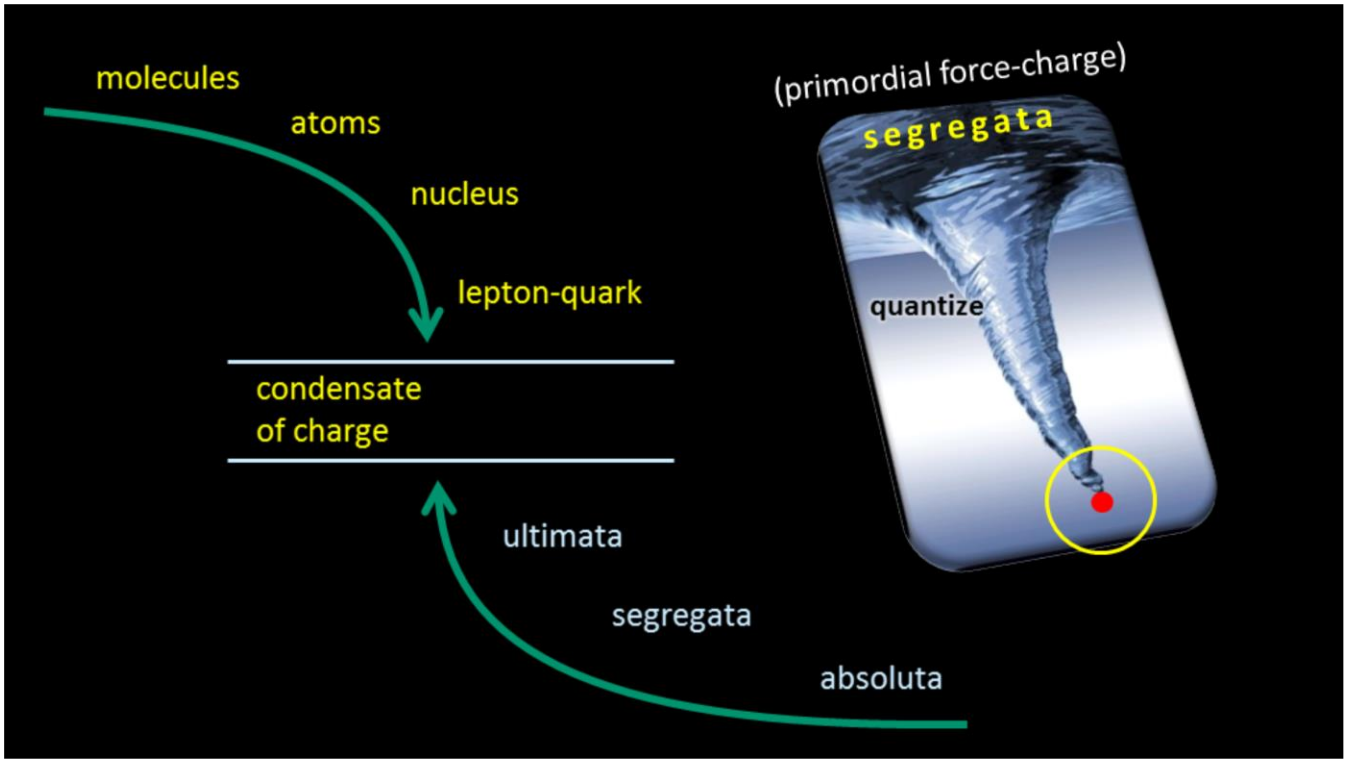
"**a condensate of charge**".

What's a condensate, and what kind of charge? We'll get to that. But first, let's introduce the **ultimaton**.

Think how rain clouds can seem to condense out of thin air, and how drops of rain can condense inside these clouds.

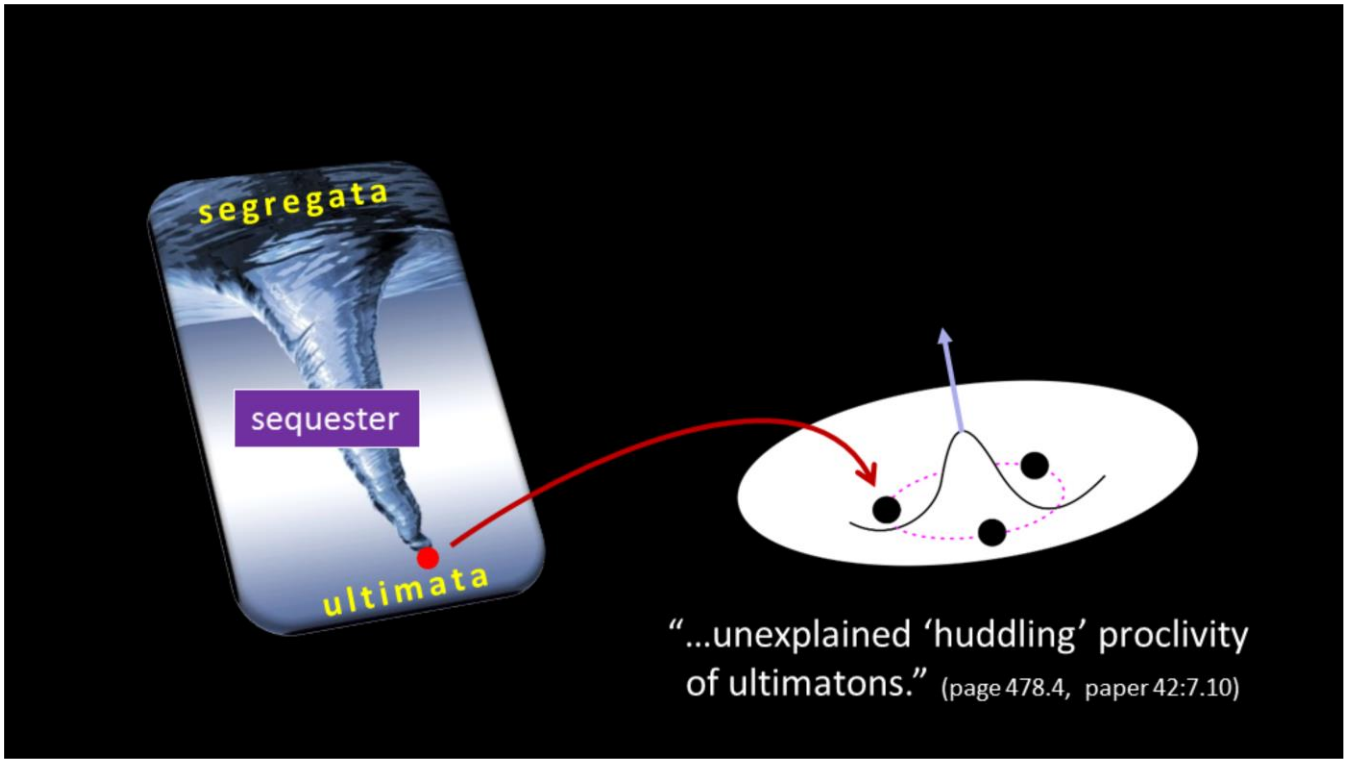
If we think of the cloud as segregata, then this tiny drop would be the ultimaton.

How to picture such a **barely finite** thing?



Think of a tiny vortex in this "**not-quite-finite**" stuff.

Then this tip becomes discrete, a quantum of superfluid spin… an **ultimaton**.

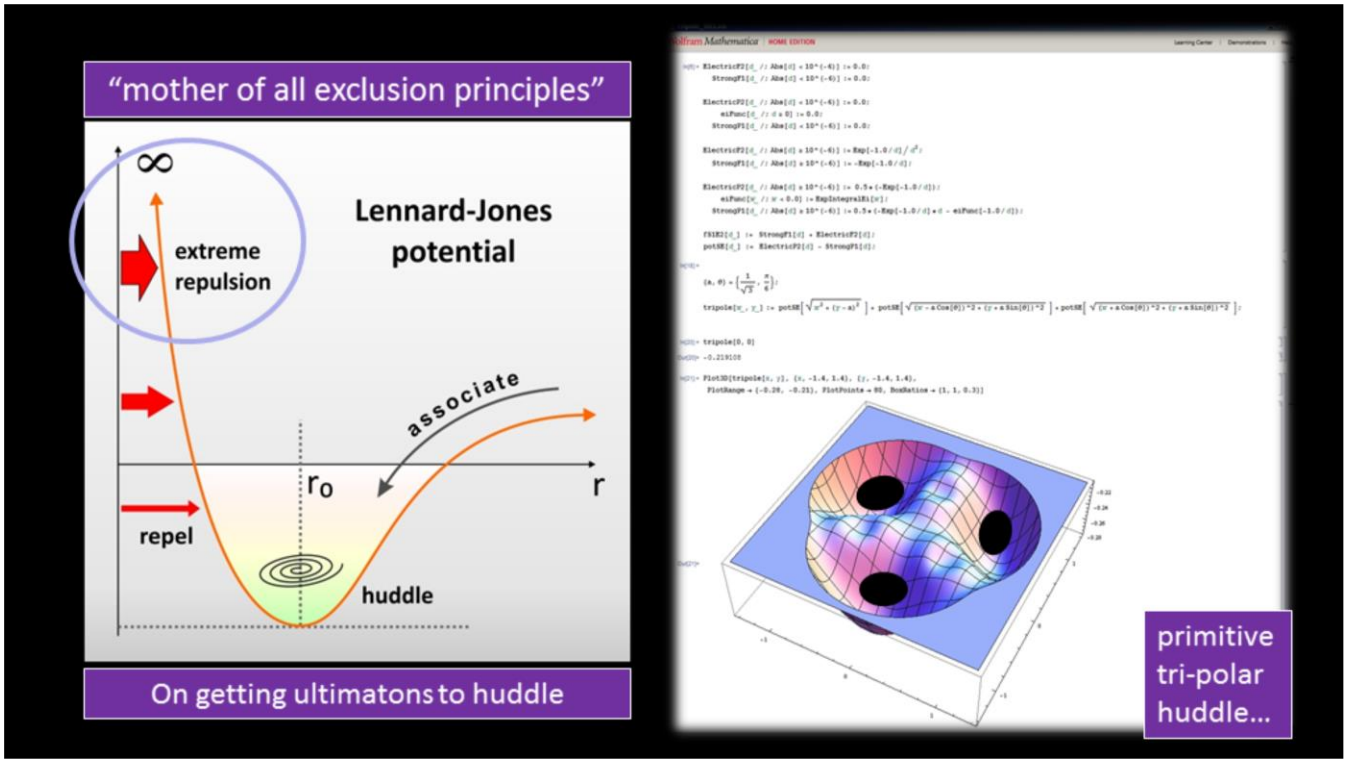


The idea is that segregata can be condensed into ultimata.

Or as Lisa Randall might say: "**sequestered** onto our measureable manifold".

But before these ultimatons can be put to work, they need to **huddle**.

Now by huddling, I imagine something like this: two or three ultimatons, locked very, very tight.

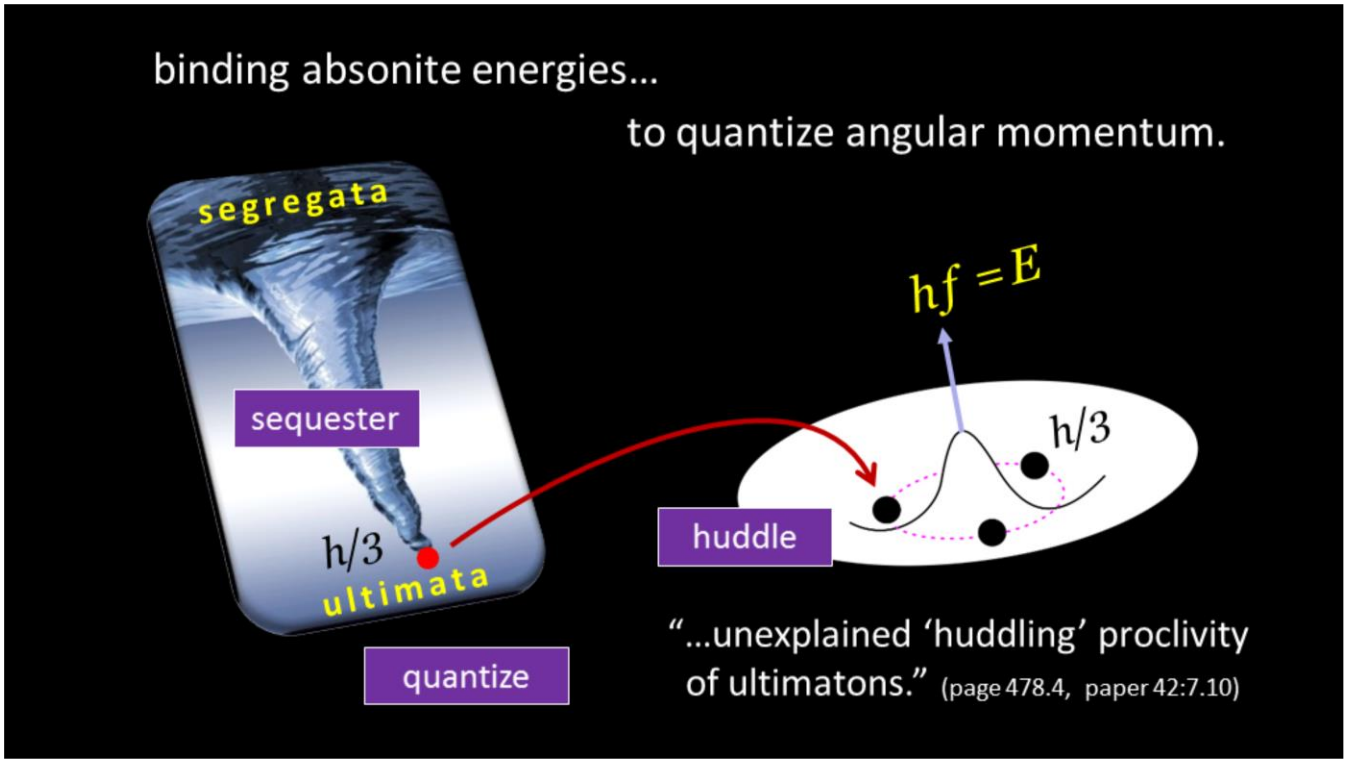


Mathematically, we'd have something like this: a balance of forces…

- "**mutual attraction**" drawing a few ultimatons together,
- while some **extreme repulsion** keeps them apart.

It's this sort of balance – between mutual attraction and extreme repulsion – that explains the ultimaton's "**proclivity to huddle**" mentioned in paper 42 (478.4, 42:7.10)

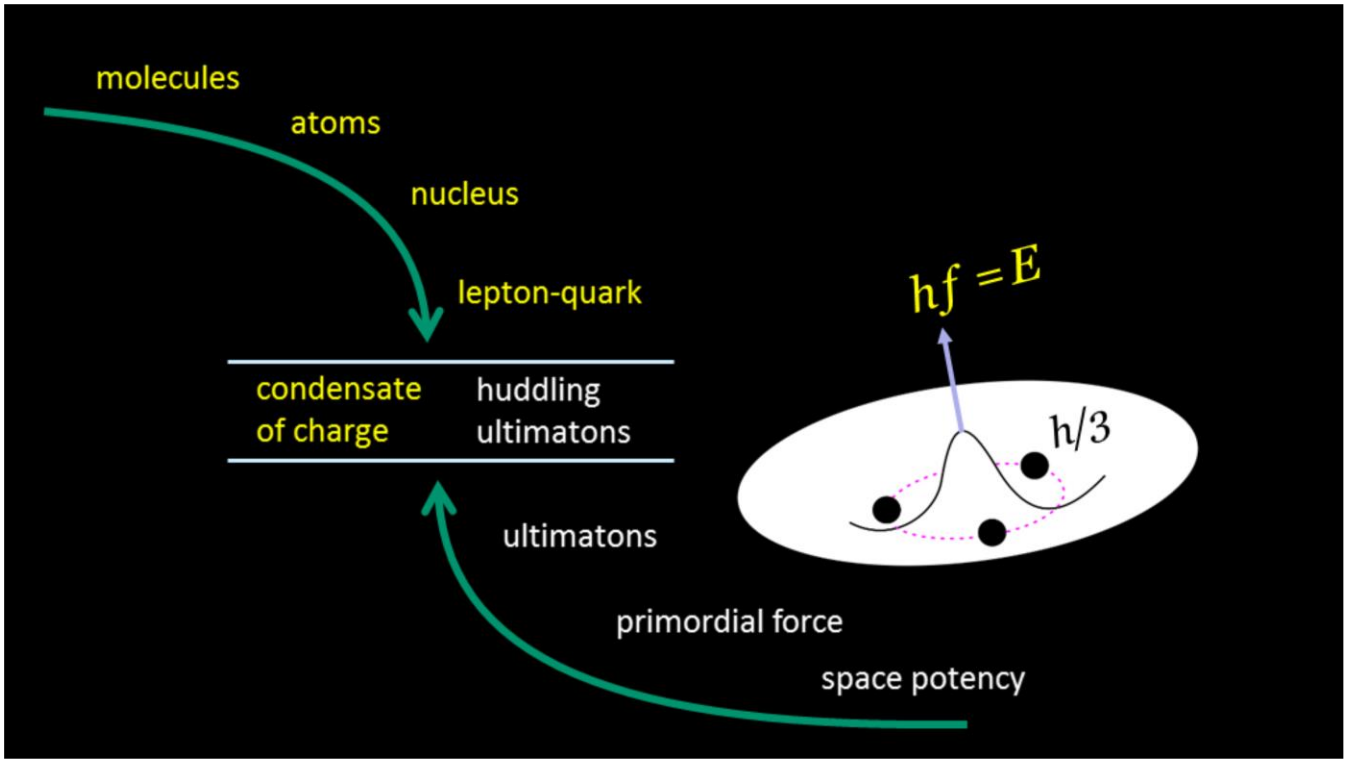
By the way, it's this extreme "**ultimatonic exclusion principle**" that allows dark islands to explode. More on that soon!



It's these two characteristics of ultimatons – their quantized superfluid spin, and their proclivity to **huddle** – that allow us to make contact with the standard model…

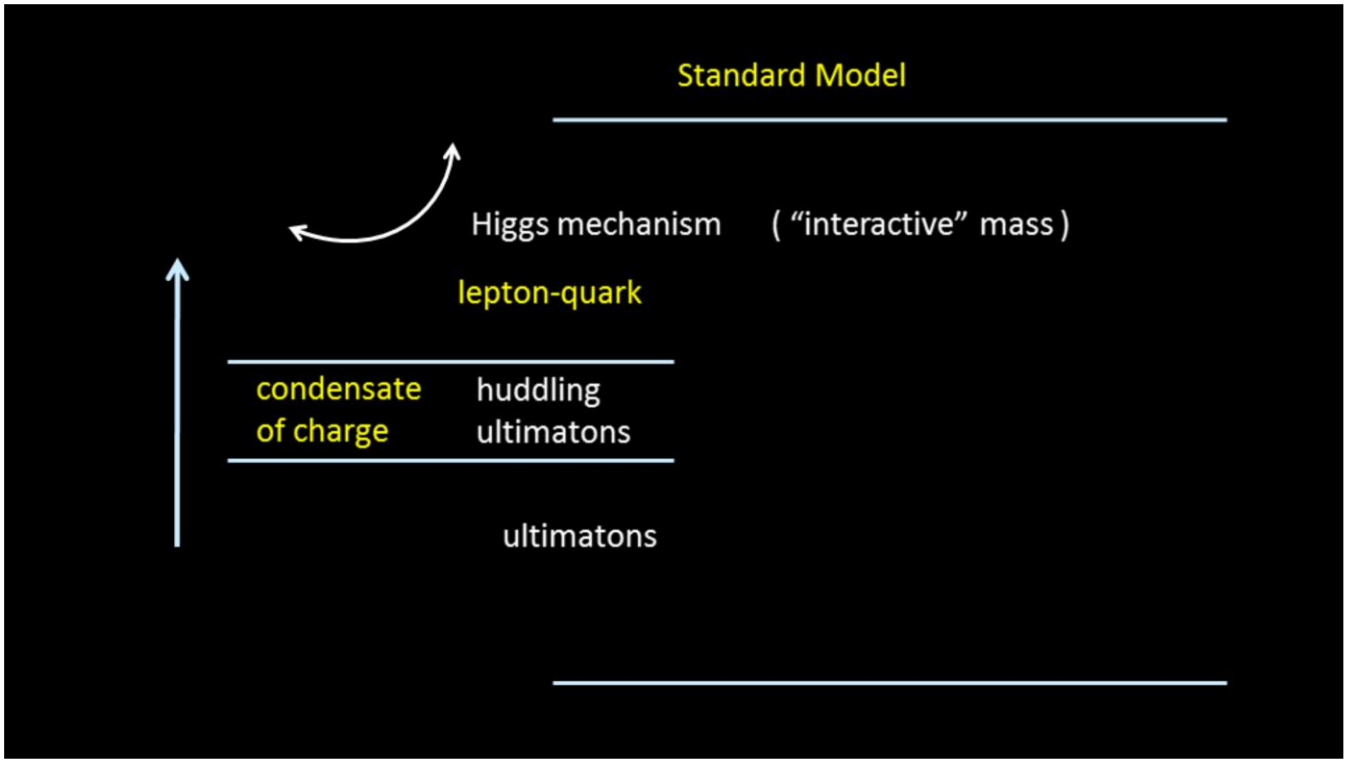
What we have here is the binding of **absonite** energies into **finite** angular momentum.

And angular momentum is something that science can measure.



So this “region-of-interest” will contain not isolated ultimatons, but **clusters** of them, huddling.

For me, this is where the Urantia Book story of matter begins…



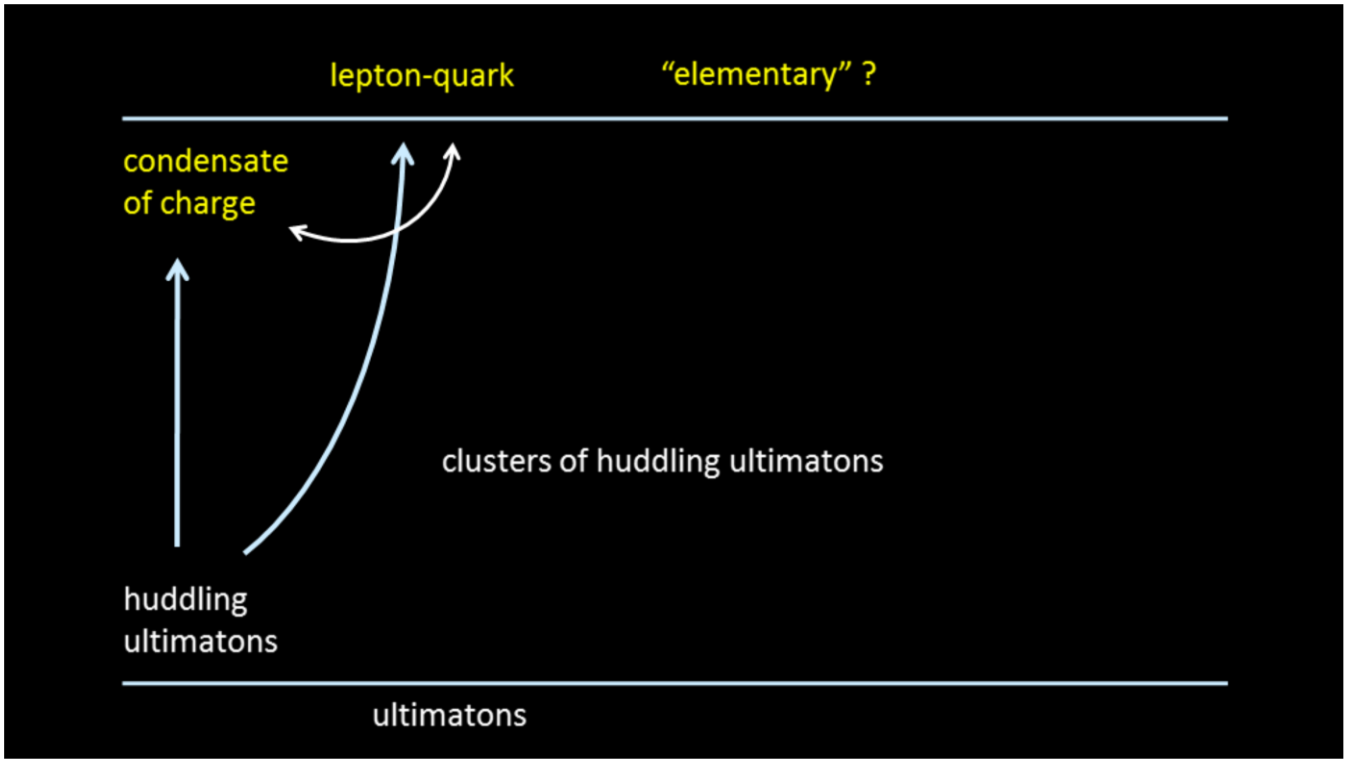
… with a condensate of charge driving the standard model,

and a condensate of ultimatons, huddling.

The thing to note here is that this "standard model" depends on an interaction between these [**leptons & quarks**], and this [**condensate of charge**].

This is the famous Higgs mechanism, thought to induce an **interactive** type of mass.

So to allow us to hook up the Urantia Book's **ultimatonic** scheme with this standard model, all we really need is for these huddling ultimatons to interact with this [**condensate of charge**], …

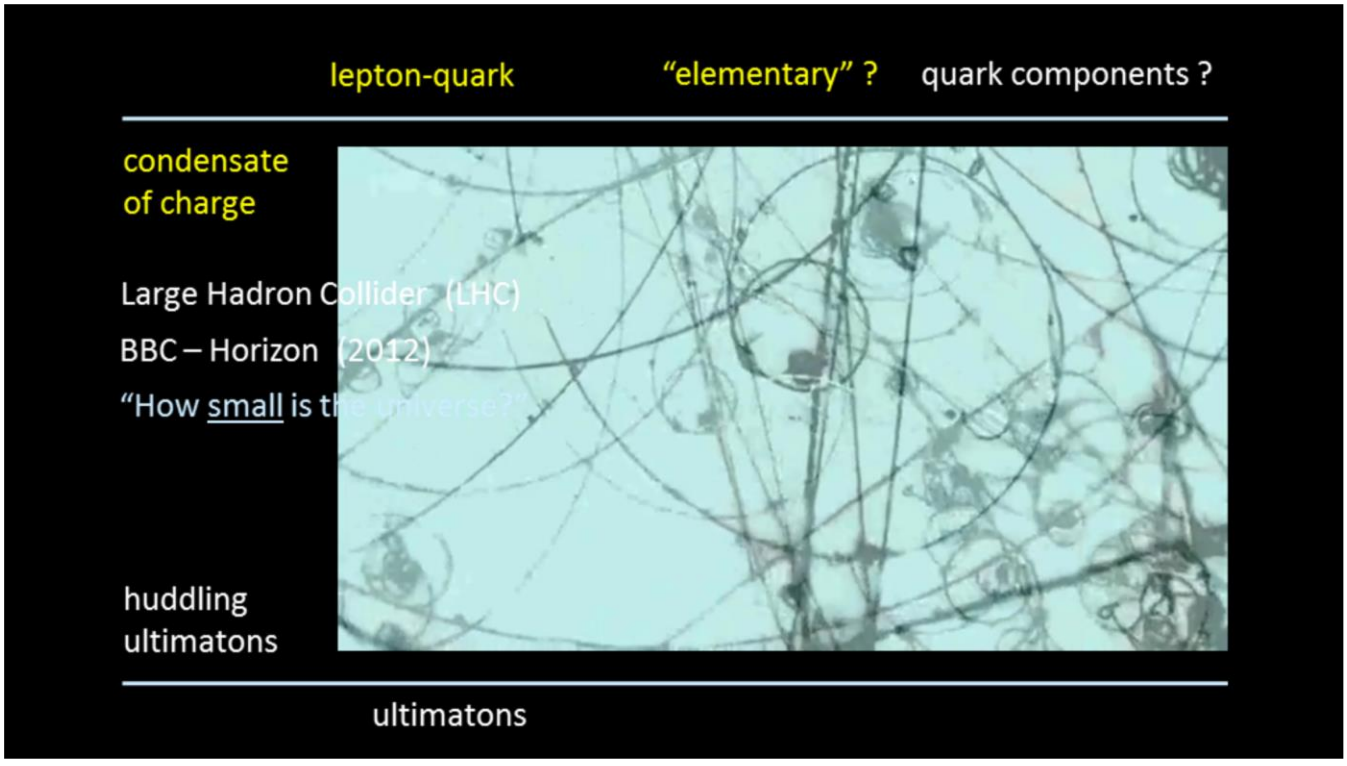


And to show how leptons and quarks can be built up from clusters of these huddling ultimatons.

Of course, if electrons and neutrinos and quarks are built up in this way, from clusters of huddling ultimatons, then once again, our ideas about what's "**elementary**" will need to change.

As it turns out, scientists have been wondering about this for some time – how elementary are "elementary" particles?

To find out, boffins built a really big machine…



… the Large Hadron Collider (or LHC).

In 2012 the **BBC** made a documentary about what scientists hope to achieve with this machine. Here's a 40 second clip:

[Movie: elementary particles?]

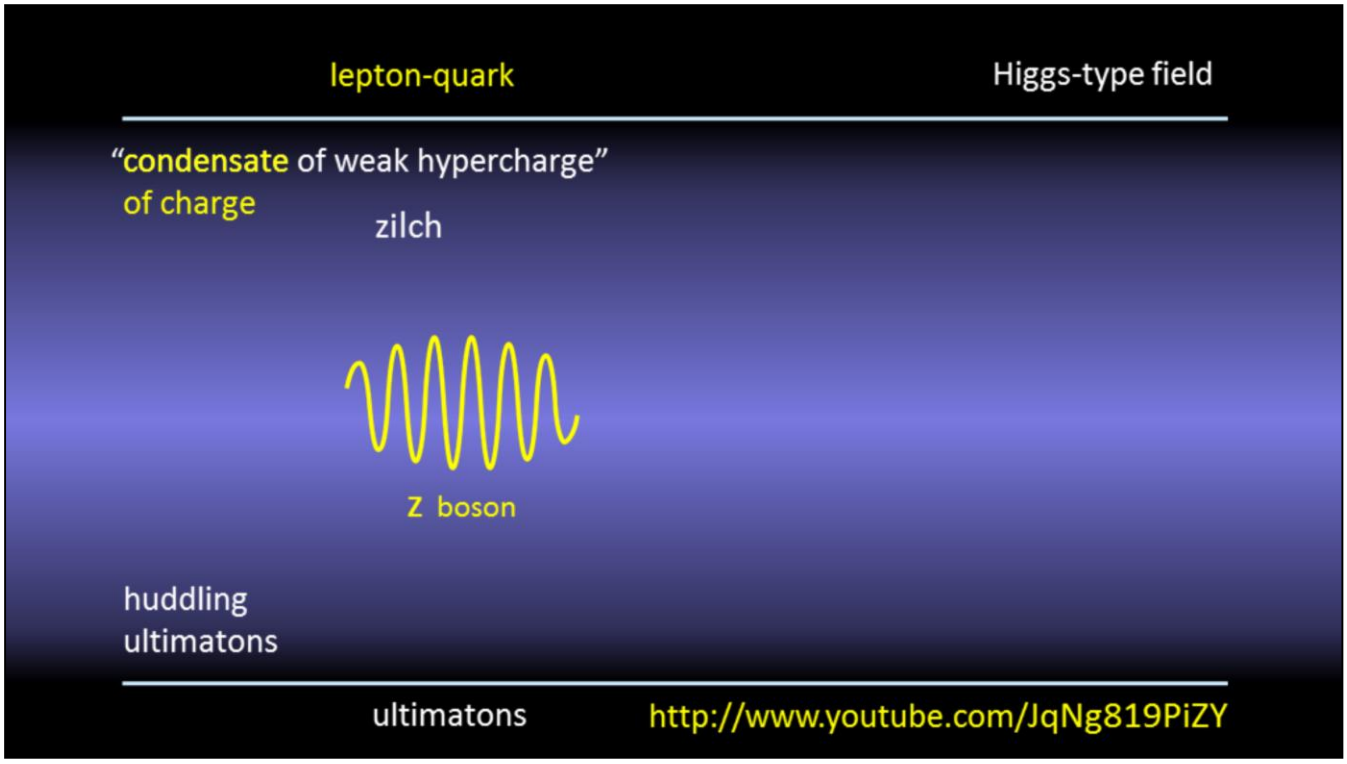
As you can see, scientists really do wonder about the internal structure of quarks. But there's a problem.

If leptons and quarks are made from smaller parts, then the next natural level down is the so-called **Planck scale**, which implies inaccessible energies and lengths. So any such **sub**-structure would seem to be forever beyond human capacity to prove.

But if something is "**beyond human capacity** to prove", do those "**limitations of revelation**" apply?

Is this why the authors were free to reveal so much about the ultimaton?

Now, about this "**condensate of charge**"…



This charge is called **weak hypercharge**, and this condensate is thought to fill all space. This is the famous **Higgs-type** field.

Since the 1970's, our standard model (for particle physics) has **assumed** that this kind of condensate exists.

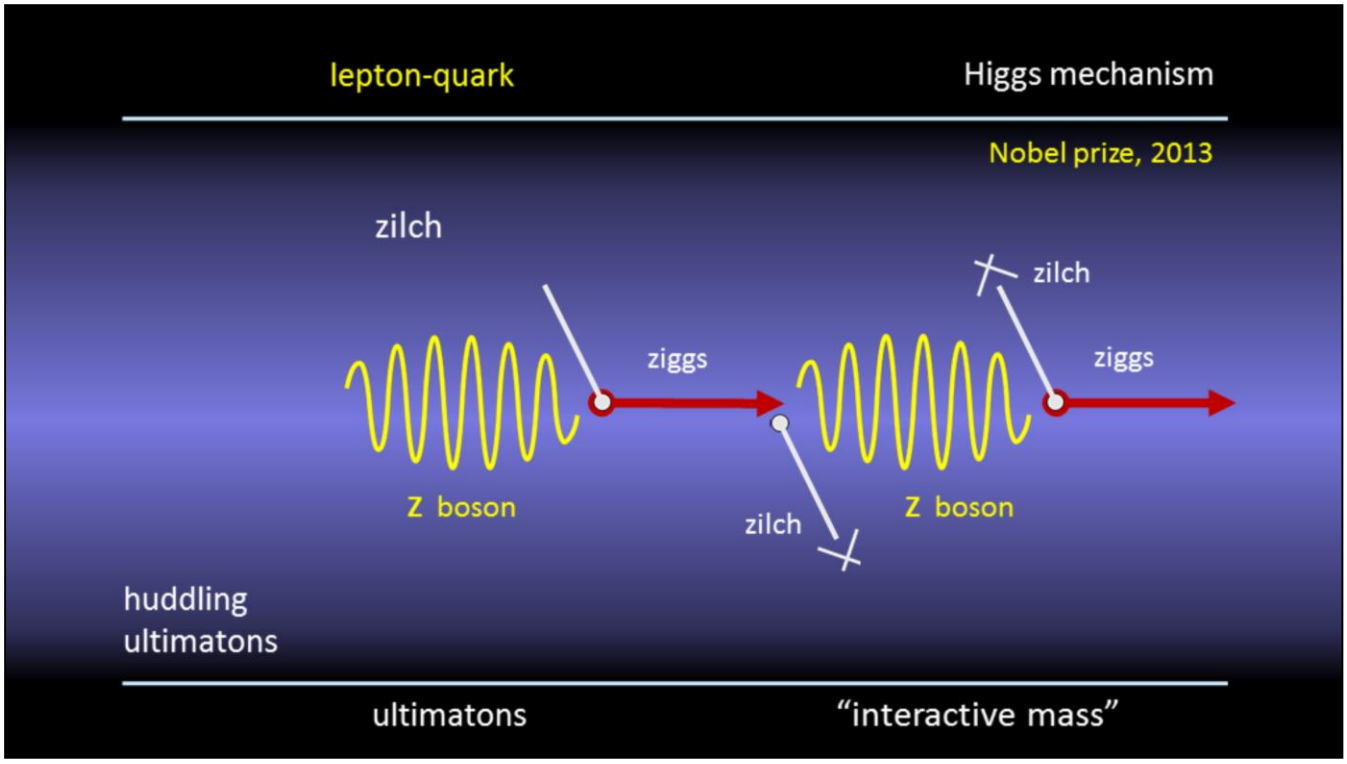
In 2012, scientists claimed to have proven that it does.

But "condensate of weak hypercharge" is a mouthful, so professor Leonard Susskind likes to call this stuff "**zilch**". Zilch.

To hear Susskind discuss zilch, here's a link to a Stanford video.

So why does this matter?

Think of a standard model particle, say a Z-boson. It's the **interaction** of this sort of standard model particle with standard model zilch that generates an **interactive**, or standard model type of mass.



Now by "interaction" we mean something like this: a Z-boson hooks onto a bit of zilch, then lets it go.

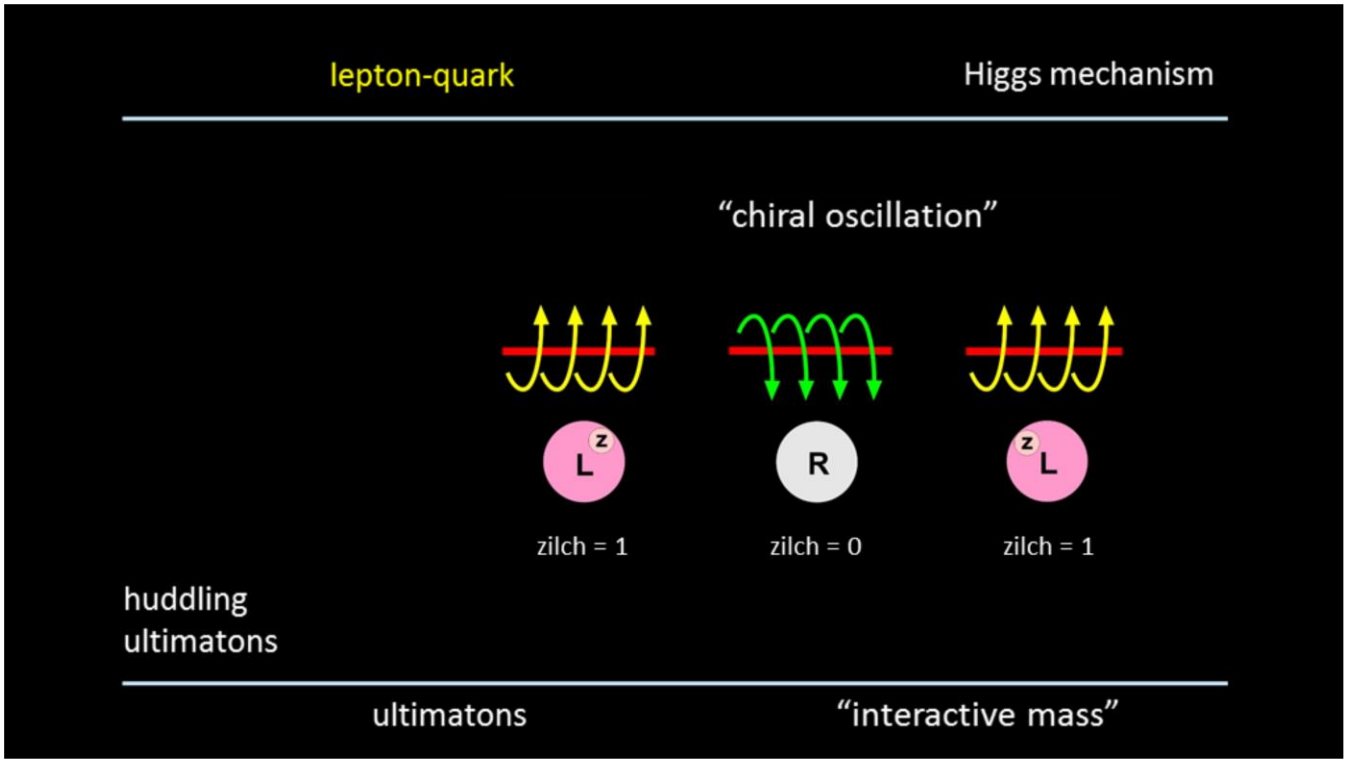
This **is** the Higgs mechanism. This is what got the 2013 Nobel prize for physics: Z-bosons hooking into this condensate of zilch.

We don't have a name for this mixture of Z-boson + zilch, but since it's so central to the Higgs mechanism, Susskind likes to call this [quantum state] a "**ziggs**".

Yep, a **ziggs**. Notice, this is **not** a "Higgs" particle. That's something completely different.

But here's the important bit: this flipping between states, between Z boson and ziggs, generates an **interactive** type of mass… exactly the type of mass we might associate with the Urantia Book's "interactive" or linear type of gravity.

And now that we have a ziggs, the **electron** can get a mass.

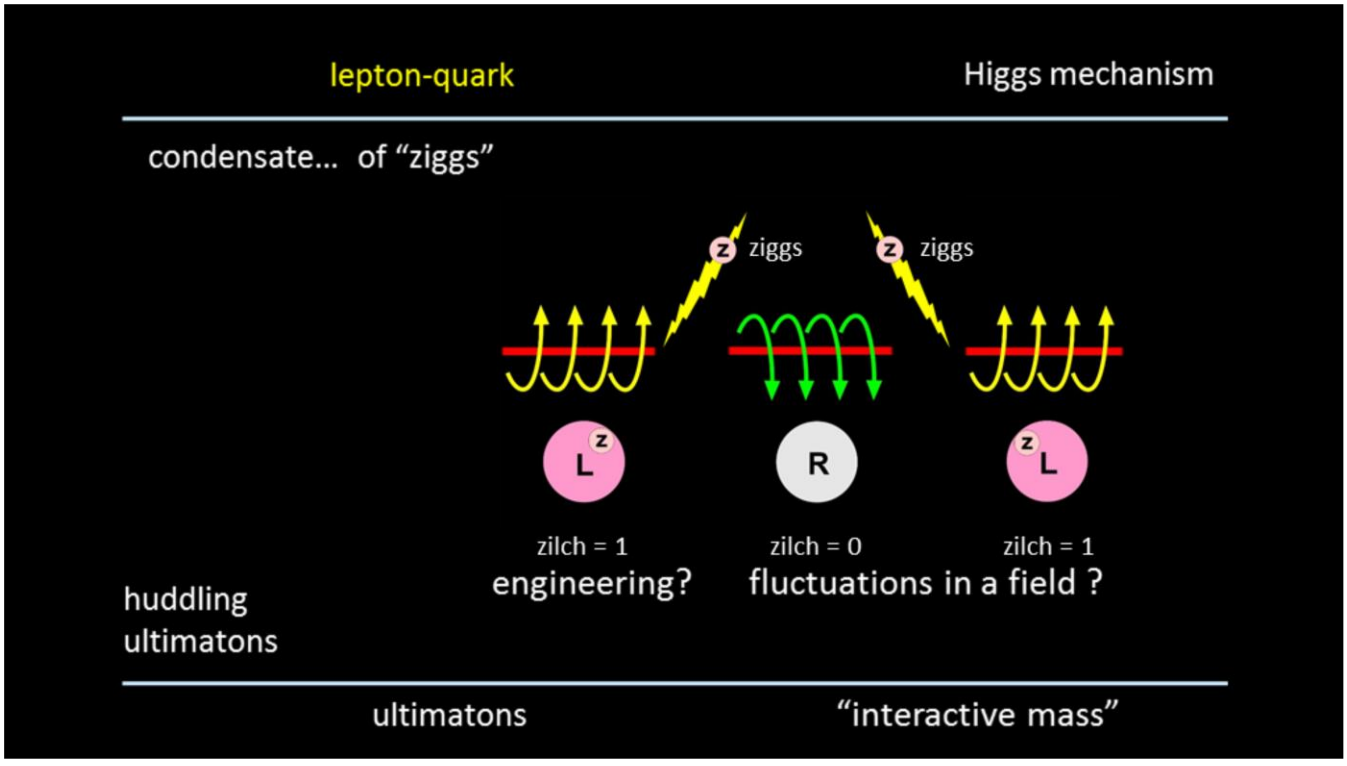


In the current standard model, an electron is thought of as spinning either left or right, and it's constantly flipping between these left and right hand states.

And much like the Z-boson, it's this flipping between [states] – this Left-Right, or **chiral oscillation** – that induces an "**interactive mass**" for the electron.

But there's a problem: when an electron is spinning left, it is has zilch. When it's spinning right, no zilch.

But zilch, this "weak hypercharge", is a conserved quantity… so where does the zilch go?



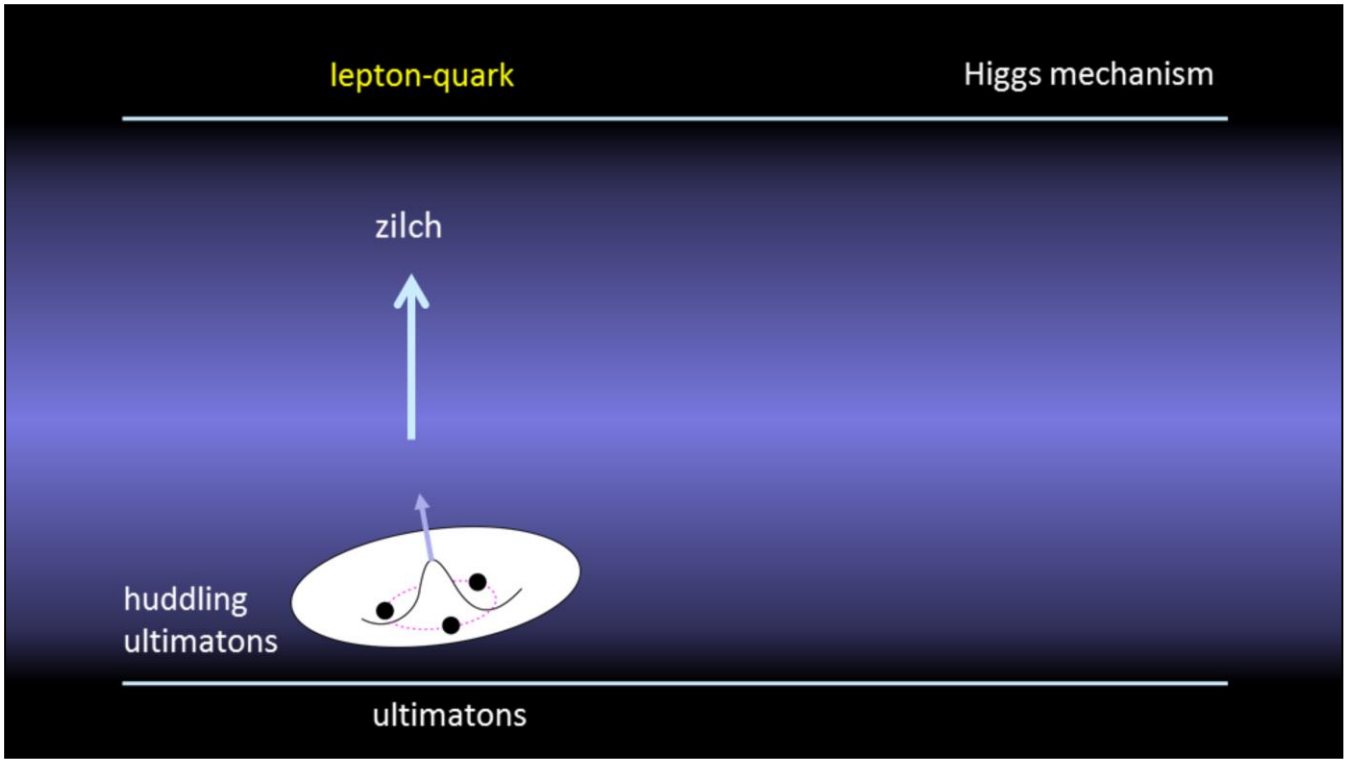
Once again, a **condensate** is involved. But this time, it's a condensate of these zilchy **ziggs** particles. By hooking and releasing a **ziggs**, the electron state switches from left to right.

In other words, for an electron to switch states – and thus get its interactive, Higgs-type mass – it has to emit and absorb a particle that carries just the right quanta of zilch.

But hang on, for 40 years we've been told that an electron is nothing but a "**fluctuation in a field**". Doesn't this behaviour seem… a **little bit fancy** for a fluctuation?

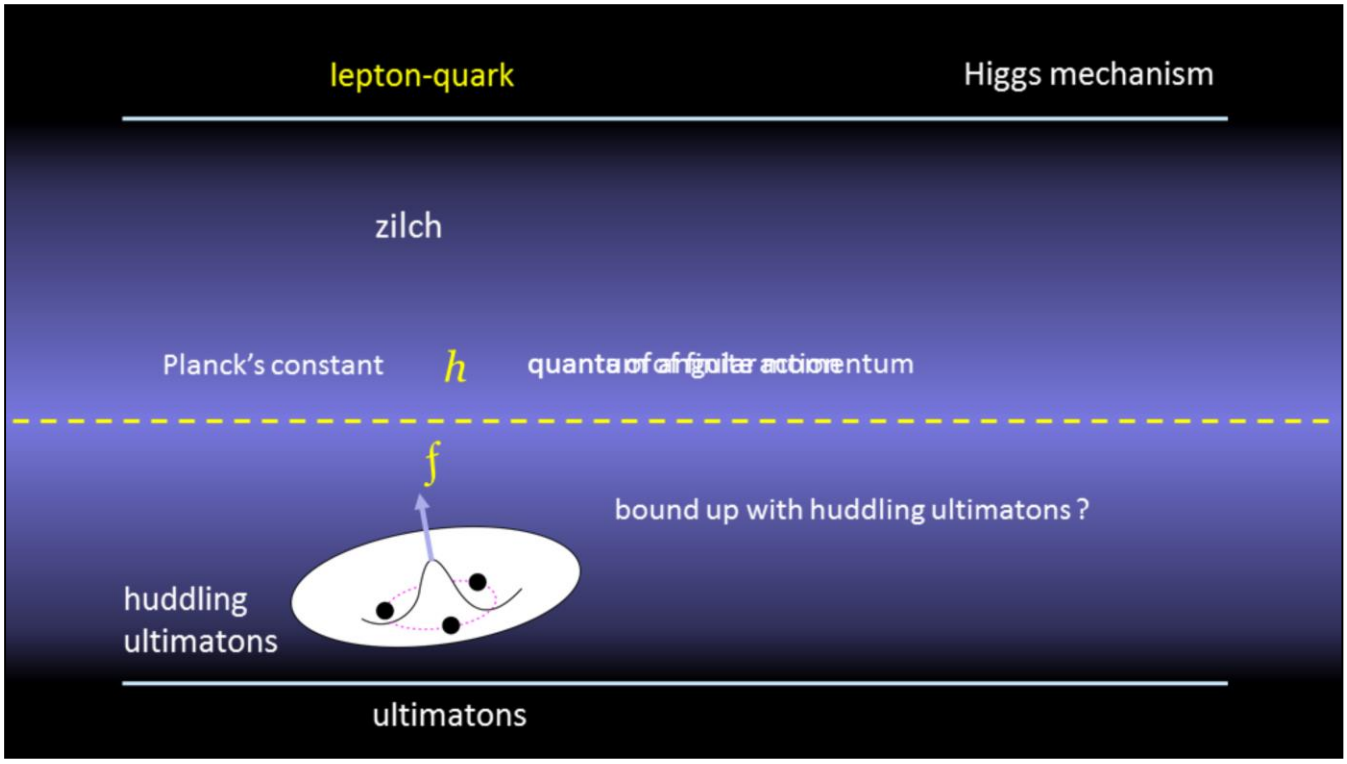
To normal folks, this looks more like **engineering** than mere "fluctuations in a field".

We'll get back to electrons and interactive mass, but first let's take a closer look at those huddling ultimatons.



Remember, to make contact with the standard model, we want [**this**] to interact with [**this**].

For argument's sake,



… let's say these [primitive] ultimatonic structures exist at the **Planck scale**. Then notice what we have: something that's "Planck-sized", and quantized, and spinning.

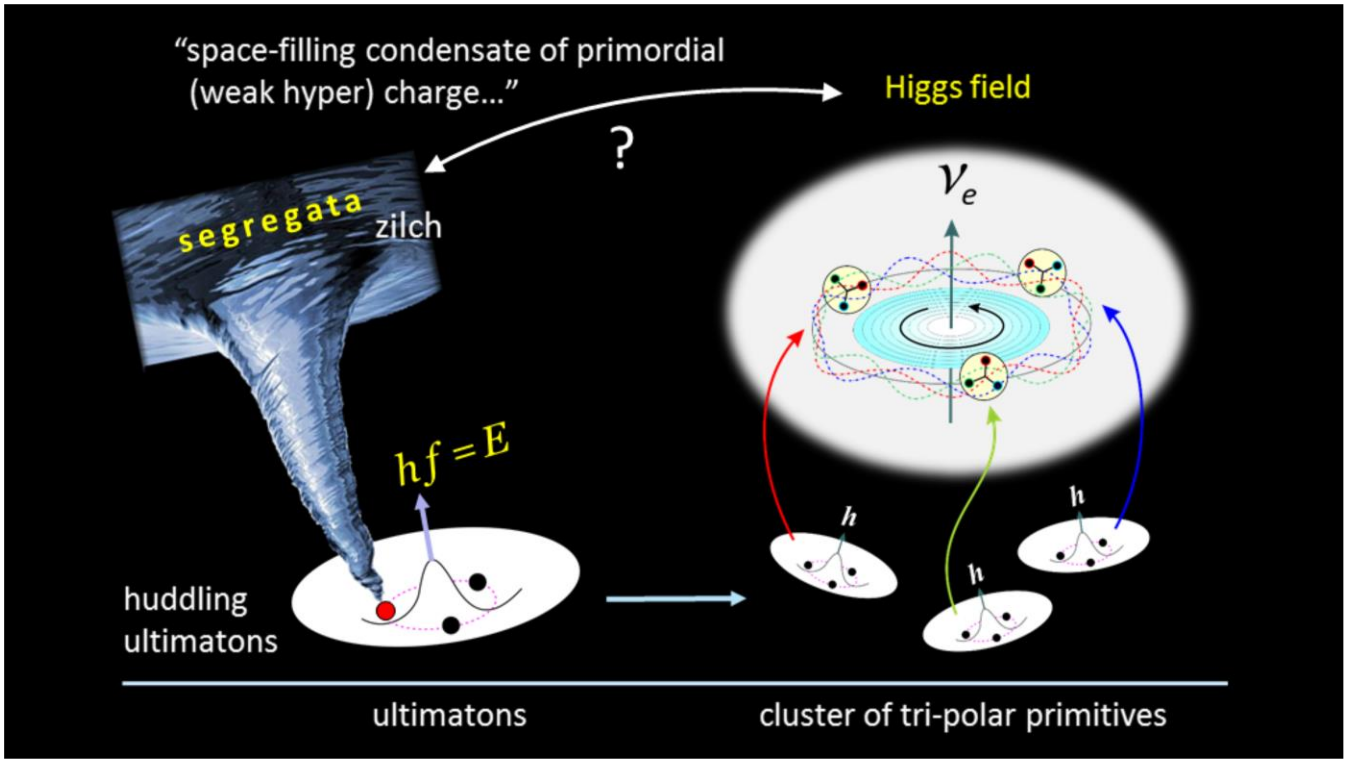
Which makes you wonder: is this where nature slips **Planck's constant** into physics?

Is this how measureable energy – **quanta of finite action** – get(s) locked into spacetime?

As quanta of **angular momentum**, bound up with huddling ultimatons?

Ok, that's a convenient idea, but could nature **really** build standard model matter from such ultimatonic parts?

Let's see how this might work.



Imagine this basic building block to be some **photon-like** thing, and then imagine a simple cluster of such blocks.

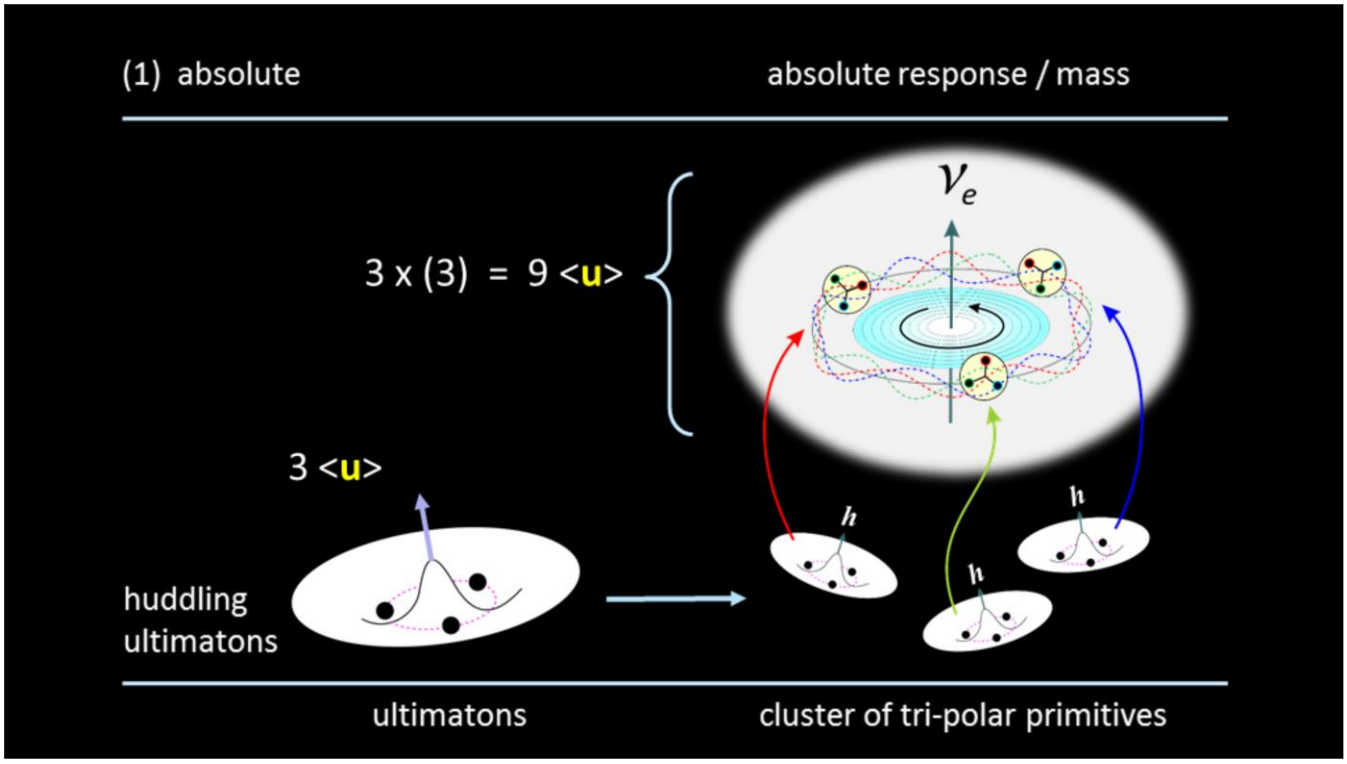
As some of you know, standard model neutrinos are modeled as a **superposition**, or mixture of three primitive spinning things. So in a Urantia Book scheme, a neutrino might be something like this.

Now, what are neutrinos famous for? Interacting with zilch! In fact zilch – weak hypercharge – is the only thing a neutrino can feel. So picture this as some **chiral** structure in that condensate of zilch. What we have here is a standard model **particle**, interacting with standard model **zilch**... but built from very **non-standard** parts.

But there's more. As we know, this Higgs-type field is thought of as a "space-filling condensate of primordial charge. Which sounds a lot like "space-filling condensate of primordial charge", in other words, **segregata**; the very stuff from which these primitive particles are made.

So here's a question: could segregata serve as this Higgs-type field that the standard model needs?

At this point, let's remind ourselves why a Higgs-type field was invented:



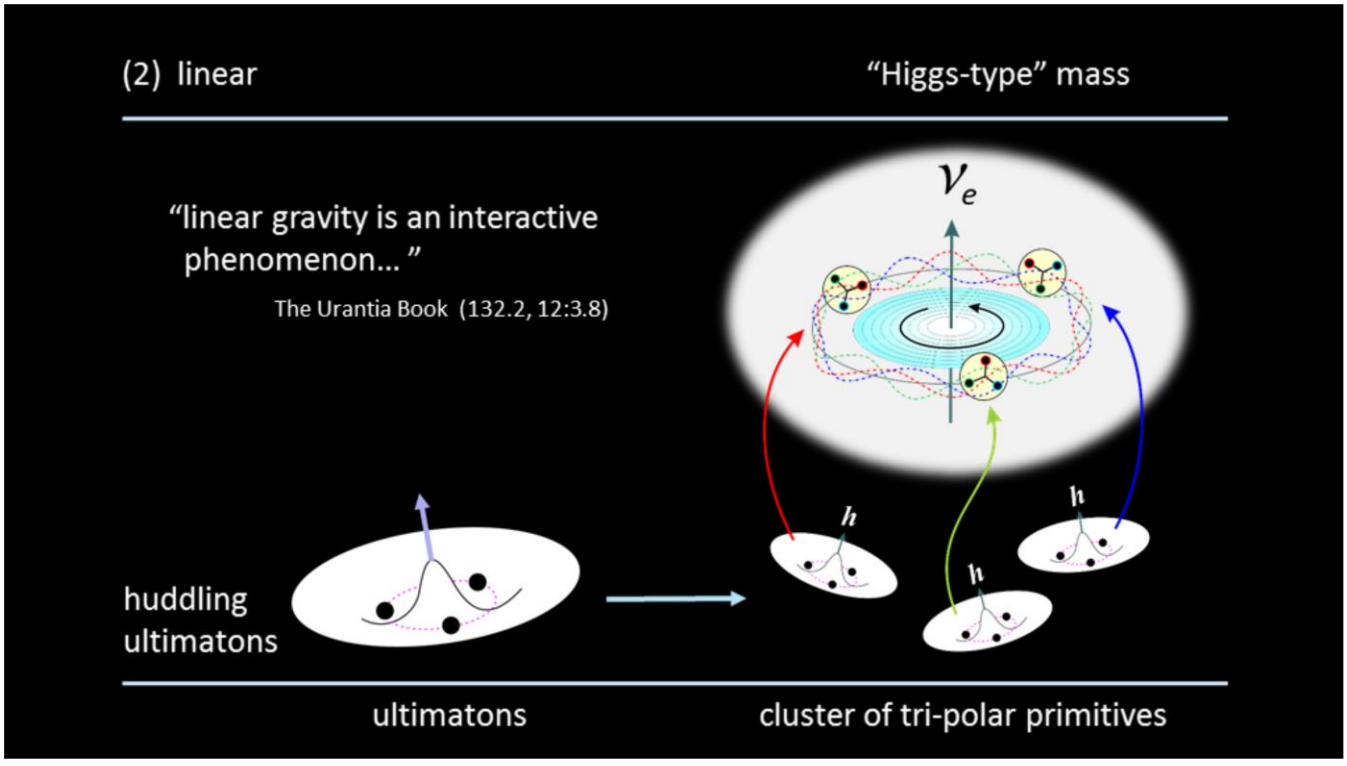
… to give a quantum property called **mass** to standard model particles.

Does the Urantia Book say anything about the mass of particles? If we think of mass as "response to gravity", then these papers describe two distinct types of "**gravity**" and "**response**".

The first is called "**absolute**" – a measure of absolute response to the [**source and center of gravity**]. It's this sort of mass that individual ultimatons are said to have.

So for example, if our building block has 3 ultimatons, and we build a tiny structure from three such blocks, then we have 3 x (3) ultimatons, or 9 units of **absolute**, ultimatonic response.

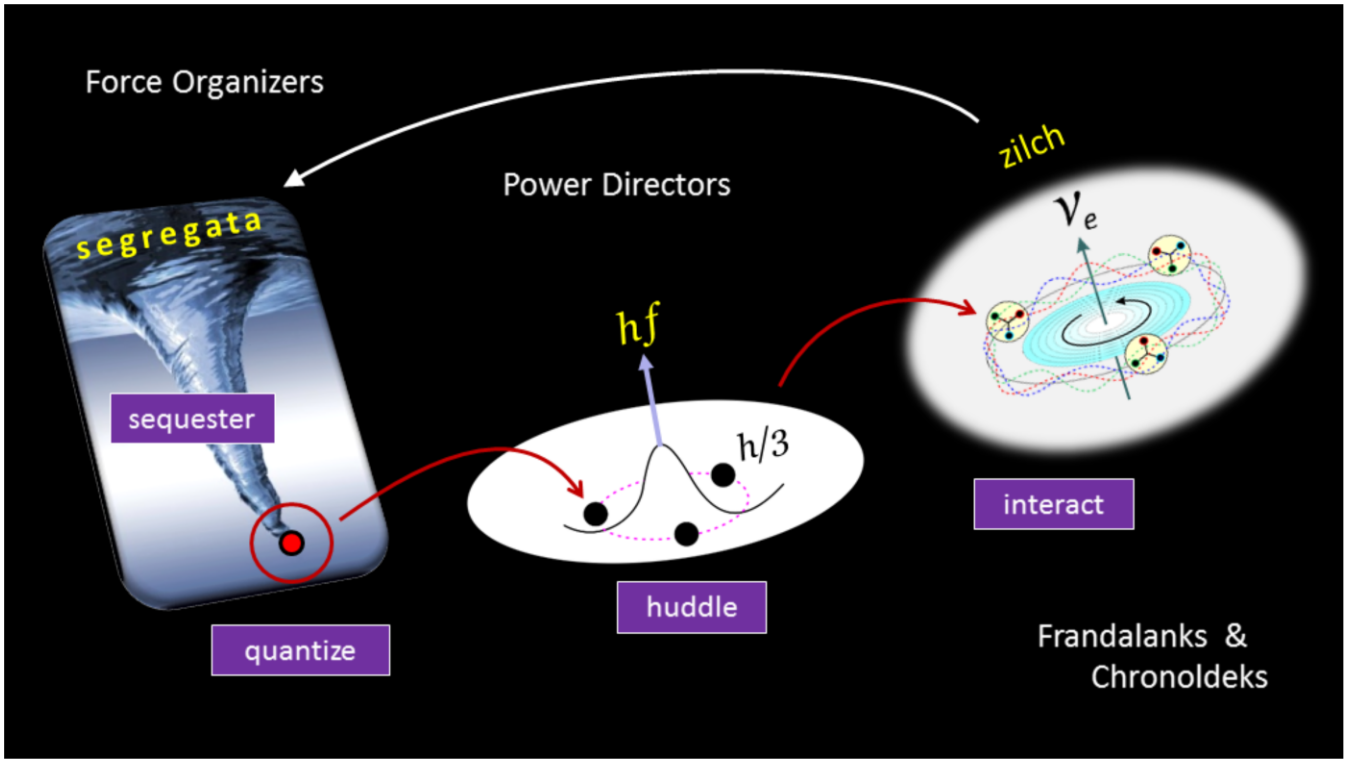
But in the standard model, this tiny structure will be interacting with zilch.



It's this **interaction** that induces a second type of mass, a second type of "gravity and response" which the Urantia Book calls "**linear**". (132.2, 12:3.8)

From paper 12 section 3: "linear gravity is an interactive phenomenon..."

It's precisely this second type of mass, this linear or **interactive** response, that the **Higgs mechanism** was invented to explain.



So here's (what seems to be) the Urantia Book story so far:

From transcendental **Force Organizers** to finite **Power Directors**, all the way down to **Frandalanks** and **Chronoldeks** embedded in space and time,

a condensate of space potency is sequestered… and quantized… and made to huddle. And then to interact with… the condensate from which it came.

The point is that if we're going to build standard model matter from ultimatons, we're going to need building blocks something like this.

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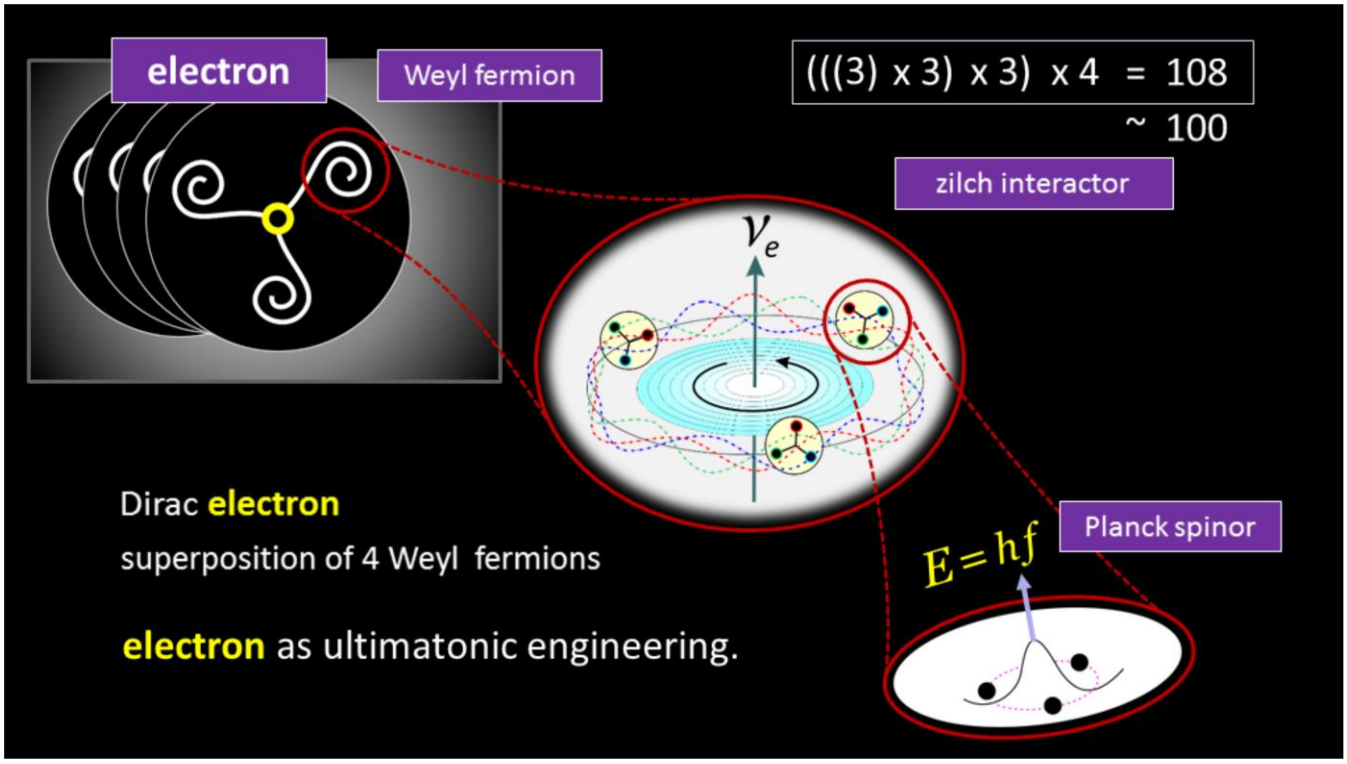
Ok, so we have hypothetical building blocks. What about the electron?

Paper 42 says electrons are built from 100 ultimatons. How might this work?



In the current standard model, the so-called **Dirac electron** is modelled as a superposition of **4 Weyl fermions** (or 2 pairs of 2).

In a Urantia Book scheme, we'd build these Weyl fermions from smaller parts, parts designed and tuned to **interact** with zilch.

And we'd build these interactive parts from Planck-scale things, our huddling ultimatons.

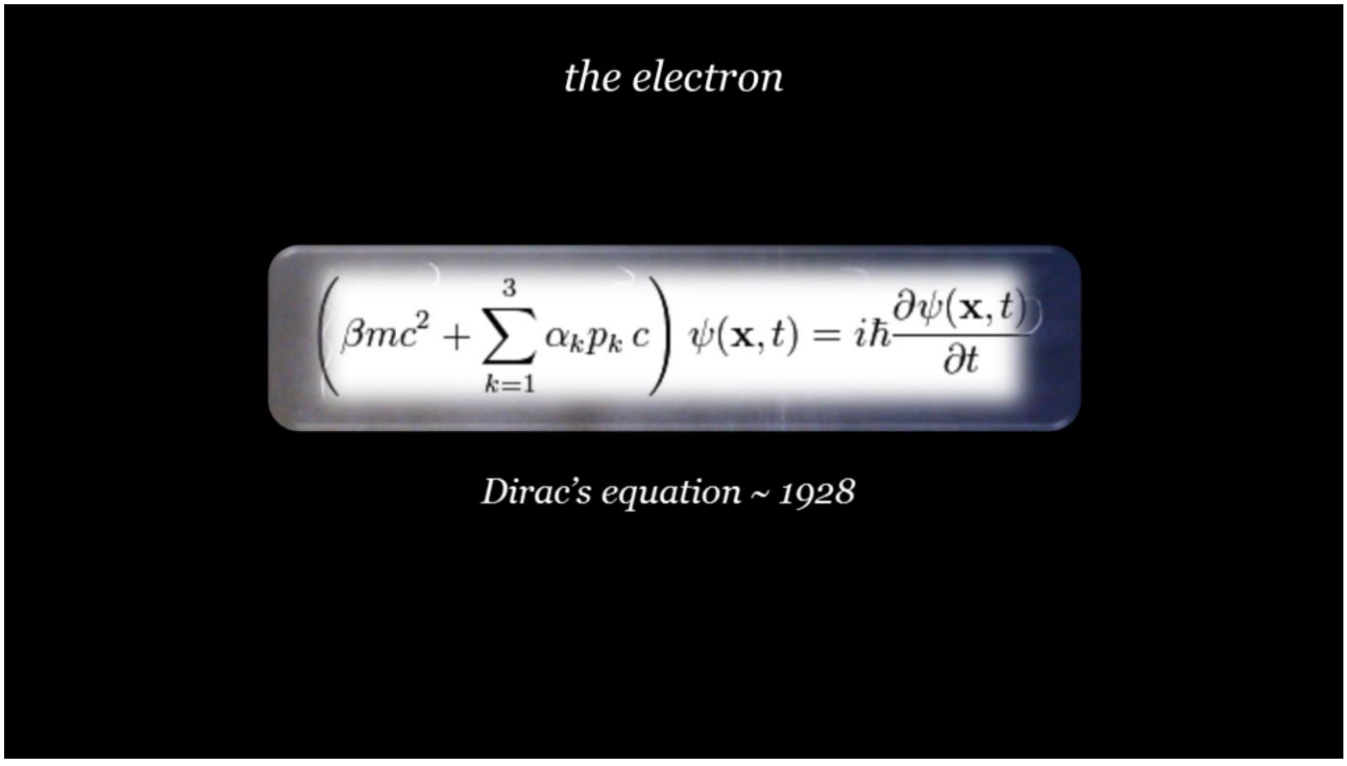
Now let's do the math: (((3) x 3) x 3) x 4 … = 108.

108 tiny units of absolute response. If we allow a few of these clusters to share dipoles and tripoles, like atoms in a molecule share electrons, then we can round this down to an even 100.

And there we have it, the electron as **ultimatonic engineering**.

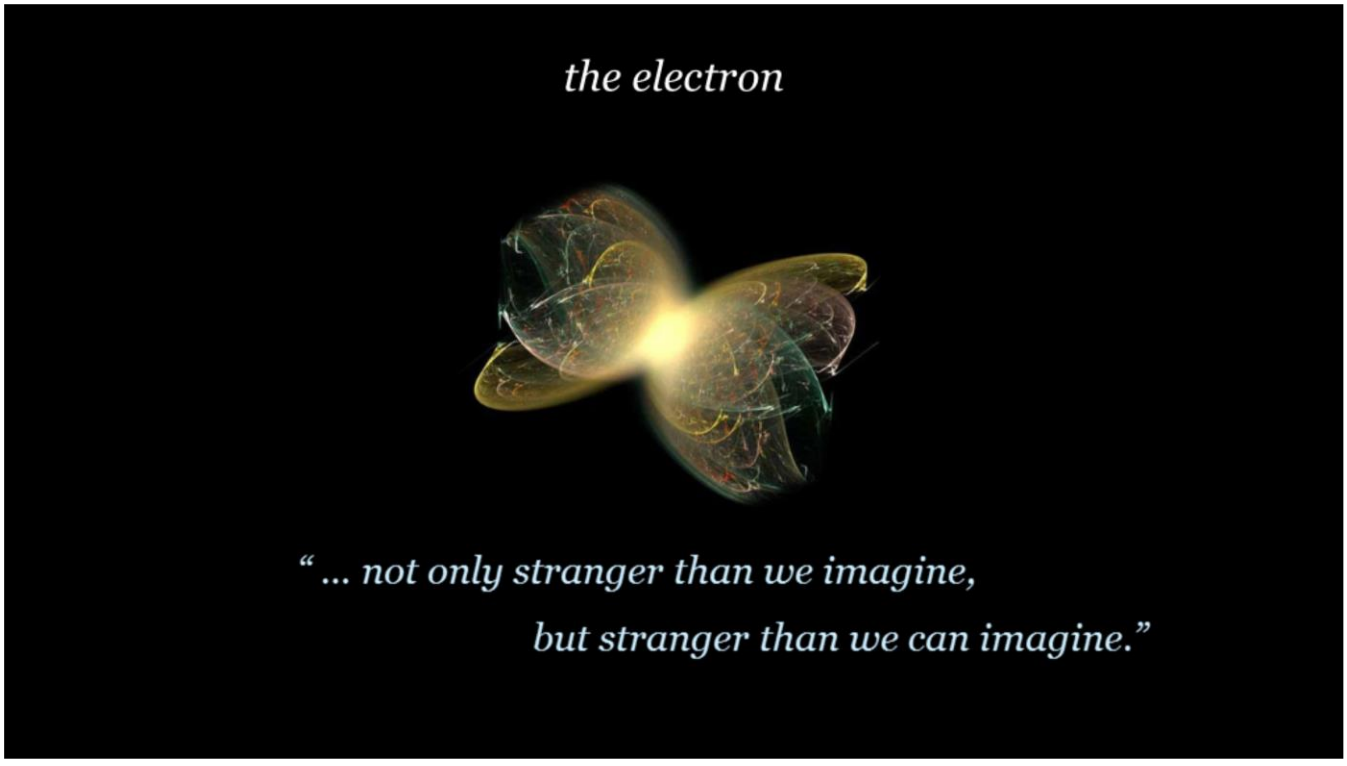
Of course the issue here is that such **ultimatonic engineering** implies design. Which may be something that physics is not yet ready to explore.

Nevertheless, does physics have room for a story like this?

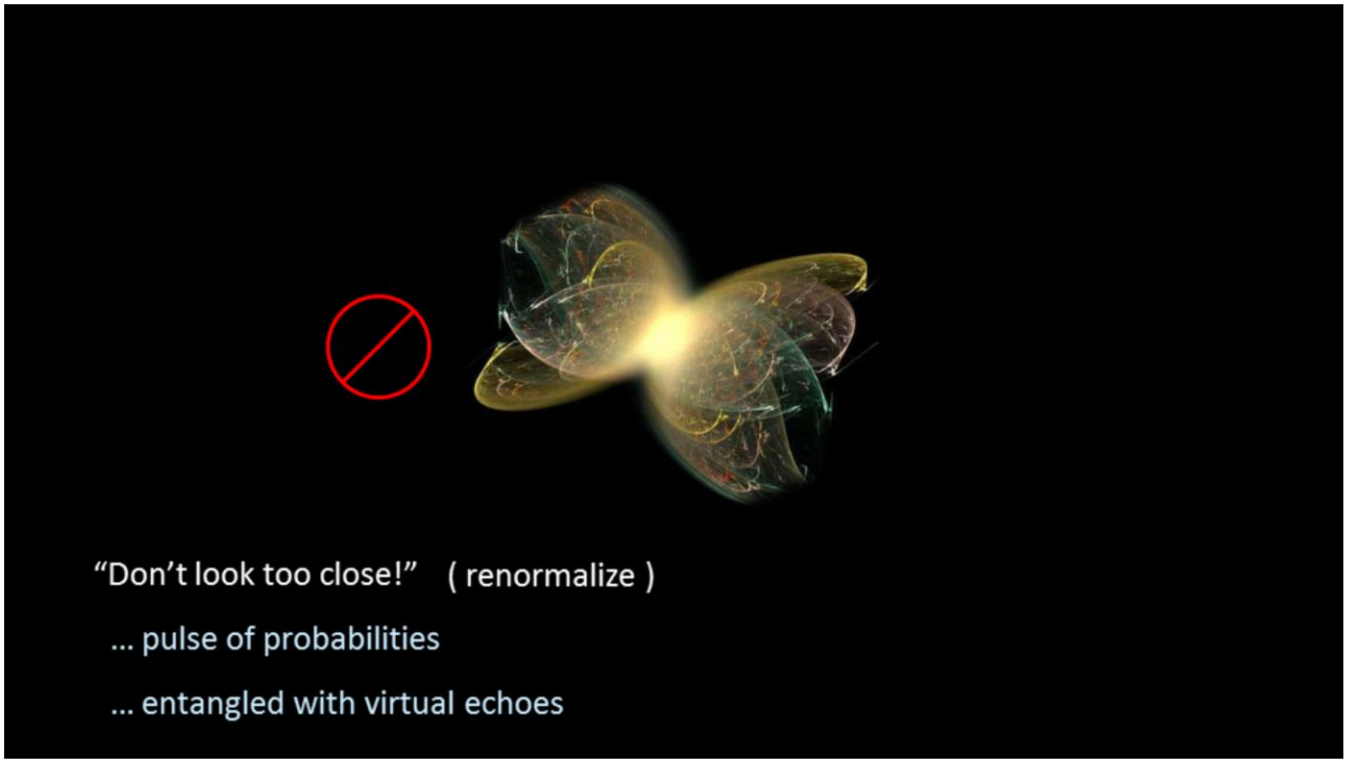


Think about Dirac's famous (1928) equation for the electron, which we still use today.

This equation tells us nothing about what the electron actually is, it simply helps us to predict (**with great precision**) certain values that we can expect to measure.



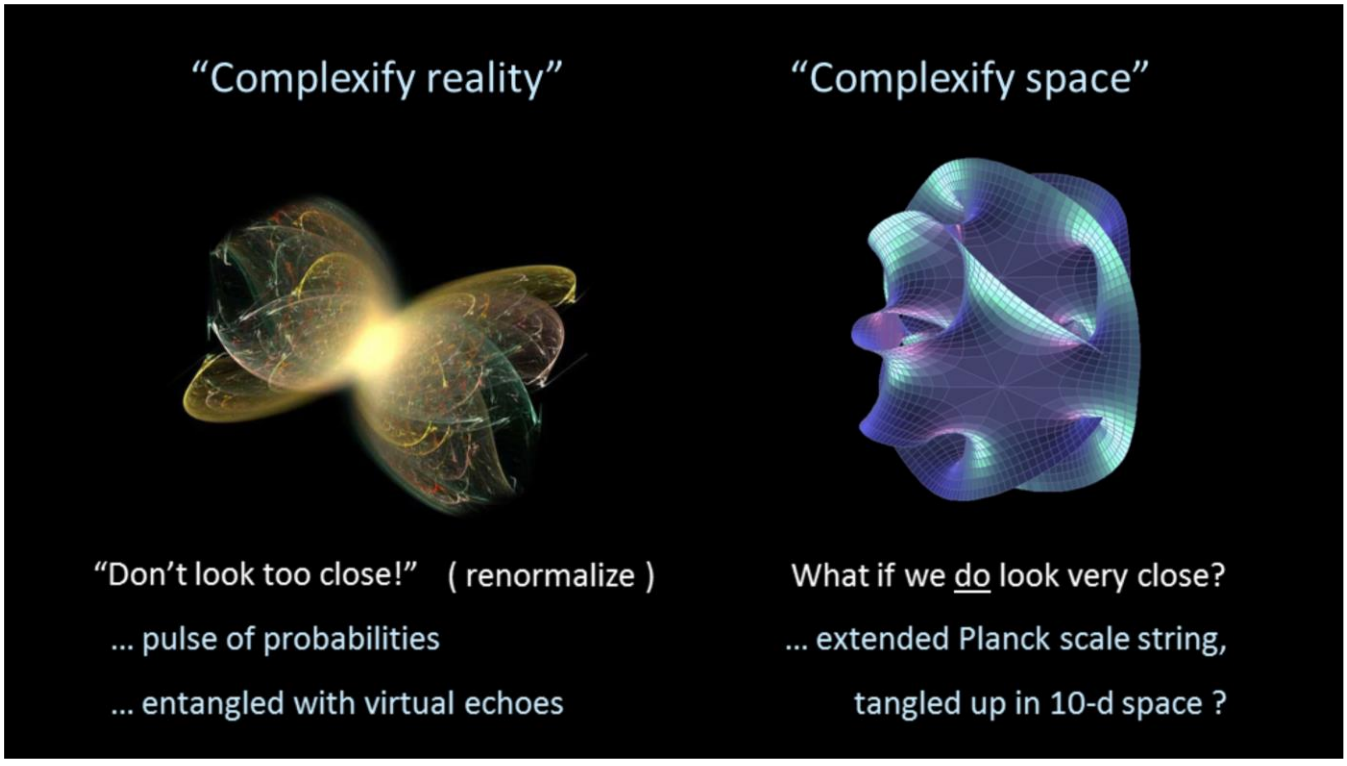
Which leaves plenty of scope for speculation…



The current **standard** view sees the electron as "**a point of charge**".

But this standard view comes with a rule: **Don't look too close!**

In this scheme, **reality itself gets slippery**. The electron becomes a pulse of probabilities, entangled with virtual echoes of itself.

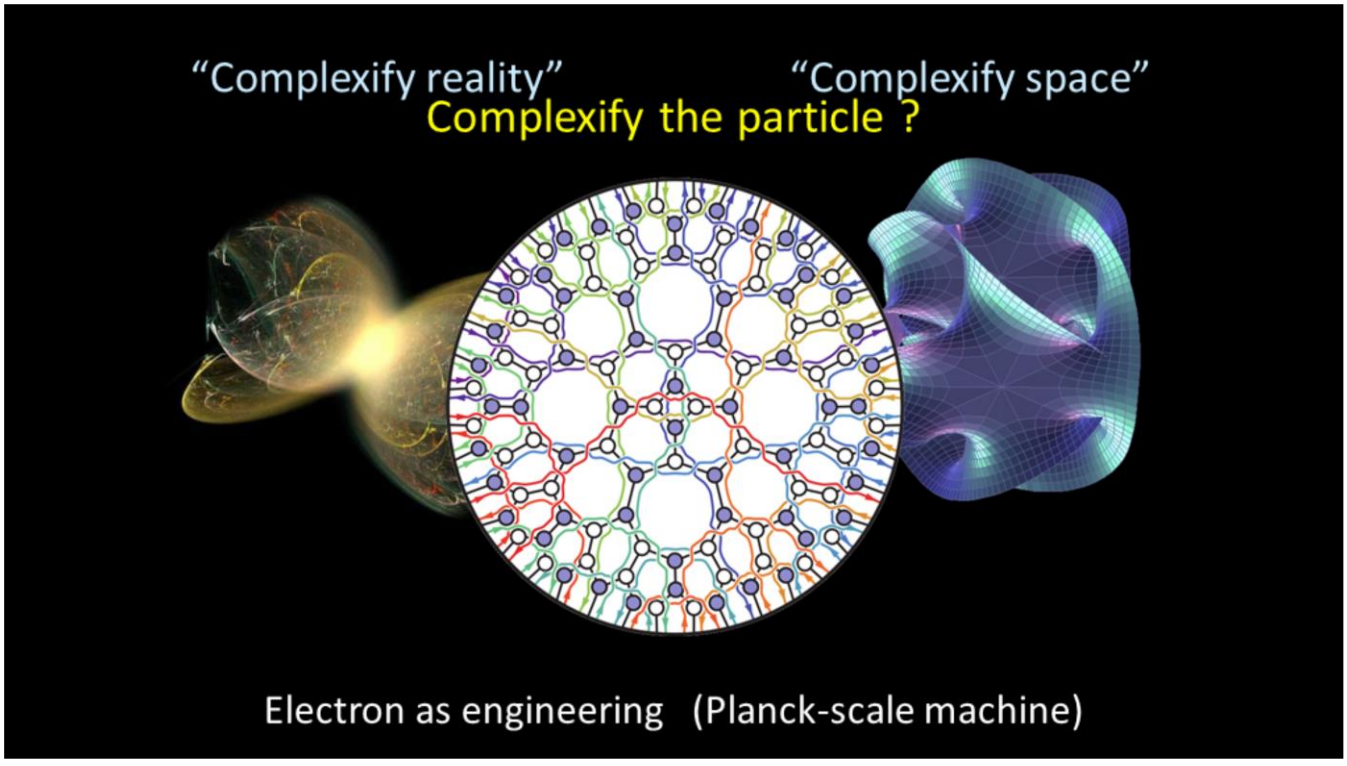


But what if we do look very, very close? Well, then things get weird. So weird that electrons **must** be something more than mere fluctuations in a field.

How about a Planck-scale **string**, tangled up in 10-dimensional space?

Of these two currently popular (and incompatible) schemes, one requires that we complexify **reality**, the other that we complexify **space**.

The Urantia Book offers a third possibility…



… complexify the **particle**.

In this scheme, the electron becomes a truly fabulous Planck-scale machine.

* * *

Remember how in paper 101 section 4, "**The Limitations of Revelation**", the author states that within a few short years, many of their statements regarding the physical sciences… "**will stand in need of revision**". (1109.3, 101:4.2)

"Will stand in need of revision."

So far we haven't attempted to revise the Urantia Book story. With regard to the nature of mass and matter, and expressed in modern terms, this – or something like it – is that story.

And quite a tale it turns out to be!

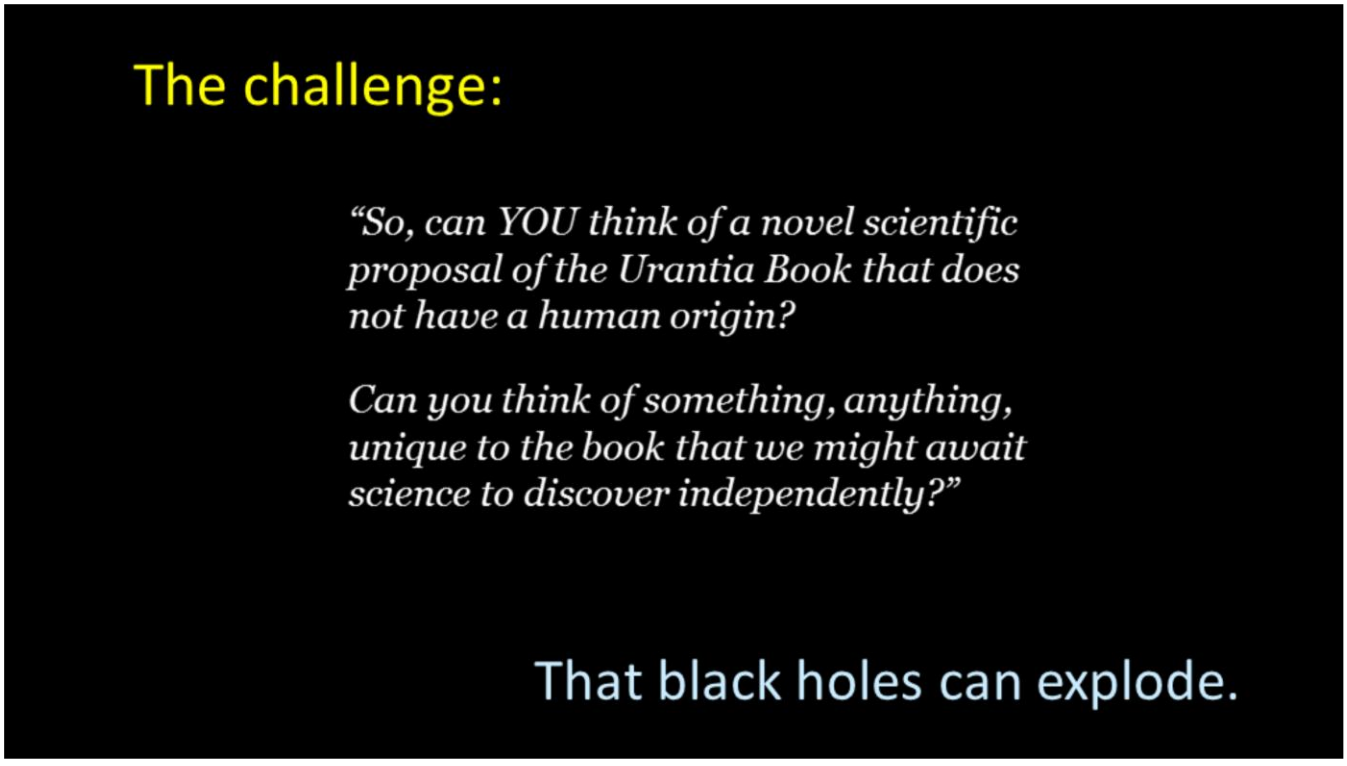
So much for mass and matter.

Let's now think what all this means for **dark islands**, and for **superuniverses**.

First, dark islands:

My interest in dark islands was stirred by a comment from a long-time reader of the Urantia Book. Like many of us, he started off quite impressed by their fabulous, "sci-fi" cosmology, and for 10 years, he "championed" so-called "Urantia Book science".

But over time, as his naïve assumptions and misunderstandings got undermined, his interest in this "scientific content" cooled off, prompting him to ask (what he thought was) a rhetorical question:



[The Challenge]:

> *"So, can YOU think of a novel scientific proposal of the Urantia Book that does not have a human origin?*
>
> *Can you think of something, anything, unique to the book that we might await science to discover independently?"*

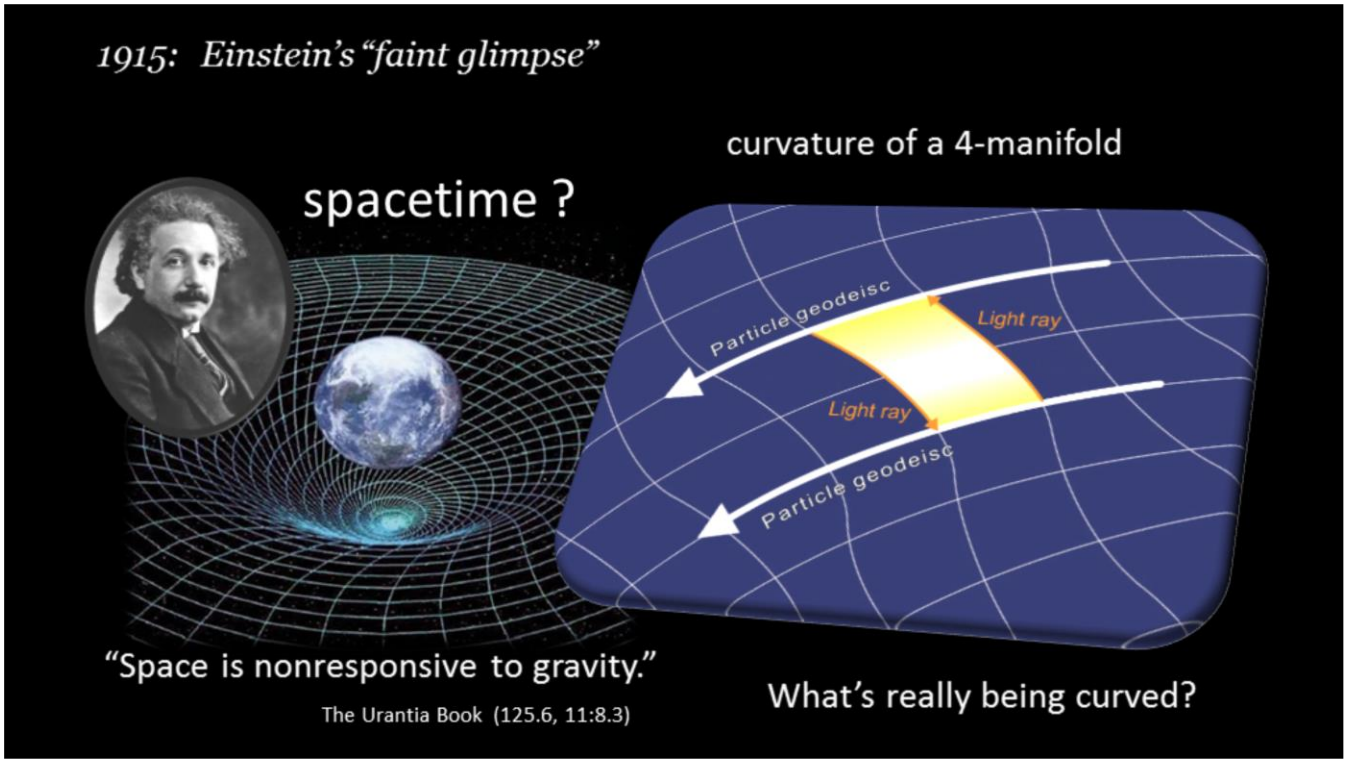
I could think of a few, but as a student of astrophysics, I'd become intrigued by one in particular. So I replied:

> *"Here's one: that black holes can explode."*

This caught him by surprise. He thought he knew a thing or two about black holes, and that they might be related to what the Urantia Book calls *"dark islands"*. But as everybody knows, *black holes do not explode*.

Besides, where in the Urantia Book does it mention exploding dark islands? His scepticism was undented, but his curiosity was aroused.

Let's take a look at what I mean.



In 1915, Einstein presented his "faint glimpse" (2078.8, 195:7.5).

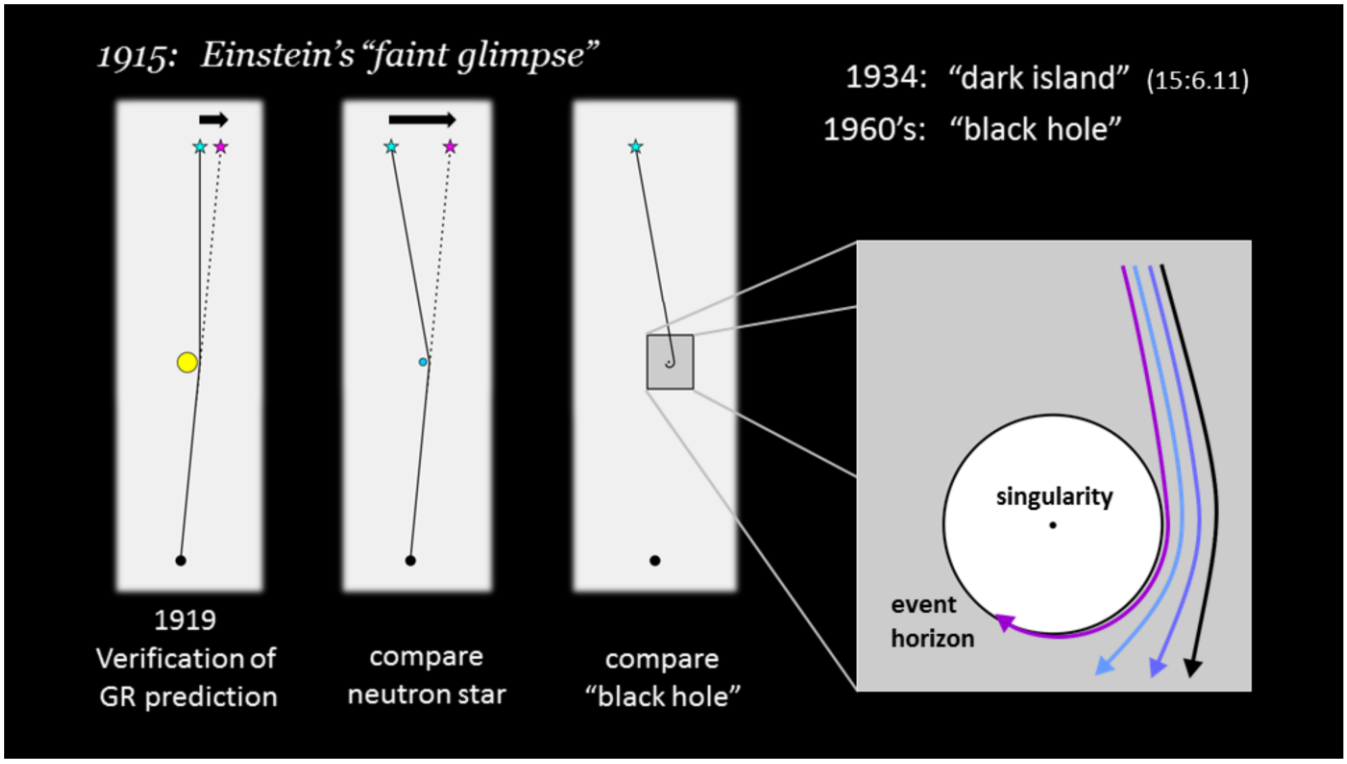
…the idea that (**one kind of**) gravity involves the curvature of a manifold in which particles and planets move.

Naturally, Einstein assumed this manifold must be space itself bound up with time, so the idea of **spacetime** was born.

But the Urantia Book upsets this simple view. From paper 11 section 8, [quote]: "**Space is nonresponsive to gravity**."

Hmm, if "**Space is nonresponsive to gravity**", we have to wonder, what's really being curved?

We'll get back to that. But first, how did science test this new idea, that gravity is related to curvature?



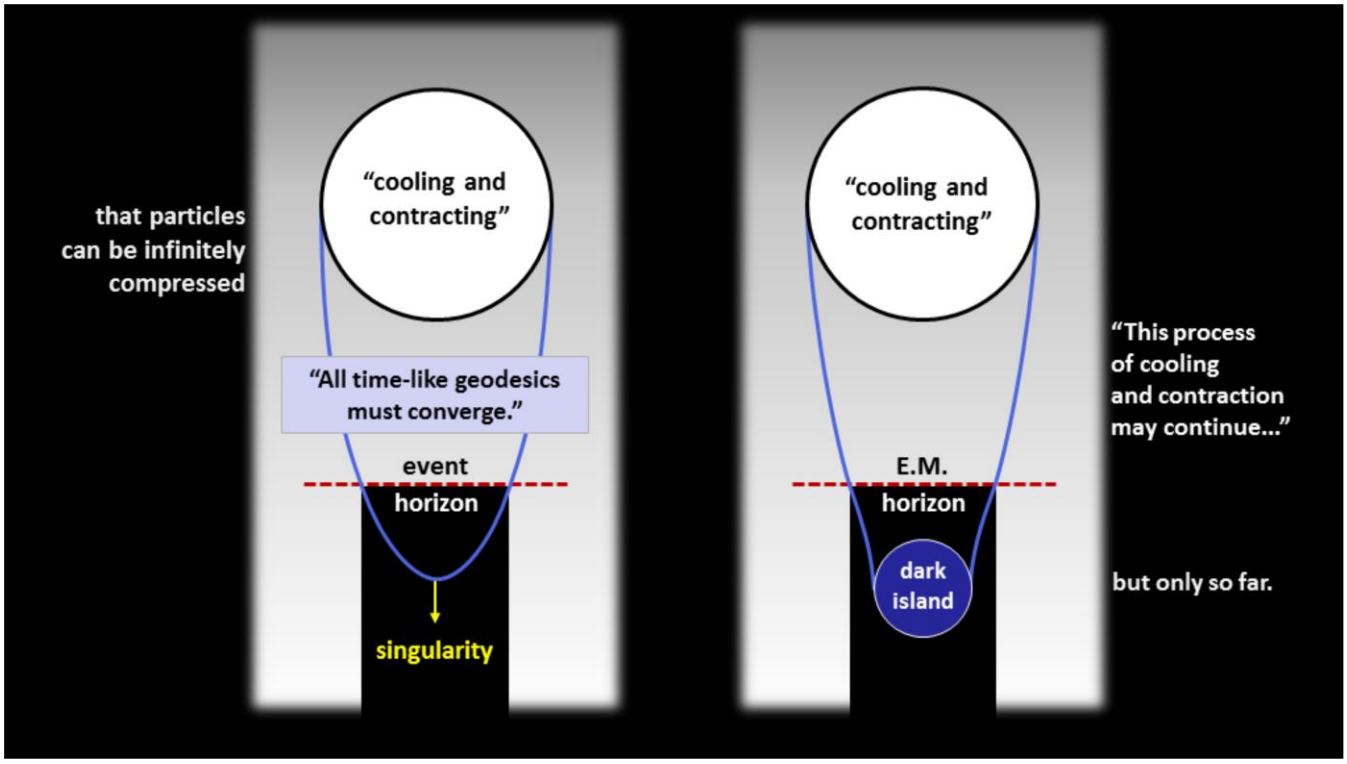
One prediction of Einstein's theory was that the mass of a star should bend (the path through space) of light. This means that during a solar eclipse, the position of stars near the sun should seem to shift. In 1919, this shift was measured, and found to match. It was this confirmation that forced scientists to take seriously Einstein's idea.

But this idea about curvature has implications: as a star cools, it contracts. As it contracts, its density increases, which should increase the local distortion of Einstein's spacetime. For example, the path of a photon passing near a neutron star could be quite sharply bent.

But if a cooling and contracting star has enough mass, something weird happens: it disappears! As the theory goes, if a contracting object shrinks below a certain size, an **event horizon** forms where light gets trapped, and the place where a star once was goes dark.

In 1934, the author of paper 15 referred to such collapsed objects as one type of "**dark island**" (15:6.11).

In the 1960's, when mainstream science got interested, they were given the catchy name "**black hole**".



The standard model view of this collapse depends on two assumptions:

1. that particles are nothing but fluctuations in a field,
   and thus can be infinitely compressed.

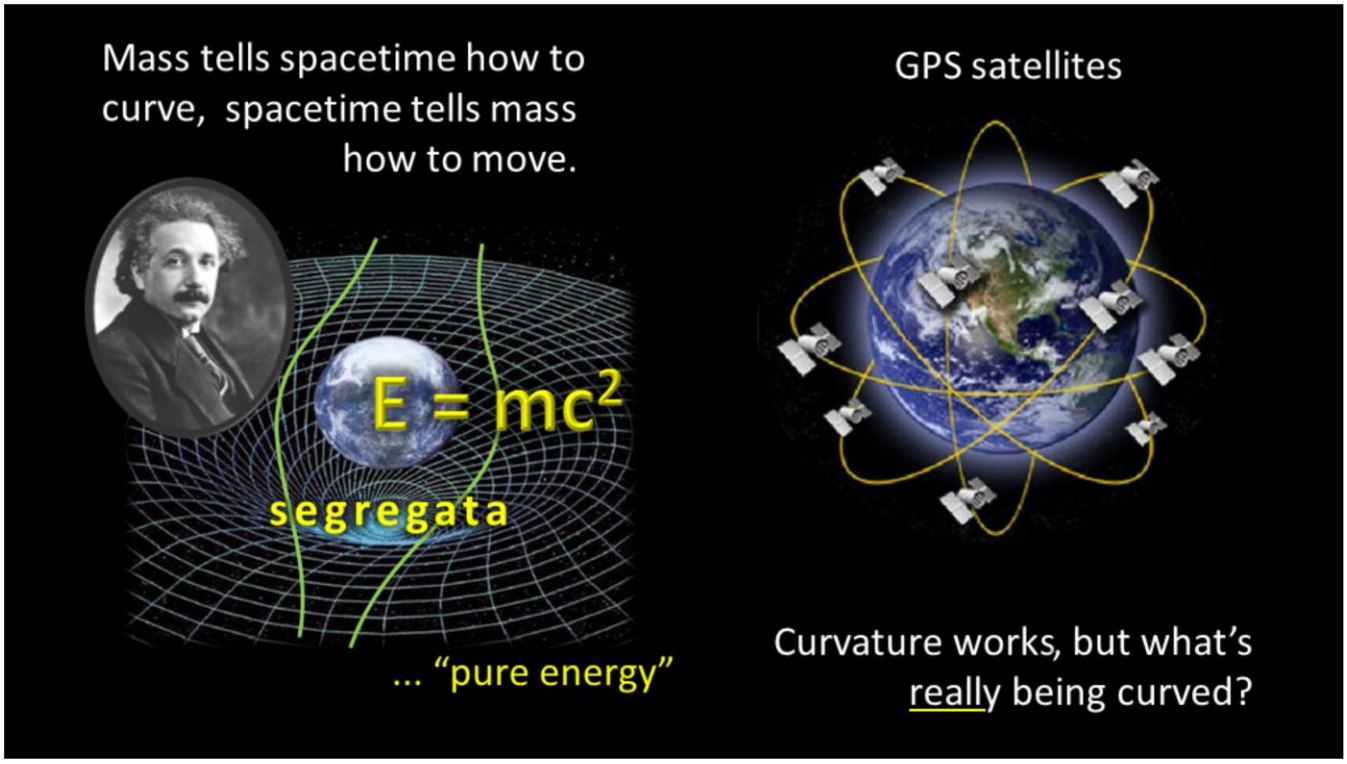
2. that since the manifold of space itself is being curved,
   all timelike geodesics must converge.

The Urantia Book story is different in two ways. First, regarding what happens when matter collapses, and second, regarding what's really being "curved". As they say in paper 41 section 3, this "process of cooling and contraction may continue…"

But only so far.

Notice that at a certain radius, an **electromagnetic** horizon can still form, where escape velocity exceeds the speed of light; such an object would neither emit nor reflect light. This is the idea behind the Urantia Book's "**dark island**".

But if "space is nonresponsive to gravity" (125.6, 11:8.3), the question is: what's really being curved?



First thing to say is that the **mathematics** of curvature **works**. And it works very, very well… as demonstrated by gravitational lensing, and as confirmed every day by the satellite navigation system.

It's this excellent match – of measurement with theory – that's led science to accept Einstein's geometrical view, that gravity is caused by mass curving space and time. As professor John Wheeler used to say, "mass tells spacetime how to curve; spacetime tells mass how to move."

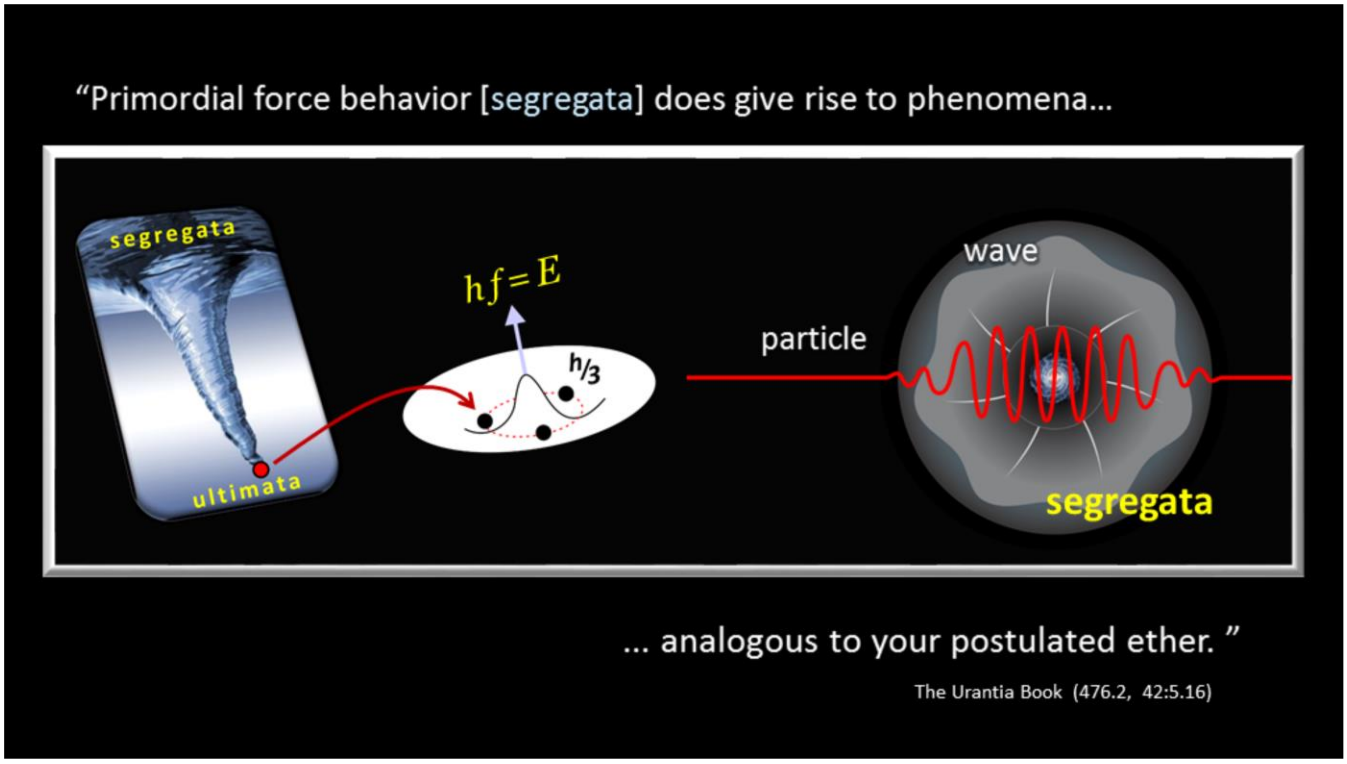
But Einstein discovered something else: **E = mc^2**. So when we say "mass tells spacetime how to curve", we're really talking about **energy**, and variations in the **distribution of energy** in space.

And let's not forget that segregata is also called "**pure energy**".

(126.1, 11:8.5), (469.9, 42:2.9)

So curvature works, but what's **really** being "curved"?

Let's take a peek behind the curtain.



As we saw earlier, in the Urantia Book scheme everything we can measure is built from ultimatons, and ultimatons are condensed from segregata.

But **galaxies** are embedded in a cloud of this same segregata, so it seems reasonable to expect some… interaction between [**this**] "frozen segregata" (or ultimatons), and [**this**] raw segregata, this halo of "primordial charge".

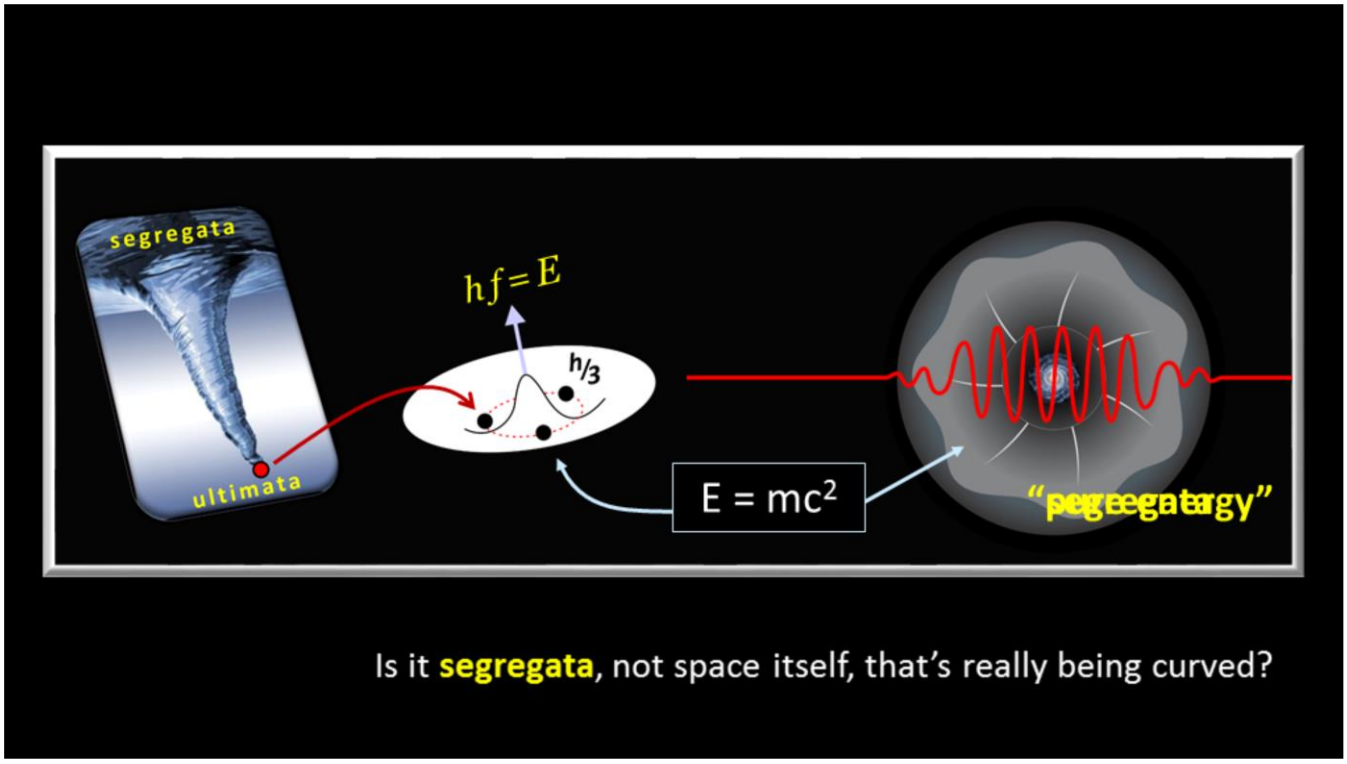
And sure enough – when crossing through open space, "particles of light" are said to "proceed in direct lines". But when ploughing through this "force blanket" of segregata, these tiny bullets start to wiggle, and we measure them as waves. (475.10, 42:5.14)

Notice what's just happened: segregata becomes a medium in which **particles of light appear to wave**. From paper 42 section 5:

"Primordial-force behavior [**segregata**] does give rise to phenomena which are in many ways **analogous to your postulated ether**." (476.2, 42:5.16).

"Analogous to your postulated ether." A medium in which particles of light appear to wave.

For scientists, this may be one of the most interesting lines in the book.



Notice something else: there's a lot of energy (**or mc^2**) locked up in here [**these ultimatons**]. And in here [**this cloud of segregata**].

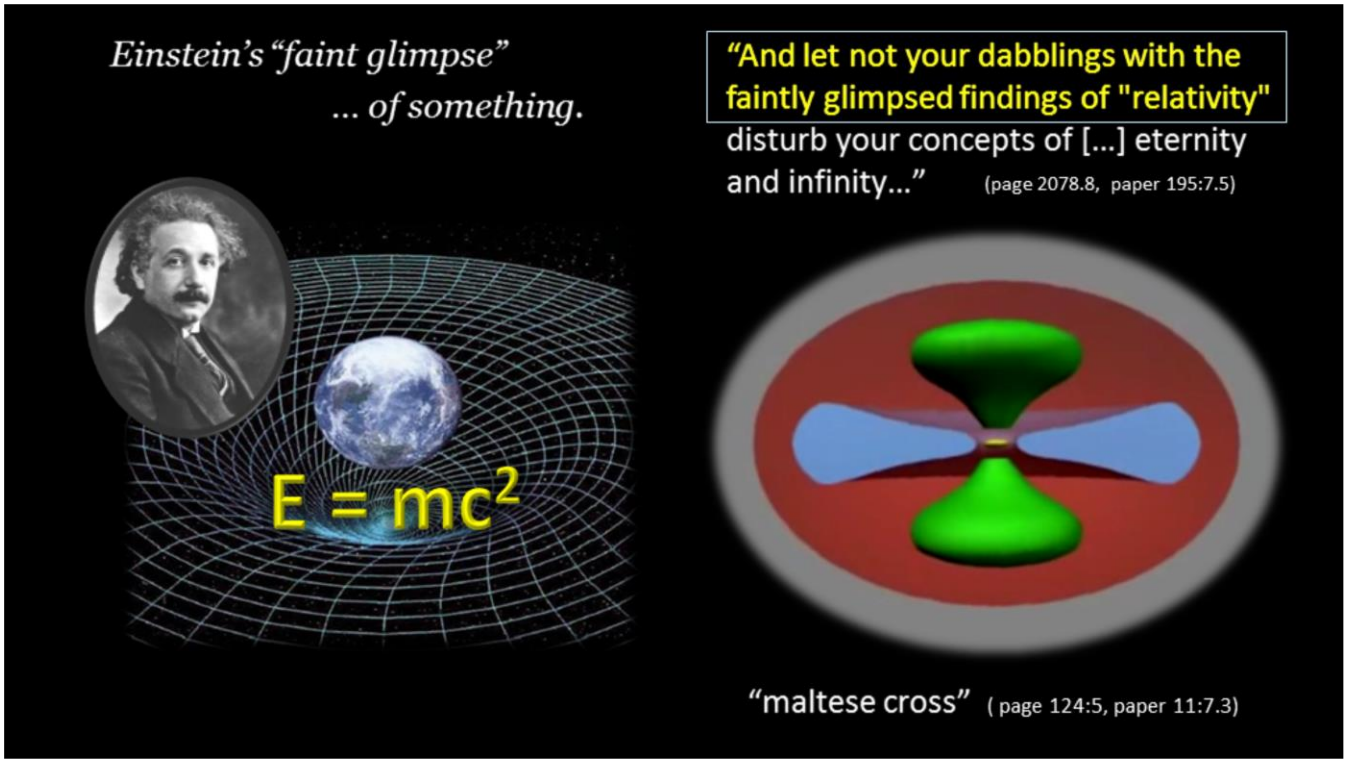
Remember, segregata is also called "**pure energy**".

But if "pure energy" or segregata can function as a medium in which particles of light appear to wave, could it be that the local distribution of segregata, not space itself, is what energy-mass can "curve" and distort?

That's worth repeating:

> Is it the **distribution of segregata**, not space itself,
> that's really being curved?

If "**absolutely ultimate**" space is "nonresponsive to gravity", and if segregata is the medium in which particles of light appear to wave, what does this mean for Einstein's ideas, about light and space and time?



It means that the factors affecting a photon's path through space may be only faintly glimpsed in Einstein's relativity. As they say in paper 195 section 7,

"And let not your dabblings with the faintly glimpsed findings of 'relativity'… " (2078.8, 195:7.5)

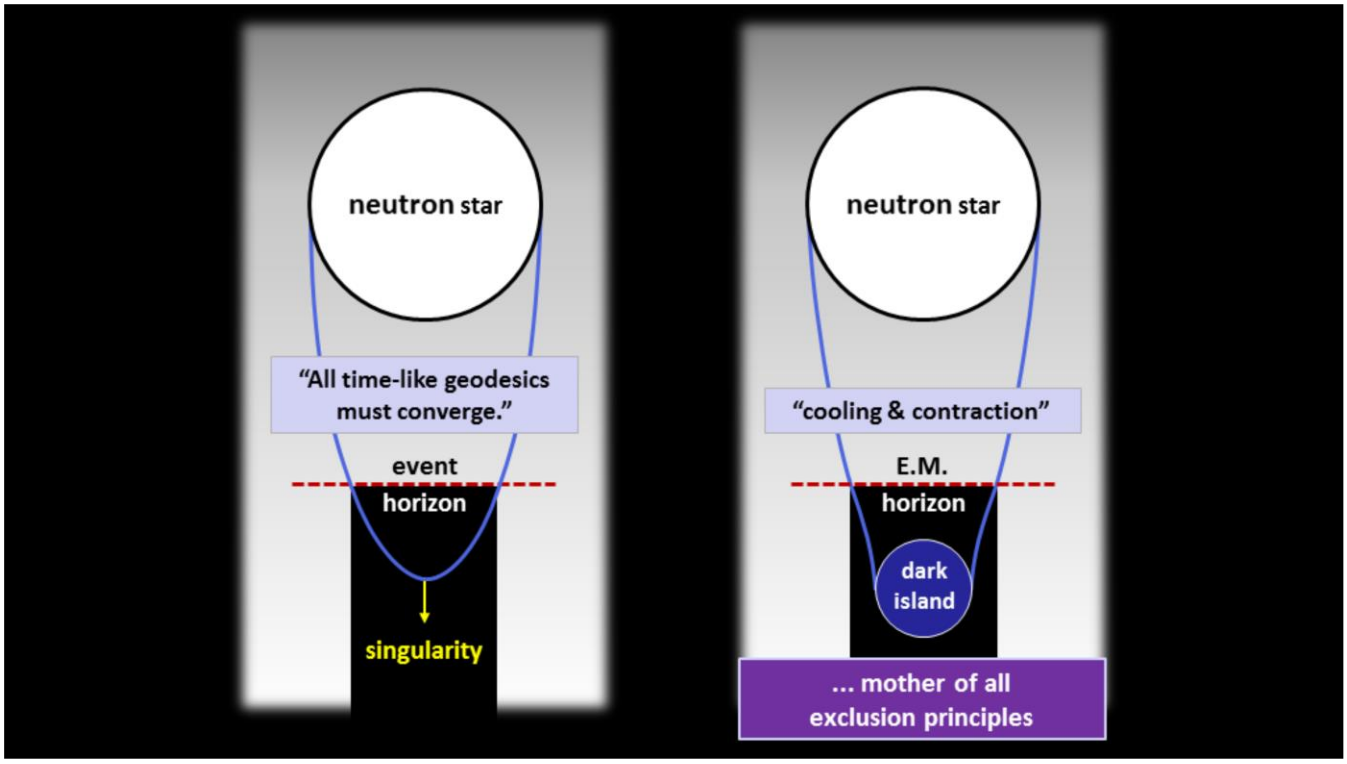
To me, this comment implies that Einstein's "**faint glimpse**", his ideas about light and space and time, were a faint glimpse of ***something***. But that **something** may be far more complex than Einstein assumed.

For example, here's a 30-second glimpse of some of the "curvatures" involved [**Movie: master universe space**]

Here's that **rotated Maltese Cross** from paper 11 section 7, and a cycle of **space respiration**. As you can see, we'd need more than Einstein's faint glimpse to accommodate this.

Here, spacetime becomes a low-dimensional manifold, in a more than finite space.

So what does all this mean for black holes and dark islands?

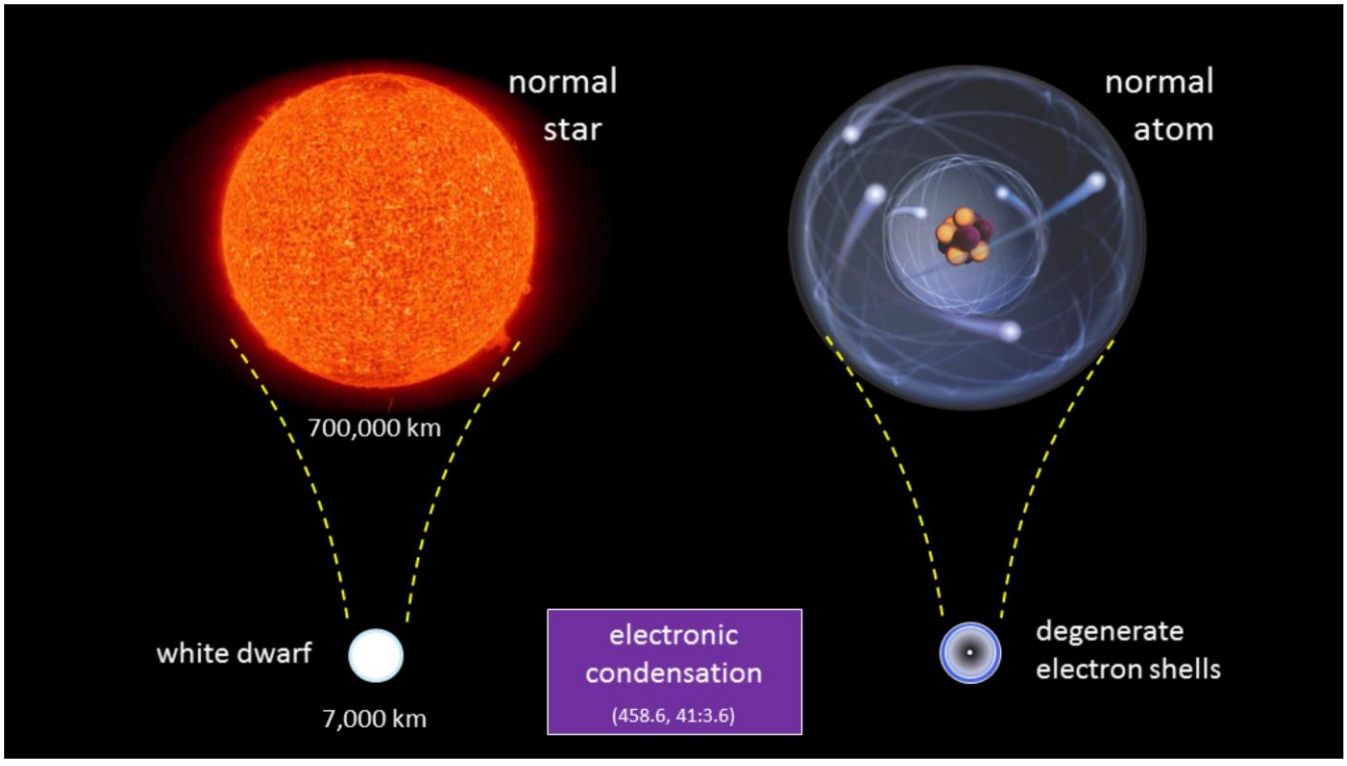


It means that certain standard model assumptions – about particles, and space, and singularities – "ain't necessarily so".

On the other hand, if "this process of cooling and contraction" can be stopped, allowing dark islands to form, then we face a question: how does nature stop the collapse of a collapsing neutron star?

The Urantia Book adds something that can do the job, something I like to call "**the mother of all exclusion principles**".

Let's take a closer look at this "process of cooling and contraction".



After a normal star like our Sun burns up its fuel, its starts to cool and contract.

But normal stars can "**cool & contract**" only so far, ending up as white dwarfs.

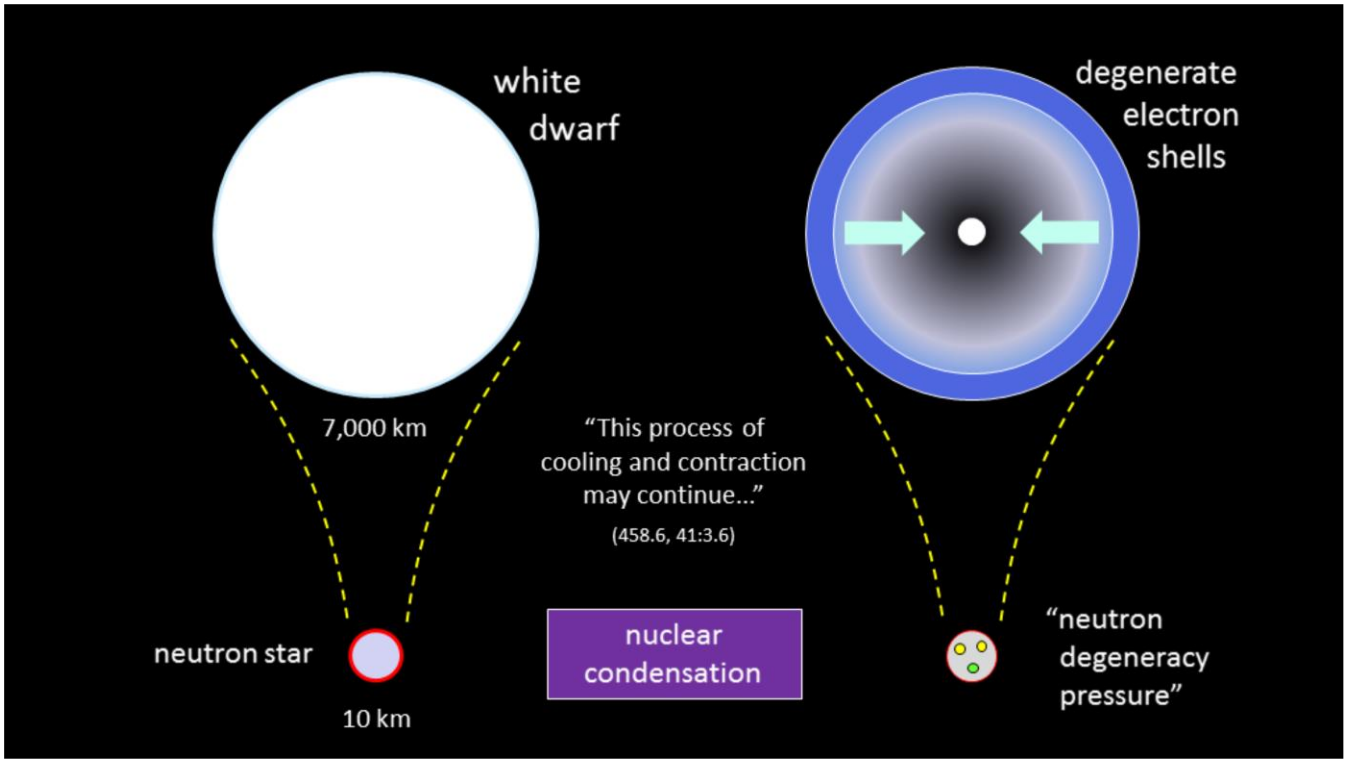
What happens is that as this ball of gas starts to **cool**, gravity squashes the atoms closer together, and the star begins to shrink. As it cools some more, electrons are forced closer to protons, and the atoms themselves start to shrink. At this point, a quantum **exclusion principle** kicks in and stops the collapse.

In paper 41, this process is called "**electronic condensation**" (41:3.6)

The idea is that "basic material units" are being brought "closer and closer together".

Worth pausing to consider what's just happened: something the size of the Sun has collapsed down to something the size of the earth.

Ok. Now what if we add **a little more mass** to this cooling and contracting star?



If we add a little more mass, then (from paper 41):

"this process of cooling and contraction may continue…"

If this dying star weighs more than about 1.4 times the mass of our Sun, then gravity wins. Gravity overwhelms the electron pressure and squashes this mass of atoms into a **ball of neutrons** only 10 km across: a **neutron star**.

Once again we have "basic material units" being brought "closer and closer together".

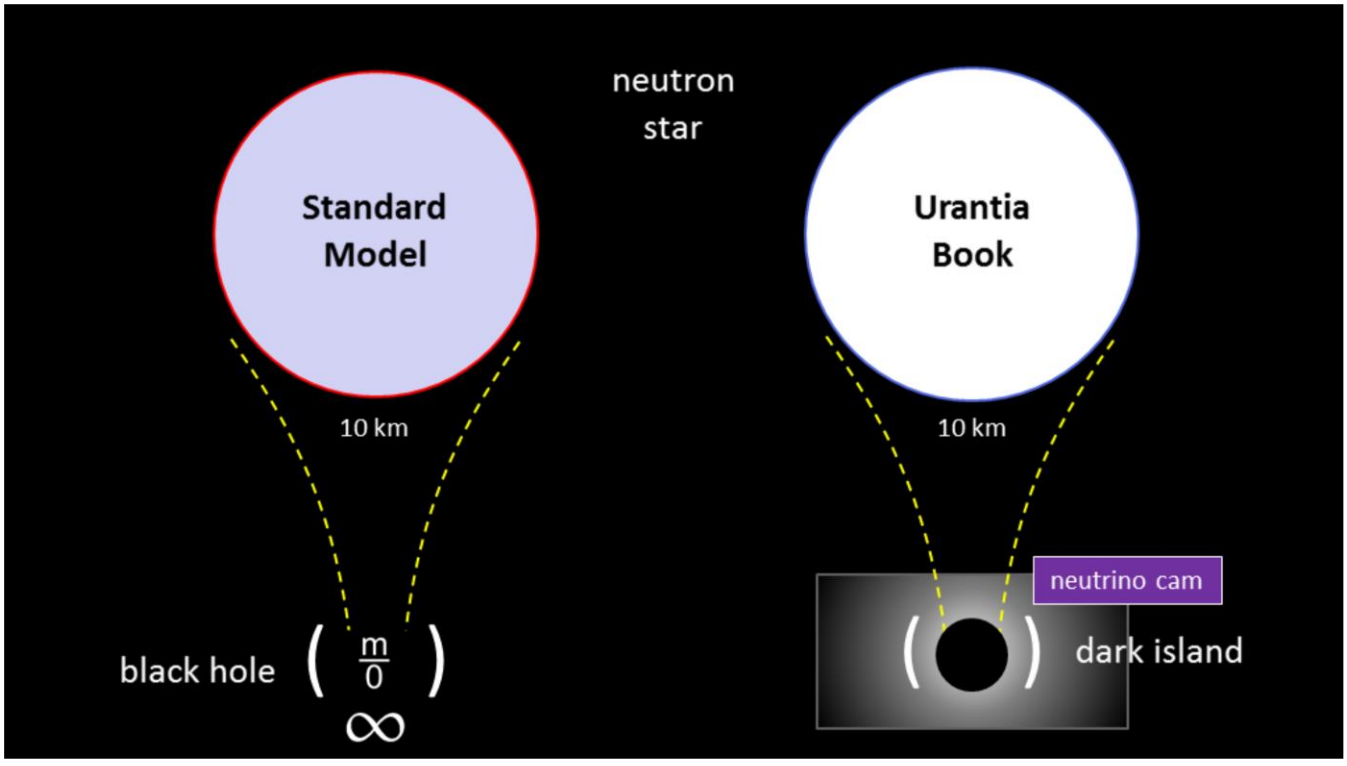
Once again, the collapse is stopped by an **exclusion principle**.

We might call this "**nuclear condensation**"

The story so far:

- A **white dwarf** is what you get when the entire mass of a normal star gets squashed into a volume the size of the Earth.

- A **neutron star** is what you get when **even more mass** is squashed into a volume only 10 km across – the size of a small city.



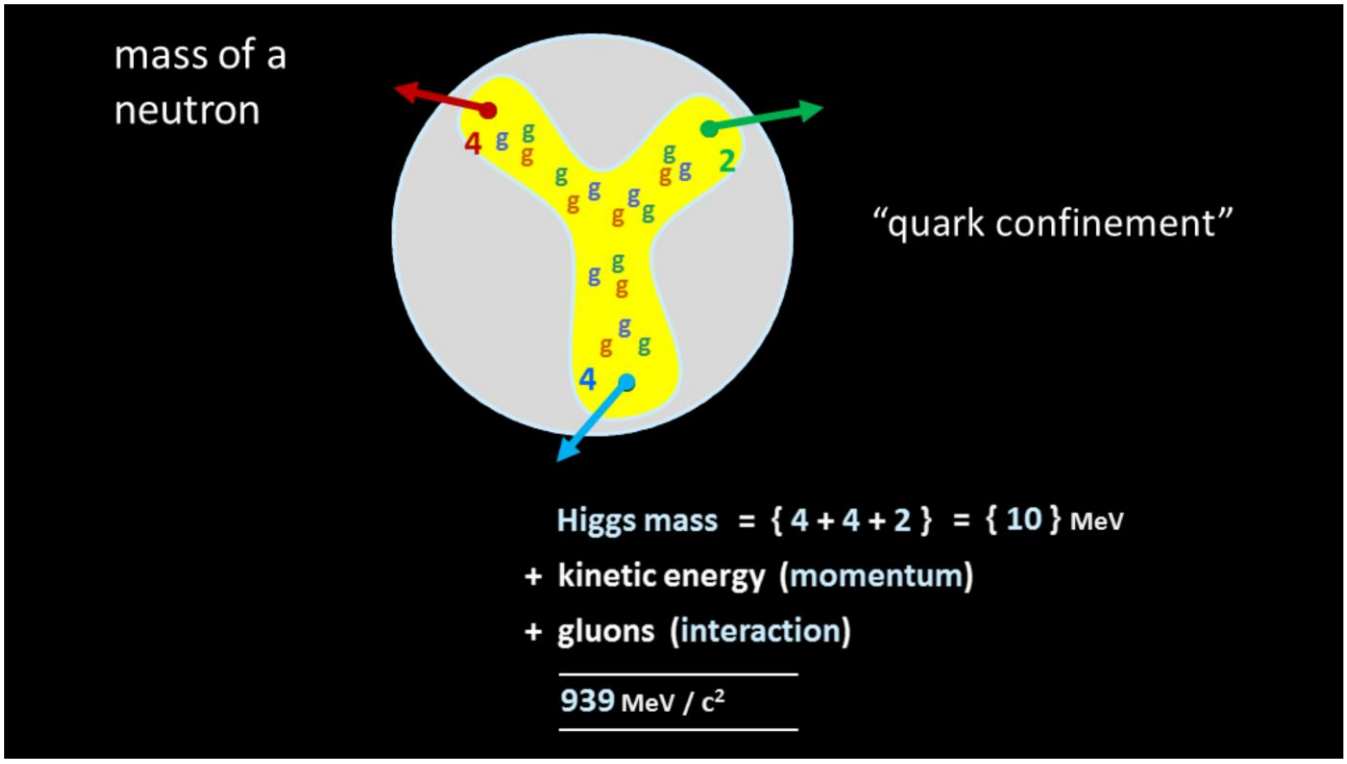
Which brings us to the cutting edge of physics.

Our “standard models” can handle neutron stars. After all, they’re just a bunch of neutrons, packed very, very tight. But if we add a little extra mass to our cooling and contracting ball, then gravity wins, again. Core temperatures jump to over a **billion degrees**, and the neutrons start to melt.

Here’s where both our standard models fall short. Quantum field theory has no way to stop the collapse, so it predicts infinite density. And the way cosmology measures space [the metric] simply fails.

But the Urantia Book implies that the collapse of a collapsing neutron star can be stopped, allowing a dark island to form.

Since this collapse depends on **gravity and mass**, let’s take a closer look at what happens to this **mass** as those neutrons start to melt.



In the standard view, neutrons are robust little bags that contain three quarks.

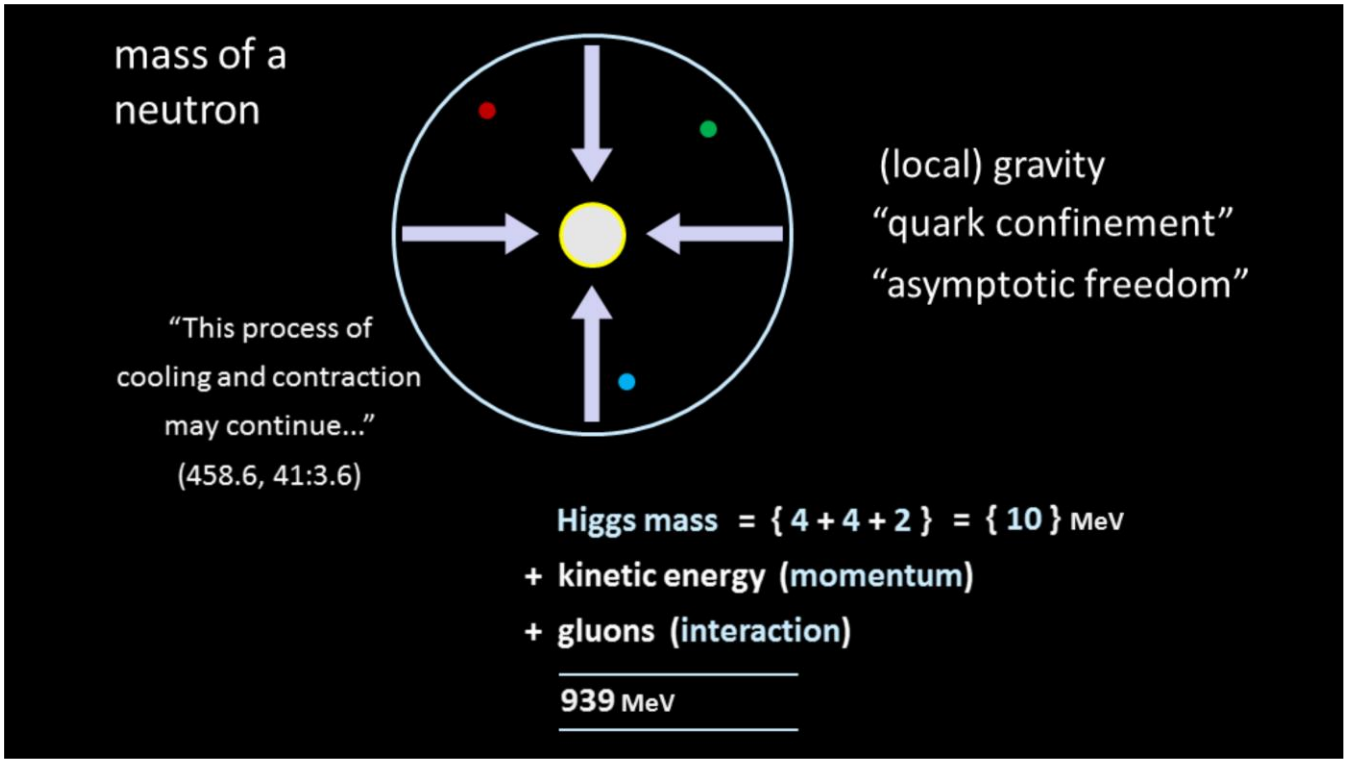
The standard model mass of such a bag is about 939 MeV/c^2.

Let's call that "**939** units of standard model mass".

But the mass these quarks get from the Higgs mechanism is tiny, only about **10** of these units of mass. That's **only 1 %** of the neutron's measured mass. Where does all the extra mass come from?

It's thought to come from two things: (1) the momentum of the moving quarks, and (2) the weird glue that keeps the quarks together. When we add up all the energy involved, we get those 939 units of "**mass**/**energy**".

It's this weird "nuclear super-glue" that imposes something called **quark confinement**: as the velocity of the quarks pulls them apart, extra glue appears to pull them back… like an unbreakable rubber band.



But the standard model has another surprise: **asymptotic freedom** (Nobel Prize, 2004).

When a neutron's quarks are close together, there's no need for all that glue, so that cloud of virtual gluons… disappears.

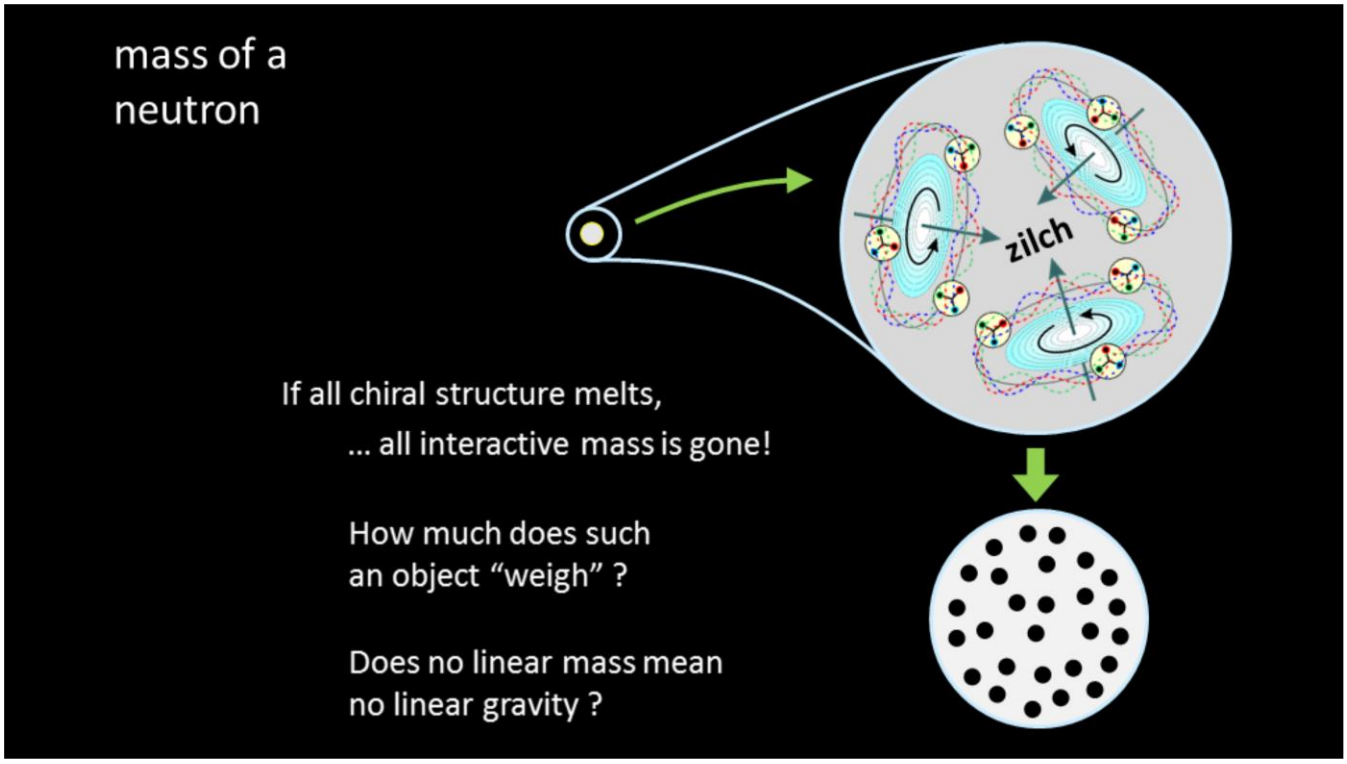
Think what this means if local, linear gravity can replace the need for gluons to confine the quarks. In other words, let gravity confine the quarks instead of glue.

But then all that **interactive** mass, from the self-interactions of a cloud of virtual gluons… **disappears** !

And as the range for the quarks to move becomes constrained, so too their momentum… **disappears** !

Ok, so if the momentum and gluons disappear, what's happened to the mass of this tiny, compacting ball? Good question!

And as this "process of cooling and contraction" continues, what's going on inside?



In the Urantia Book story, this tiny structure would still be filled with those clusters of huddling ultimatons. And remember, it's these clusters that interact with zilch.

So here's something to think about: if these tiny structures melt, there'd be nothing left for a Higgs-type mechanism to flip. Meaning… **all** that interactive mass is gone.

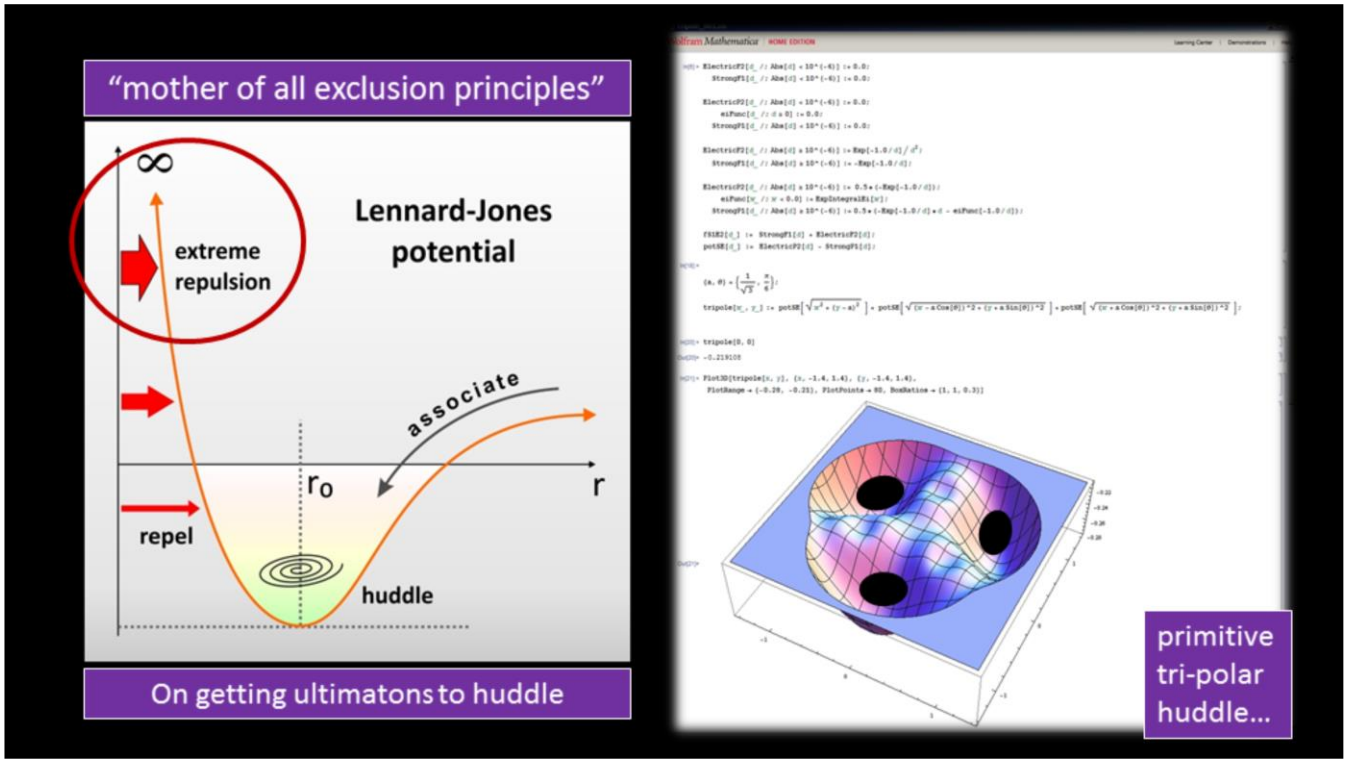
Which raises a question:

As this cooling and contracting ball approaches the "**limiting** and **critical explosion point** of ultimatonic condensation", if all the so-called interactive, or linear mass is gone, how much does such an object weigh?

And if "**no linear mass**" means "**no linear gravity**", what local force is left to confine the agitated - absonite - attributes of all those ultimatons?

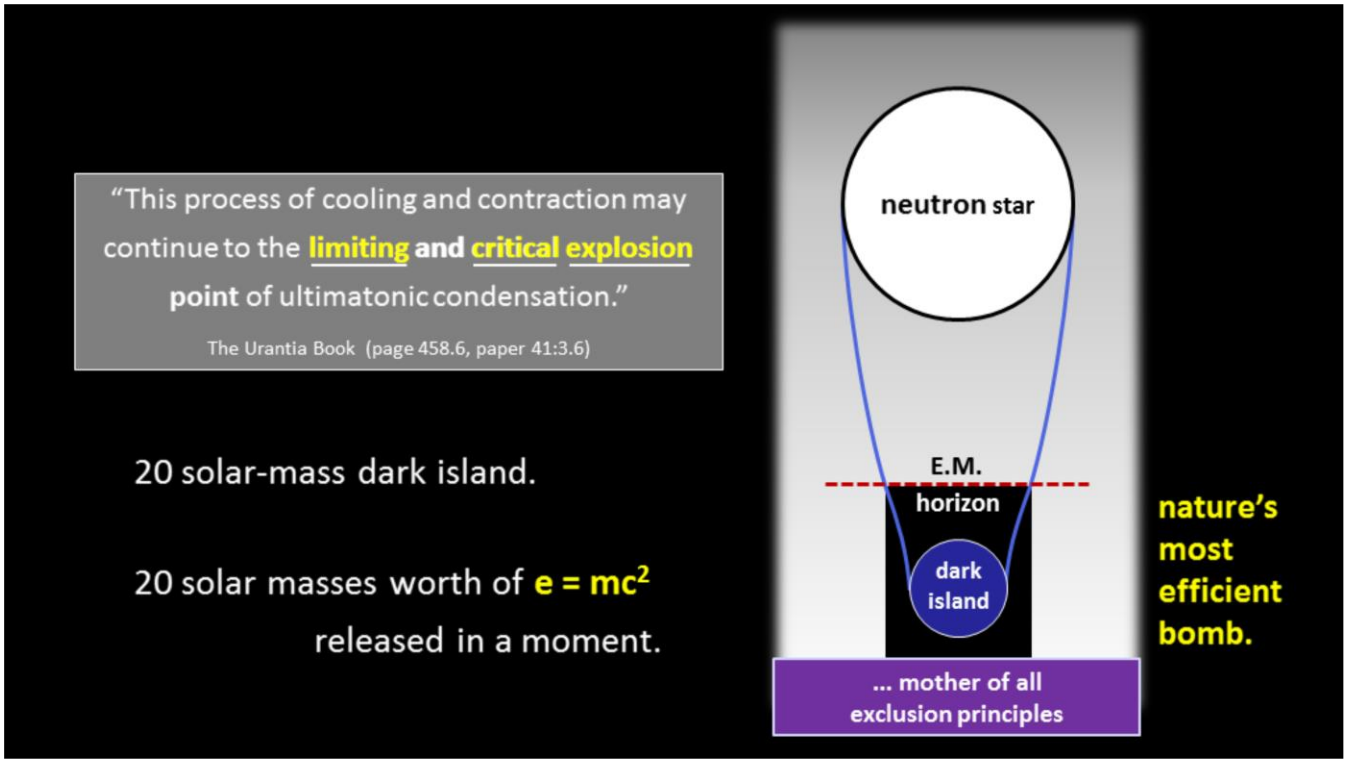
Remember, in the Urantia Book story, ultimatons are not mere "abstract fluctuations".

They are a condensate of a condensate of space potency.



Here let’s recall that “**ultimatonic exclusion principle**”:

The idea is that if ever the **absonite attributes** of these huddling ultimatons start to overlap, this extreme repulsion, this “mother of all exclusion principles” kicks in, meaning that…



this process of cooling & contraction may continue, but only so far.

Only until this **ultimatonic exclusion principle** stops the collapse.
But that's not the end of the story.

"This process of cooling and contraction may continue to the limiting and critical explosion point of ultimatonic condensation." (458.6, 41:3.6)

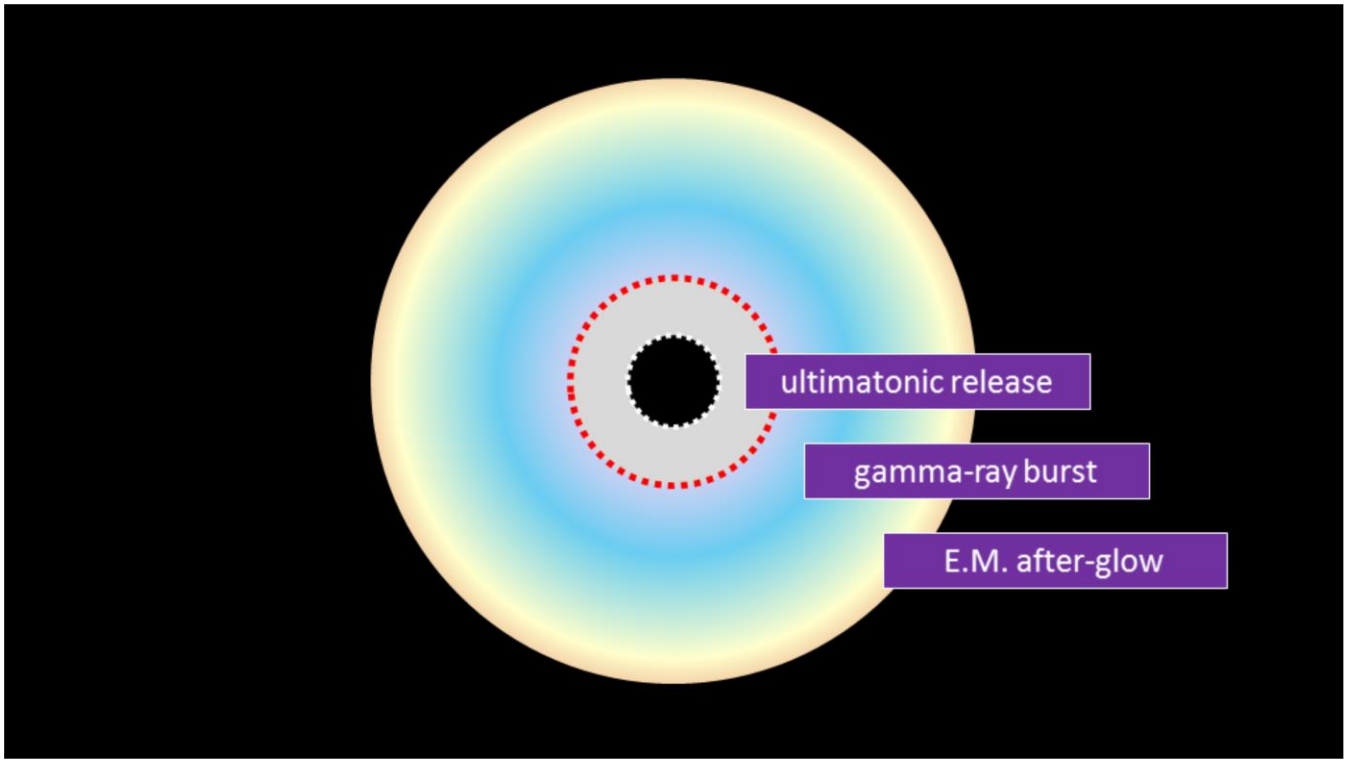
How many ways can we read "**limiting**", "**critical**" and "**explosion**"?

This ball explodes.

- Imagine a 20 solar-mass dark island:
- 20 solar masses worth of **e = mc^2**
- released in a moment.

As I read this paragraph, as this "limiting and critical explosion point" is reached, dark islands become nature's most efficient bomb.

But what sort of bomb?

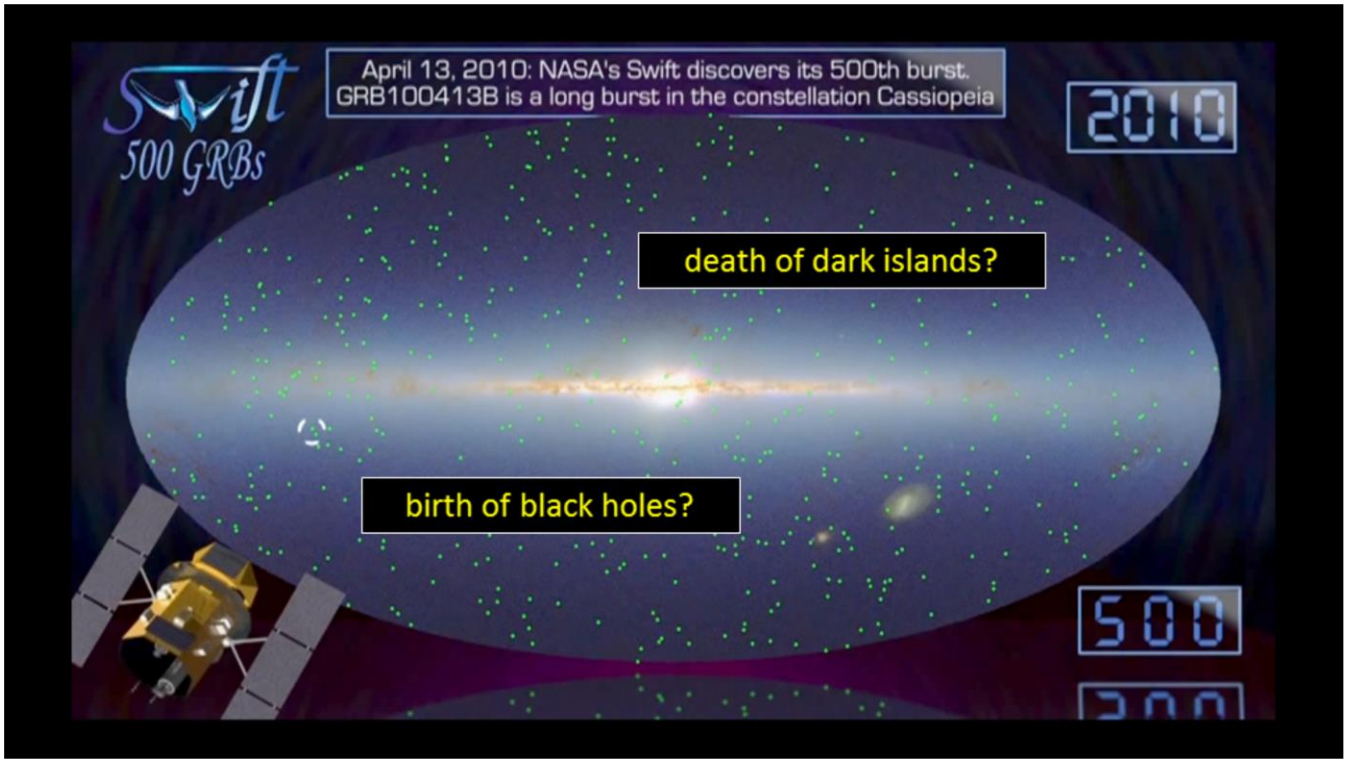


If this “ultimatonic explosion” begins as a release of unbound ultimatons, then initially, there’d be no electrons, so no electromagnetic light.

The actual, initial explosion may be **dark**.

Of course, as the initial **ultimatonic commotion** settles down, there’d be **electromagnetic** effects…

- maybe a **gamma ray burst** ?
- followed by some after-glow ?



We've spotted this type of bomb going off ever since we got gamma ray detectors in space.

And they remain a mystery.

This is a snapshot showing the first 500 gamma ray bursts detected by NASA's SWIFT observatory (up to 2010).

One explanation (for the short period type) …

is the **birth** of a black hole.

But do they really mark the **death** of dark islands?

If so, what a neat technique for recycling dead stars!

As we've seen, the Urantia Book tells quite a tale about mass and matter, and dark islands that go boom.

Central to this story are new foundations for the vast reservoirs of **energy** and **mass** that science currently can measure, but can't explain.

In the upcoming movie, I explore what these new foundations might mean for Orvonton, our ancient superuniverse.