The Right-Handed Universe

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August 22nd 2010

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"Why Antimatter Matters To You."

A Cosmic Mystery Unlocked

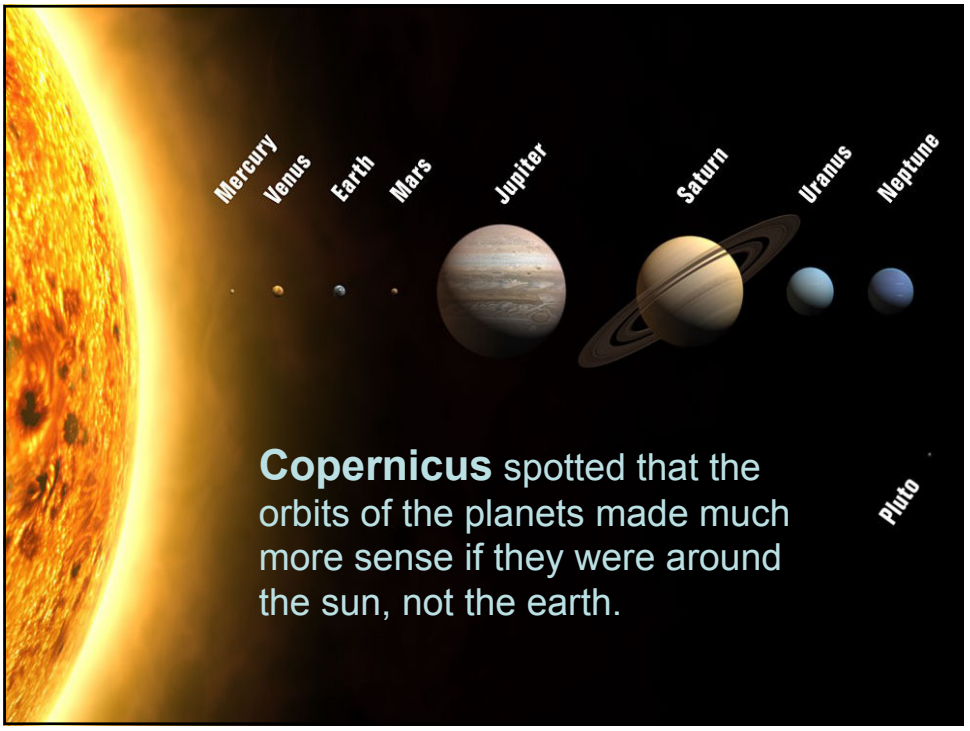
ANTI MATTER

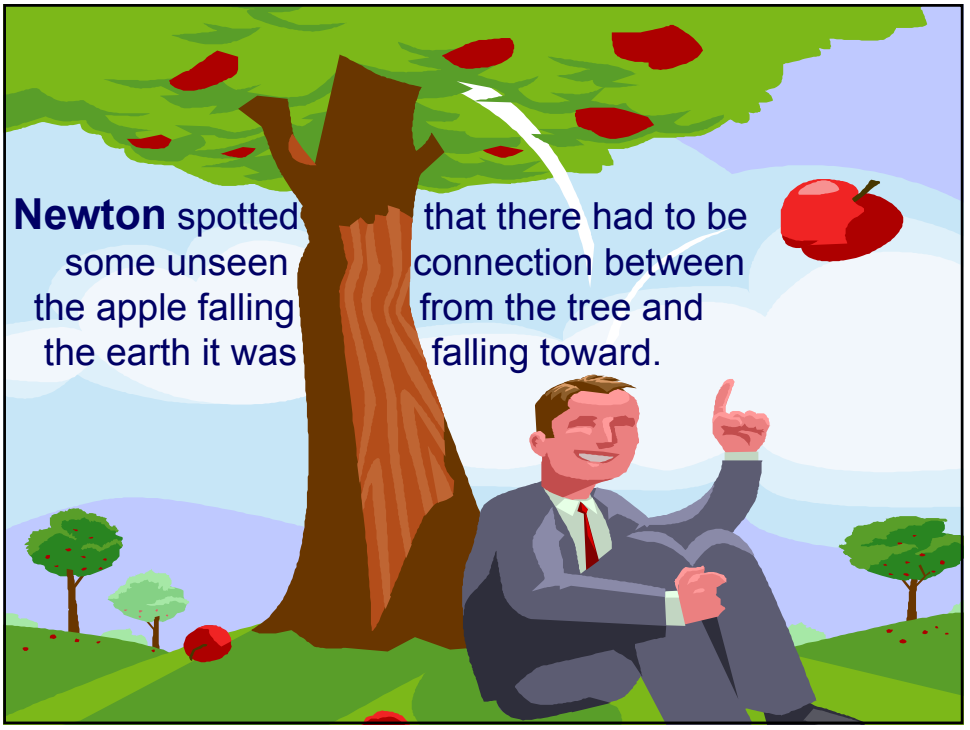
The biggest cosmic clue of them all.

The Universe is full of clues as to how things really are.

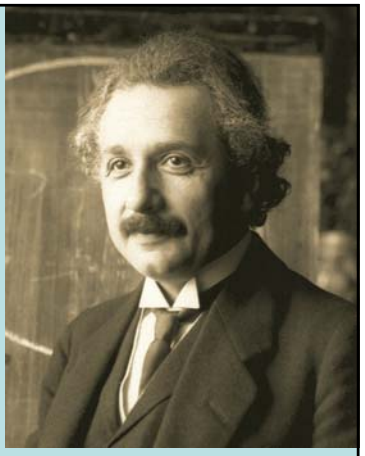
EVERY major leap forward in science has been made by spotting these Cosmic Clues and figuring out what they're telling us.

EVERY great name in science has been responsible for searching out one of these 'Cosmic Easter Eggs' and unwrapping it for us.

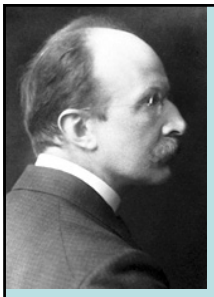

Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto
Copernicus spotted that the orbits of the planets made much more sense if they were around the sun, not the earth.


Newton spotted that there had to be some unseen connection between the apple falling from the tree and the earth it was falling toward.

Einstein spotted that the laws of physics were contradictory unless the speed of light was **absolute** in some way.



This gave us **The Theory of Relativity.**

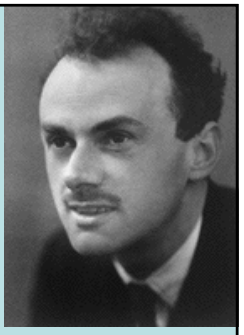


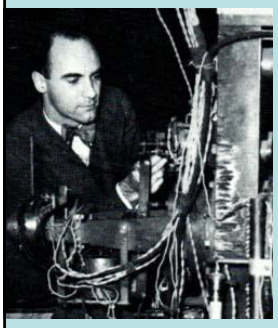
Max Planck spotted that energy is given off and absorbed in tiny bite-size chunks - quanta.

Count Louis de Broglie spotted that sub-atomic particles had wave-like properties.

Together they gave us **Quantum Mechanics.**

Paul Dirac spotted that Relativity and Quantum Mechanics together tell us that for every sub-atomic particle there must be a matching anti-particle with an opposite electrical charge – antimatter.





Carl Andersen spotted those anti-particles four years later, in cosmic radiation hitting the earth's upper atmosphere.

Between them they set the scene for
the biggest astronomical puzzle of all time.

So what is antimatter telling us?

Most importantly it's drawing our attention to the way that material particles are put together.

By looking at this carefully we can learn things about the universe we live in – things that could prove immensely valuable.

As we begin to run out of oil and face various other challenges that technology doesn't seem to have answers for, a new take on reality opens up all sorts of options that wouldn't be possible otherwise.

First, a few facts about antimatter…

- **It's very rare, very difficult to handle, and *very* expensive to manufacture.**

(a) Antimatter is annihilated on contact with ordinary matter (as well as taking an equal amount of that matter with it). It ceases to exist even on contact with air – so it has to be kept in a vacuum and mustn't touch the sides of its container.

(b) It's estimated that one gram of positrons (anti-electrons) would cost around $25 billion to produce and a gram of anti-hydrogen atoms would cost around $62.5 ***trillion*** to produce and collect.

- **We'd spot it immediately if there were any serious amounts of antimatter out there – planets, stars, gas.**

  This is because matter and antimatter go MAD (Mutual Assured Destruction) when they meet, giving off vast amounts of energy with a clearly identifiable call-sign. There are signs of an antimatter 'pocket' near the centre of our galaxy.

- **If controllable, antimatter would be the perfect fuel.**

  Both it and an equal amount of normal matter convert 100% into pure energy on contact. 10 Kg of antimatter would produce enough energy to keep a car going for a million years without stopping!

But – far more important than that …

Antimatter is shouting something very fundamental about how particles are formed – what all the *stuff* in the universe is made of.

It's long been reckoned that almost exactly equal amounts of matter and antimatter were formed at Big Bang time – Dirac's equations say that's how it would be.

So where has all the antimatter gone??

The popular view is that only one in a billion or so more bits of 'our' stuff were formed than 'other' stuff. Doesn't sound much.

But to end up how it is now – after MAD had wiped out all the 'other' stuff and most of 'ours' - that difference would have had to tip the ***same*** way a trillion trillion trillion trillion trillion trillion times.

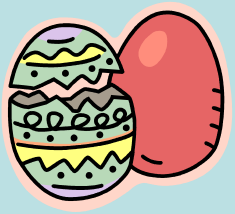
That's ***way*** too much for it to be a coincidence.

So – the question becomes …

What's the *structural* difference between matter and antimatter??

(Since one has formed in greater quantities and/or lasted longer than the other.)

Time to unwrap this particular Easter Egg and see what's inside…



Shedding some light on the matter…

De Broglie showed us that sub-atomic particles have wave-like properties. That's now been proved experimentally in all sorts of ways.

Schrödinger's Wave Equation for matter is the basis of Quantum Mechanics, the most successful scientific theory ever.

Schrödinger also identified a regular ' jittery motion' in electrons, suggesting a wave going round inside them at the speed of light.

This idea has recently been confirmed definitively by experiment.

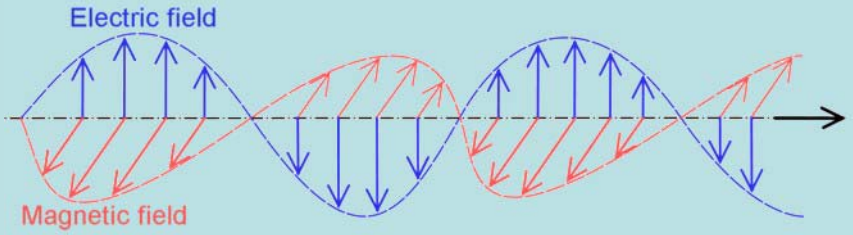
Other recent research shows how properties of an electron could be explained by a wave of the sort light is formed from, but going round in tiny circles rather than in a straight line.

The book 'Tapestry of Light' describes how all the experimental findings of Special Relativity can be explained by particles of matter being formed from photons ('bits' of light).

So we need to know a bit about light…

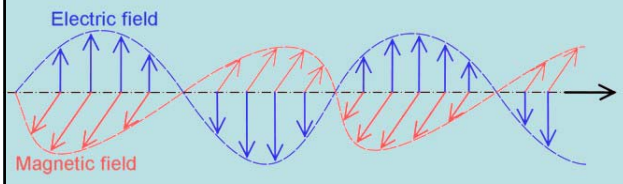
Light is a **transverse electromagnetic wave** effect.

That just means it's an electric field and a magnetic field each vibrating at right angles to the other – and at right angles to the direction the light is going – like this:



Think of a blue yo-yo going up and down and a red yo-yo going left and right – both pushing each other along in the direction shown by the arrow

One very important thing we need to notice here:

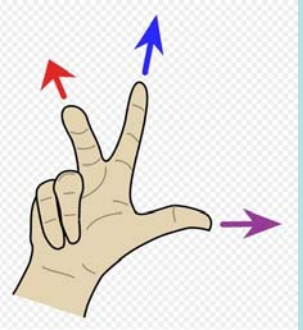


The magnetic field is always a quarter-turn clockwise from the electric field, looking in the arrow direction

So when the blue is up, the red is right, when the blue is down, the red is left – looking along the dotted line in the arrow direction.

This is given by Fleming's Right-Hand Rule, which tells us which direction the resulting effect (purple arrow) is for a given combination of electric and magnetic fields at right angles to each other.

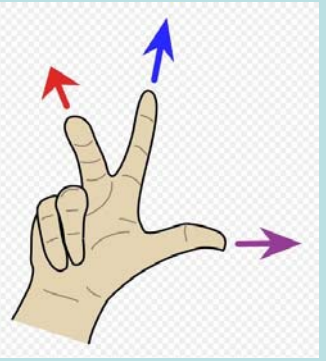
If you try it with your own right hand, you'll see it fits the diagram above.



That, in a nutshell, is it.

There is ***no such thing*** as a true mirror image of ***any*** photon.

A mirror-image photon would have its magnetic component a quarter-turn ***anti-clockwise*** from its electric component – and ***that never happens.***



So if matter is made from photons, it's not possible to produce a perfect mirror image of any particle, either.

The cosmos is ***not*** symmetric.

We live in a ***right-handed*** universe.

Consider the issue of **garden clippers…**

A garden equipment manufacturer makes garden clippers. First, of course, he makes right-handed clippers.

As he expands, he also starts making clippers for people who are left-handed.

But here he hits a slight snag …

He only has clockwise-threaded screws to hold both types of clippers together. He finds that the right-handed pairs have a firm action and stay together well –

– But because of the opposite rotation, the left-handed pairs get loose and come apart much more quickly.

This is exactly the ***right-handed universe*** issue, in miniature.

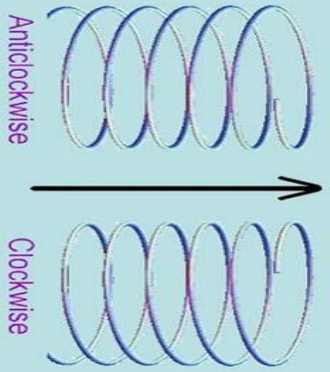
Photons come in a whole heap of **polarisation modes.**

They can be **vertically polarised**, **horizontally polarised**, or anything in between (refers to the direction of the electric field).

They can also be **elliptically polarised**, where, instead of just going up-and-down or side-to-side, the electric field part traces out an oval shape as it moves along. This can be anything from nearly flat to nearly a perfect circle.

All of these modes can be made from a mix of just **two** modes – clockwise and anticlockwise circular polarisation.

So any particle formed from light is made from one or other - or a combination - of these two types of photons.



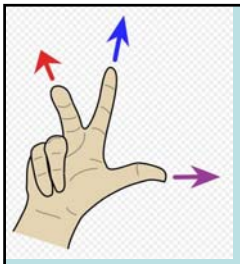
The Electron and the Positron

Recent research has shown that a particle formed from one circularly polarised photon wrapped round in a closed loop would have quantum properties exactly like an electron.

It follows logically that the electric field acts outward, giving the electron its negative charge – and inward, causing the light wave to bend round on itself.

The magnetic field would then act at right angles to that – round the surface of the electron, binding it together (like a series of bar magnets wrapped around it).

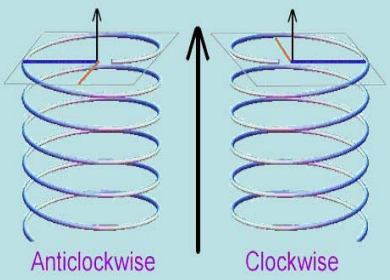
If that's the case, then it's almost certain that a positron (anti-electron) would be formed from the opposite type of circularly polarised photon (one clockwise, the other anticlockwise) – giving the opposite type of charge acting outward.



We've seen how photons of light are effectively all 'right-handed', or 'clockwise' in terms of the rotation of the magnetic field from the electric field. We've seen that 'left-handed' or 'anti-clockwise' photons just don't exist.

We've also seen how right-handed and left-handed clippers, both made with the same type of clockwise (right-hand) threaded screws, may be quite different in terms of how well they hold together and how easily they come apart.

So it makes perfect sense that a positron, say, might be less robust than an electron – if one is a left-handed structure based on an inherently clockwise element (a photon) and the other is a right-handed structure based on that same clockwise element.



So let's have another look at those two types of circularly polarised photons.

If we look at just the electric field part of each, they look like perfect mirror images of each other.

But now, if we add in a snapshot of the electric component and magnetic component at one instant, we see a clear difference.

The left circularly polarised (anticlockwise) photon is <u>not</u> a reflection of the right circularly polarised (clockwise) photon – the magnetic component is pointing the wrong way (they're both rotated the <u>same</u> way from the electric component).

Just like the two types of clippers, these two types of photons both have a 'right-hand thread' element – so 'left-handed' particles may be less stable than 'right-handed' particles.

The Nobel Treasure Trail

In 1980 James Cronin and Val Fitch shared the Nobel Prize in Physics for proving 'CP Symmetry-Breaking'. C and P stand for 'Charge' and 'Parity' (mirroring).

In other words, antiparticles are almost – but not quite – perfectly symmetric opposites of conventional particles.

This is exactly what we'd expect from our analysis, if particles are in fact formed from photons of light.

In 2008, three Japanese researchers shared the Nobel Physics Prize for identifying processes through which CP symmetry-breaking occurs. This involves previously unknown particles and their antiparticles, which again don't behave symmetrically.

One of them said at the end of his Nobel Presentation: "We still can't explain why conventional matter dominates the universe."

WE CAN - if we see that matter is shaped from asymmetric 'stuff '.

So What?

So the 'closed-loop photon' description of matter links a known 'handedness' in photons to a clearly apparent asymmetry in the universe around us. It offers a very sound explanation for a Cosmic Conundrum for which no other explanation has ever been suggested.

This seriously strengthens the case for particles of matter being formed from photons. The idea that one well-known cosmic asymmetry is unrelated to another self-evident cosmic asymmetry is just not credible – especially when we consider the mass of evidence linking energy and matter.

Starting from the premise that matter is indeed formed from closed-loop photons of energy opens up vast new areas of scientific possibilities – as well as giving us a radically new understanding of the nature of material reality.

How Does This Affect Me?

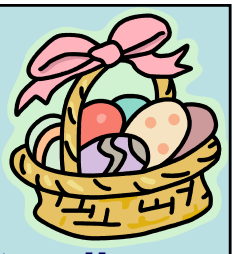
We're 'hitting the buffers' on a whole load of different fronts: energy (oil), water, soil, food, climate change – you name it.

Einstein said that no problem can be solved at the same level of understanding that first created that problem – makes sense.

We need to take a serious step up in our understanding of who and what we are and where we live – our universe.

This insight into the nature of physical reality – the gift inside the 'Easter Egg' of the Antimatter Conundrum – offers us vast opportunities for undreamed-of scientific advances: travel, communications, new sources of energy – you name it.

But far more than this, it offers us 'The Universe Unwrapped' – a totally new level of understanding of what it's all about.



There isn't one person on this planet who won't benefit from that new understanding and the treasures that it brings.

See:

for further information