

The Double-Slit Experiment



Part I

By Ciarán Handley

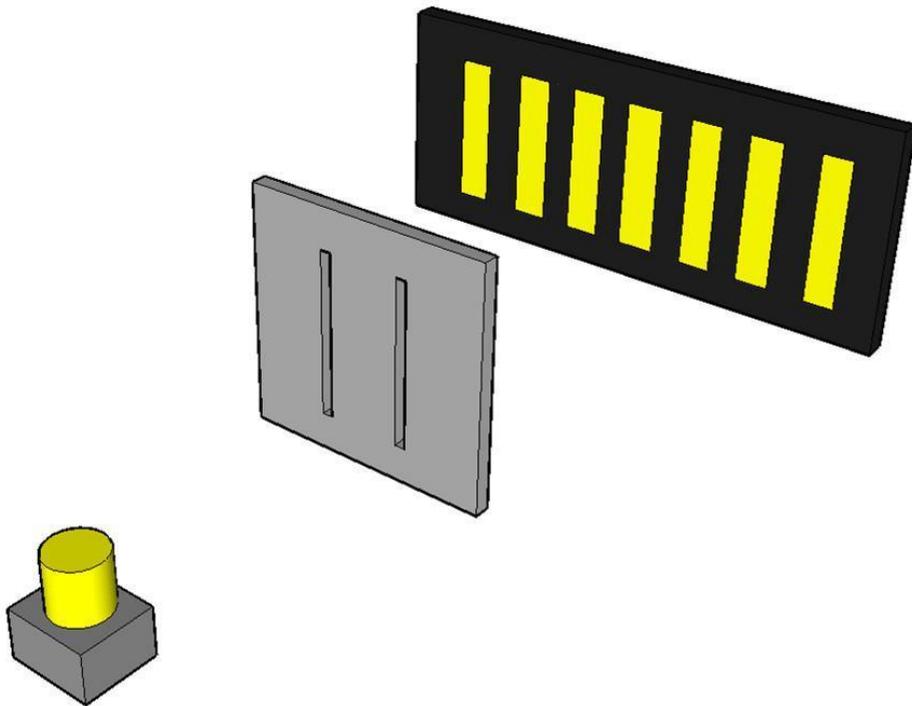
4th September 2018

The Double-Slit Experiment Chapter 1



Ready?

Let us jump straight in.



Perhaps the easiest way to do this is to begin by showing the mainstream physicist's understanding and then making a few corrections

We begin by looking at the experiment as seen by mainstream physicists..

[YouTube: "Dr Quantum – Double Slit Experiment" \(5:42\)](#)

Now, let us come to the root of the misunderstanding.

At 2:25 minutes in, Dr Quantum tells us that

"An electron is a tiny, tiny bit of matter, like a tiny marble."

That is *not* the case. The electron in this case is *not* a solid piece of matter like a marble. It is a *wave pattern*. It is vibration. It is not solid. It is a Wave Pattern that is best understood not in terms of Quantum Mechanics, but in terms of *String Theory*.

If we let this play through for the next half minute Dr. Quantum tells us that we should expect to see two slits on the screen because we fired tiny bits of matter. The reason for Dr. Quantum's surprise when this does not happen is that *he thinks the electrons are pieces of matter*.

He cannot accept that *they are not*.

Unification Theory: Quantum Mechanics & String Theory

Chapter 1



I'm including a document that I released in 2014

It summarises an insight that I spent thirty years working on from when I had my first lead at the age of seventeen to when I solved it properly in 2013. It is a key cornerstone in my Unification Theory between Quantum Mechanics and String Theory. This is a key part of my life's work in physics.



This is one of the deepest insights in the history of physics

It was the insight that unlocked my Unification Theory between Quantum Mechanics and String Theory.

Let me begin by giving the insight. And then I'll apply it to the Double-Slit Experiment.

I'll give the document now exactly as I released in it 2014.

Families of Sub-Atomic Particles - Why are there Three instead of One?

Proposed Solution – Harmonics of Superstrings

by Ciarán Handley
October 2014

One of the most puzzling problems in Quantum Mechanics is why there are different *families* of sub-atomic particles. Pretty much everything we see around us in the universe is made up of the first family. But other families of particles come into existence at higher energies, such as those energies used in a particle accelerator.

These other families of particles have higher mass, and are unstable.

Particles

	Family 1	Family 2	Family 3
Quarks	up	charm	top
	down	strange	bottom
Leptons	electron	muon	tau
	electron neutrino	muon neutrino	tau neutrino

In terms of mass of particles, the higher the family of particle the heavier the particle.

Mass

	Family 1	Family 2	Family 3
Quarks	light	heavy	very heavy
Leptons	light	heavy	very heavy

Because $E=mc^2$, this means that the energy of the particles increases with higher families.

Energy

	Family 1	Family 2	Family 3
Quarks	low energy	high energy	very high energy
Leptons	low energy	high energy	very high energy

Family 1 are stable – thankfully – as most of the universe is made up of family 1. The particles in the higher families decay however, and the higher the family the more unstable the particles.

Stability

	Family 1	Family 2	Family 3
Quarks	stable	unstable	very unstable
Leptons	stable	unstable	very unstable

So What’s the Problem?

The problem is this – where do families 2 and 3 come from?

The solution I’m proposing came to me early last year (2013) and is surprisingly simple: families 2 and 3 correspond to the second and third harmonics of the superstring.

To explain this, we need to first explain what a *superstring* is, and then explain the concept of *harmonics*.

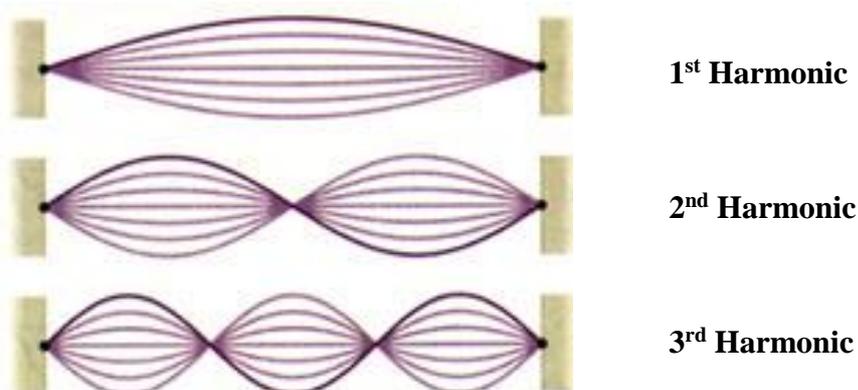
What is a Superstring?

The idea is this – all subatomic particles are made up of vibrating strings. And different configurations of the strings correspond to different sub-atomic particles.

That’s it – that’s all we need to know on superstrings. Now, what’s next? Harmonics.

Understanding Harmonics

Strings vibrate at not just the base frequency (the Fundamental or 1st Harmonic), but they can also vibrate at higher frequencies, such as the 2nd and 3rd Harmonics.



The higher harmonics correspond to higher energies. Also, the higher the harmonic, the less stable.

Ok, that's all we need to understand on harmonics. We're ready now to propose the solution to the problem of why there are families of particles.

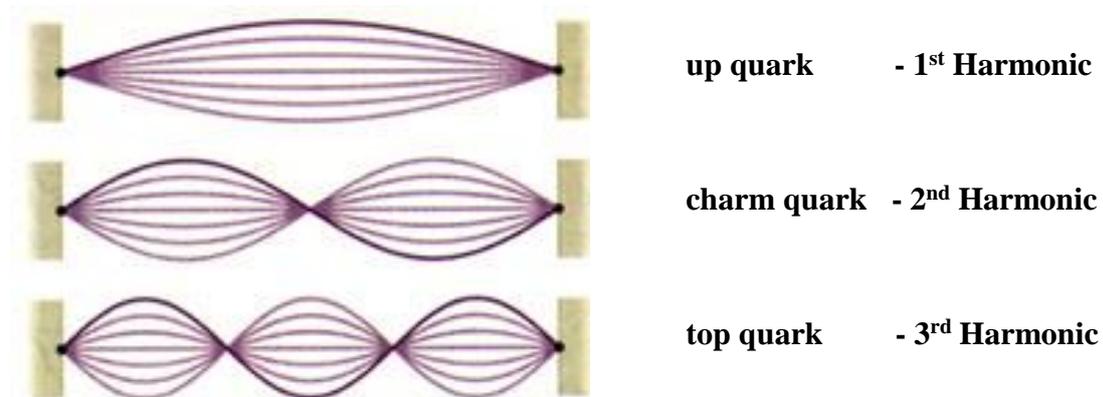
Proposed Solution to why there are Families of Particles

The proposal is that the first family of particles corresponds to the Fundamental or 1st Harmonic. These have the lowest energy and are stable.

The second family of particles corresponds to the 2nd Harmonic. These have a higher energy, which means because of $E=mc^2$ that they have a higher mass. They are also unstable.

The third family of particles corresponds to the 3rd Harmonic. These have an even higher energy, which means because of $E=mc^2$ that they are very massive. They are also more unstable.

In the example of the *up* quark, this corresponds to the 1st harmonic. The *charm* quark corresponds to the 2nd harmonic and the *top* quark corresponds to the 3rd harmonic.



Similarly for the *down* quark, *strange* quark, *bottom* quark and for the *electron*, *muon* and *tau* and also for the *electron neutrino*, *muon neutrino* and *tau neutrino*.

The answer is I believe, that simple.

Is mise, le meas
Ciarán Handley
www.anucentre.ie

A Note on Intellectual Property

The contents of this document are the culmination of decades of hard work. All of this work is original, except in those cases where I reference the work of others. While I am happy for others to build on my work under no circumstances will I allow any individual to take credit for original work that was done by me and I do insist on full credit and recognition being given to my work as is appropriate.

Unification Theory: Quantum Mechanics & String Theory

Chapter 2



What does it all mean?

This clip will help explain.

[Standing Waves Part I: Demonstration](#)



The properties of matter are a function of their String Harmonic configuration

For example the mass of a particle is dictated not by a Higg's Boson – that interpretation is *incorrect*. Rather it is dictated by its *String Harmonic* configuration.

For example if one accelerates particles towards the speed of light then their mass increases. How does one account for this? By String Harmonics. It takes a lot of energy to accelerate a particle towards the speed of light. This energy is sufficient to energise the particle's String Harmonics at higher harmonics. Different harmonics correspond to different properties of the particle such as its charge, it's spin, its mass and so forth. It is this energy going into the higher harmonics that change the properties of its mass. Not the Higg's Boson. That interpretation is incorrect.

Does this energy going into the higher harmonics change anything else apart from mass? Yes.

Different String Harmonics correspond to time. Changing these is what causes ***Time Dilation*** effects. Similarly other String Harmonics correspond to the properties of length. Changing these is what causes ***Length Contraction*** effects. As seen in *Special Relativity*.



*This provides a link between my Theory of String
Harmonics and Special Relativity*

In this I provide the first links in my overall Unification Theory, for my theory of String Harmonics provides the key to a Unification Theory between *Quantum Mechanics, String Theory* and *Relativity*.

It also links in *Classical Physics, Electromagnetism* and more.

But we'll take it one step at a time.

Wave-Particle Duality

Chapter 1



*Is he alive or is he dead?
Schrödinger's cat.*

Is an electron a wave or a particle?

That depends. On its *String Harmonics configuration*.

One set of String Harmonics corresponds to a particle. Another set of String Harmonics corresponds to a wave.

In this understanding I give another key foundation stone for my Unification Theory between Quantum Mechanics and String Theory.

Wave-Particle Duality

Chapter 2



How does one switch between vibrational waves and physical matter?

By a change in Symmetry. By either a *Symmetry Restoration* or a *Symmetry Breaking*.

How does an electron switch between being a wave or a particle?

By a *change in symmetry*.

I'll be explaining this as we go.

The Double-Slit Experiment Chapter 2

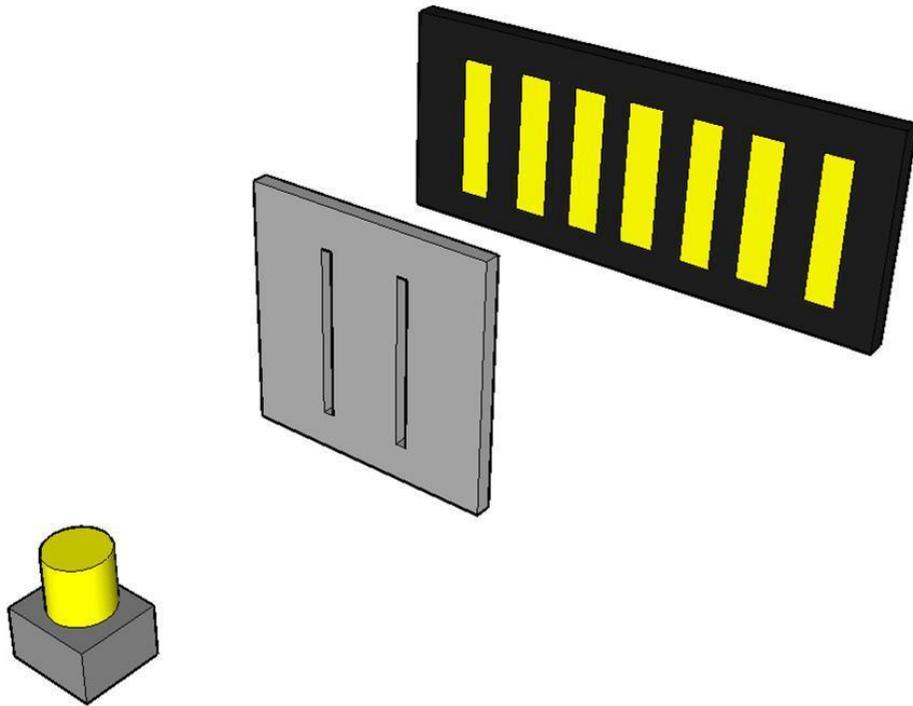


Ready?

The proper understanding of this experiment was doomed right from the beginning because the initial assumption was *incorrect*.

“An electron is a tiny, tiny bit of matter, like a tiny marble.”

Right there. That is the problem right there.



“How could pieces of matter create an Interference Pattern like a wave?”

This is what Dr. Quantum asks us. The answer is very simple. They could not.

Waves make Interference Patterns. Particles do not. It is that simple.

“It doesn’t make sense”. This is what Dr. Quantum tells us.

He is correct. It doesn’t make sense. *If one believes that electrons are particles* then it doesn’t make sense.

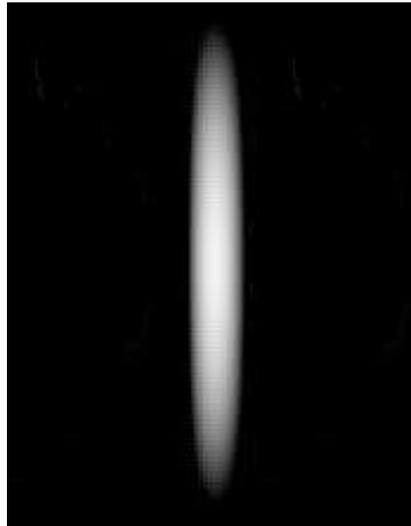
*It doesn’t make sense because the assumption that electrons are bits of matter is **incorrect***

The Double-Slit Experiment Chapter 3



Why did Dr. Quantum believe that the electrons were particles?

This assumption was incorrect. But why was this misunderstanding there in the first place?



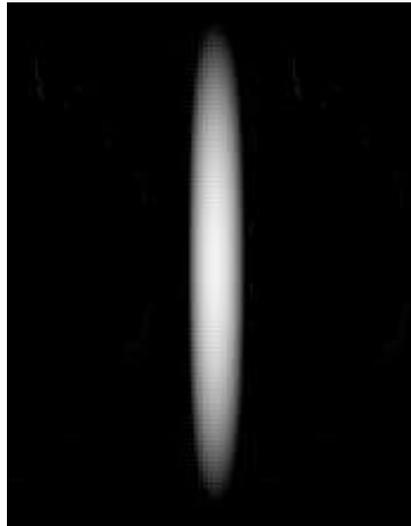
At 2:31 minutes in to the clip Dr Quantum says: *“Let’s fire a beam through one slit. It behaves just like the marble. A single band.”*

It is true that if one fires particles through a single slit that one gets just one band. This is true.

But you know what – if you send waves through a single slit you *also* get just one band.

We can see this in the video from 1:10 to 1:30 minutes in.

[YouTube: "Dr Quantum – Double Slit Experiment" \(5:42\)](#)



*If we use just **one** slit then we see this pattern **regardless** of wave or particle. **Both** waves & particles do this.*

So this pattern, with a single slit, could be made by *either* waves or particles.

A single slit does not tell us whether it is a wave or a particle. We need two slits to tell us that.

At 2:31 minutes in to the clip Dr Quantum says: “Let’s fire a beam through one slit. It behaves just like the marble. A single band.”

That is true. Just like the marble. But also *just like the wave*, a single band. Because a wave through a single slit *makes a single band pattern too*.

Scientists have missed this because they are so focussed on believing that electrons are tiny pieces of matter that they take the single band as being evidence to say that yes, electrons are bits of matter. Just like marbles. They haven’t made the connection that waves *make the same pattern* if it is a single slit. Their paradigm, or mindset, is so focussed on electrons being little pieces of matter that they have missed this.

This is a key part of why scientists have missed that electrons are not tiny pieces of matter. They took this single slit as evidence that the electrons were made of tiny pieces of matter and so never questioned their assumption.

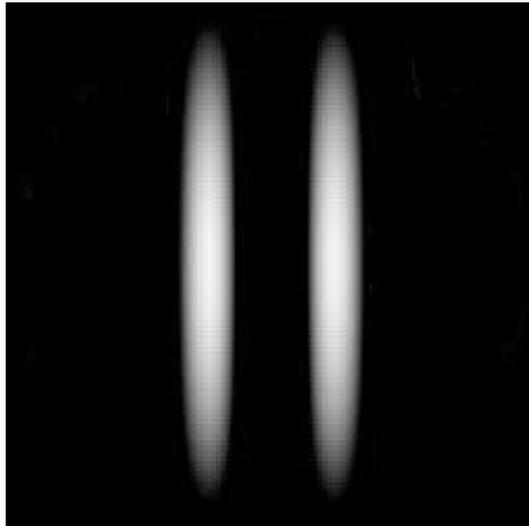
At 2:31 minutes in Dr Quantum says that electrons behave just like marbles. (Missing that a single slit can also be caused by a wave.) He uses this as a justification that electrons are like marbles, to say that with two slits we should get a two band pattern. Like with marbles. Rather than waves. (It can’t be waves because he has already established that electrons are particles.) Do you see where the confusion comes from?

The Double-Slit Experiment Chapter 4



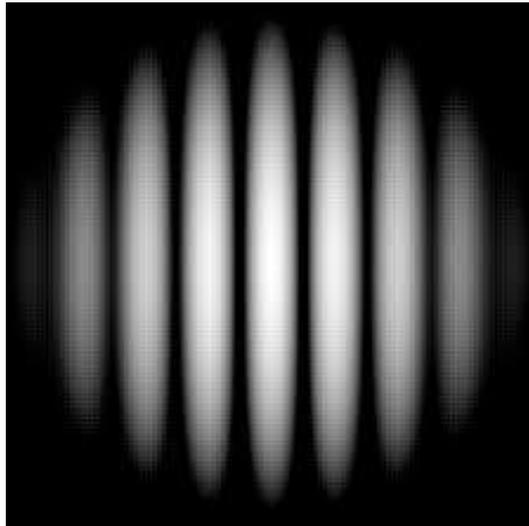
Back to basics

Let us review the different patterns seen as made by particles and by waves.



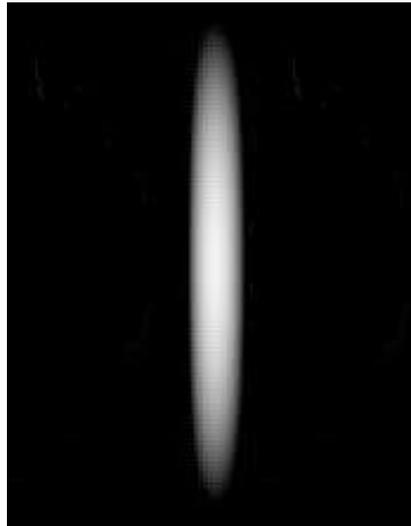
*If we are using a Double Slit and we see this pattern,
then this **must mean particles***

If we fire electrons through a Double Slit and we see that pattern, then we know that the electrons are particles. Because that is what particles do. Waves don't do that.



*If we are using a Double Slit and we see this pattern,
then this **must** mean **waves***

If we fire electrons through a Double Slit and we see that pattern, then we know that the electrons are waves. Because that is what waves do. Particles don't do that.



*If we use just **one** slit, then we see this pattern **regardless** of wave or particle. **Both** waves & particles do this.*

So this pattern, with a single slit, could be made by *either* waves or particles.

A single slit does not tell us whether it is a wave or a particle. We need two slits to tell us that.

Got it?



“The conclusion is inescapable”

The conclusion is indeed inescapable. *The electrons leave the gun as waves.*

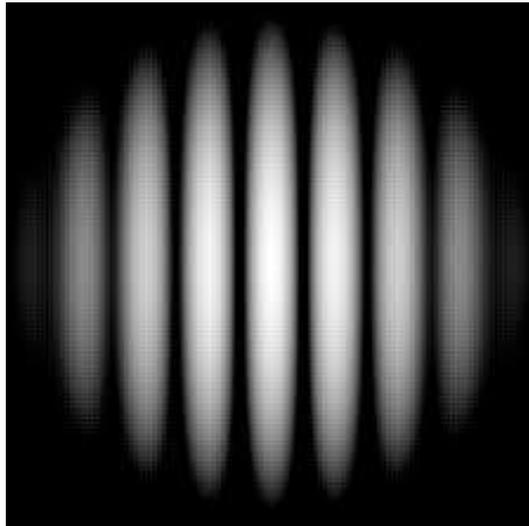
But this is not what physicists want to see. They cannot accept that the electron is not a tiny piece of matter. And so even when they see the Interference Pattern they still think that pieces of matter must somehow have created it. They cannot accept that the electrons are not tiny pieces of matter because *they cannot accept that vibration is more primary than physical matter.*

At 3:35 minutes in it is said that “*This conclusion is inescapable.*” Meaning the following.

“The single electron leaves as a particle, becomes a wave of potentials, goes through both slits and interferes with itself.”

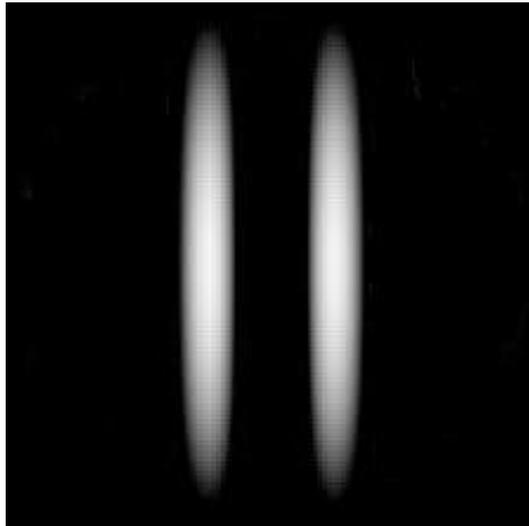
No.

That is not what is happening.



*When the experiment is not observed we see this. That means that whatever is causing this is made of **waves**.*

The laws of physics that apply here are the *Laws of Waves*.



*When the experiment is observed we see this. That means that whatever is causing this is made of **particles**.*

The laws of physics that apply here are the *Laws of Particles*.



*The conclusion is inescapable.
The laws of physics **have changed**.*

The Laws of Physics have changed from the *Laws of Waves* to the *Laws of Particles*.

If the Laws of Physics have changed then there must be a change in Symmetry. Either a *Symmetry Breaking* or a *Symmetry Restoration*. One or the other.

Which is it in this case? That is not obvious. It is a *Symmetry Restoration*. To explain why will require going deeper into String Theory, which we are not ready for just yet. We need to lay some more foundations first. But there must be a change in Symmetry. Either a *Symmetry Breaking* or a *Symmetry Restoration*. One or the other.

What causes the change in Symmetry is the *observation* of the experiment.

The act of observing reality, changes it.

I will be explaining Symmetry Restoration and Symmetry Breaking in more detail later, for there is a misunderstanding in the approach to Symmetry as understood by mainstream physicists that I need to correct.



A key mistake made by physicists is that they have not been able to let go of the assumption that electrons are tiny pieces of matter

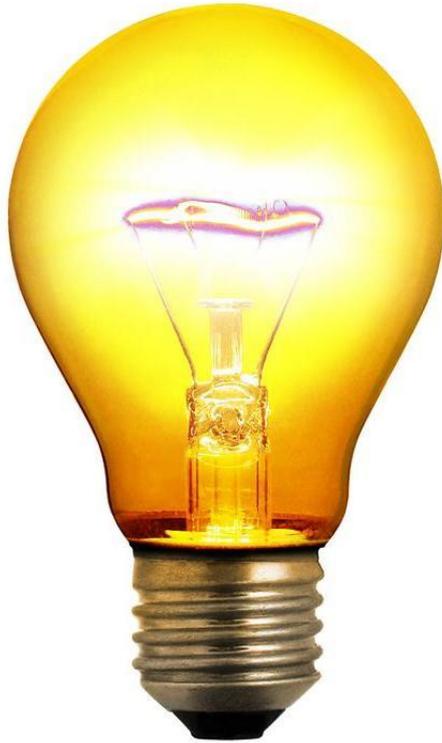
Even when confronted with evidence to the contrary. The experiment tells them that there is an Interference Pattern, but they still cannot accept that the electrons are not really particles. And so they maintain the assumption that electrons really are still pieces of matter and then try to twist the physics around to match their assumption.



In the video it says that the observer collapsed the Wave Function simply by observing

No, this is not the case. There is no wave function. That has been misunderstood by physicists for almost a century now.

However we are working through the correct solution now.



It's like when Copernicus said that the Sun did not revolve around the Earth. But rather that the Earth revolved around the Sun.

The scientists of the time could not accept it. They could not let go of the assumption that Earth was the centre of the Universe. And so they overly complicated things. They persisted in thinking that the Sun revolved around the Earth, and they came up with all sorts of complicated models to explain this.

The answer however was much, much simpler. If you think of it as the Earth revolving around the Sun, then the models of planetary motion become much simpler.

Like the Double Slit Experiment.

It is a lesson in simplicity.

Young Einstein

The Double-Slit Experiment



End of Part I