

Father Inire's Mirrors and Wolfe Physics

The Urth list — 16 messages, 5 voices, 19 Aug 2003

<https://urth.darkrealm.vip/thread/urth/4177>

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James Wynn — 19 Aug 2003, 16:04

Josh said:

Everyone knows that Leonardo Da Vinci built a mirror thingie like this, right? Or at least drew it in a notebook.

Crush bites:

I was not aware of this. I googled for it and could only find references to to da Vinci's "mirror-image script", how he recommended that painters use a mirror to check their work, and an invention to grind mirrors. It would not be surprising for Wolfe to have an interest in da Vinci since he was one of the fathers of modern engineering.

So please elaborate, Josh!

On this and on the subject of how well Wolfe describes technical concepts in layman's terms, I have picked up a rumor that Father Inire's mirrors operate by quantum tunneling. Is this true and, if so, can any physics grads critique how well he justifies this in the famous "fish" explanation"?

-- Crush

Josh Geller — 19 Aug 2003, 17:26 · follows James Wynn

On Tue, 2003-08-19 at 09:04, James Wynn wrote:

Josh said:

Everyone knows that Leonardo Da Vinci built a mirror thingie like this, right? Or at least drew it in a notebook.

I was not aware of this. I googled for it and could only find references to to da Vinci's "mirror-image script", how he recommended that painters use a mirror to check their work, and an invention to grind mirrors. It would not be surprising for Wolfe to have an interest in da Vinci since he was one of the fathers of modern engineering.

Among other things.

So please elaborate, Josh!

I've seen the drawing. It's in a book somewhere around here.

On this and on the subject of how well Wolfe describes technical concepts in layman's terms, I have picked up a rumor that Father Inire's mirrors operate by quantum tunneling. Is this true and, if so, can any physics grads critique how well he justifies this in the famous "fish" explanation"?

I don't know about any of this. I do know that time is really interesting, and has a number of poorly documented features.

I'll be building one of these things as soon as I can afford to.

Ask me then.

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Tony Martinez — 19 Aug 2003, 17:21 · follows Josh Geller

On this and on the subject of how well Wolfe describes technical concepts in layman's terms, I have picked up a rumor that Father Inire's mirrors operate by quantum tunneling. Is this true and, if so, can any physics grads critique how well he justifies this in the famous "fish" explanation"?

I don't have a copy of the book on hand, so forgive any misrememberings. I seem to remember the argument goes something like this: light is, mathematically, made up of lots of different frequencies, from 0 upto infinity. This means that some of the components of light travel *faster than light*. I remember this scene as a speculation that if you could remove all the frequencies which, added together, slow down the sum total, you'd have the ones which travel faster than light. (*)

It's a nice idea, which someone once told me had been the object of study. But light seems to strongly resist being separated thus so... (**)

--Tony

(*) It's the speed of the wave group which is "the speed of light", not it's components.

(**) I remember being told by a physics professor that he knew of a group which researched this very topic. Year after year, they came up with ingenious ways of splitting the frequencies, and year after year people came up with even more ingenious explanations of how they hadn't /quite/ managed it. Dunno how true this is, mind you.

Tony Martinez — 19 Aug 2003, 17:35 · follows Tony Martinez

I forgot: the mirrors are one way to filter out all the frequencies except the one you're interested in, since only the components whose wave-lengths subdivide the space between the mirrors exactly add together, rather than reducing each other. Lasers and the like are built on this idea, and provide light with a very narrow frequency set--although, unfortunately, below light-speeds.

--Tony

P.S. Um, I think. It's been a while, and I don't have my books and notes etc. with me, so forgive the non-research.

Josh Geller — 19 Aug 2003, 18:44 · follows Tony Martinez

You'd want a tunable laser.

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On Tue, 2003-08-19 at 10:35, Tony Martinez wrote:
I forgot: the mirrors are one way to filter out all the frequencies except the one you're interested in, since only the components whose

wave-lengths subdivide the space between the mirrors exactly add together, rather than reducing each other. Lasers and the like are built on this idea, and provide light with a very narrow frequency set--although, unfortunately, below light-speeds.

--Tony

P.S. Um, I think. It's been a while, and I don't have my books and notes etc. with me, so forgive the non-research.

--

Antonio Martinez — 19 Aug 2003, 18:30 · follows Josh Geller

You'd want a tunable laser.

Could you elaborate a little? (I don't remember all this stuff that well!) Is this to modulate the signal, i.e. achieve different speeds? Or, as is likely, for some completely different purpose altogether?

Thanks,
--Tony

Michael Buice — 19 Aug 2003, 18:34 · follows Antonio Martinez

On Tuesday, August 19, 2003, at 11:04 AM, James Wynn wrote:
On this and on the subject of how well Wolfe describes technical concepts in layman's terms, I have picked up a rumor that Father Inire's mirrors operate by quantum tunneling. Is this true and, if so, can any physics grads critique how well he justifies this in the famous "fish" explanation"?

As I recall when I first read New Sun, my exact thought was that Severian was straining to describe something Quantum Mechanical. My copy of Shadow & Claw is out on loan collecting new Wolfe converts at the moment, so it might be awhile before I can contribute something erudite and mind-boggling concerning said Fish.

Michael

Michael Buice — 19 Aug 2003, 18:50 · follows Michael Buice

On Tuesday, August 19, 2003, at 12:21 PM, Tony Martinez wrote:
I don't have a copy of the book on hand, so forgive any misrememberings. I seem to remember the argument goes something like this: light is, mathematically, made up of lots of different frequencies, from 0 upto infinity. This means that some of the components of light travel *faster than light*. I remember this scene as a speculation that if you could remove all the frequencies which, added together, slow down the sum total, you'd have the ones which travel faster than light. (*)

The fact I believe you are trying to get at is the concept that group velocity and phase velocity are distinct. This is not directly Quantum Mechanics, per se, just wave mechanics (classical physics; however, it does apply to QM).

Drop a stone into a pond. You will see circular waves propagating from the impact point. These

wave fronts are moving at a certain speed, the speed of "sound" in water. The velocity of those wave fronts is called the "group velocity" and is the analogous speed referred to by the "speed of light" for wave packets of light, when it is viewed as an electromagnetic wave.

These same waves you see on the pond can also be seen as a combination of waves which each have precise frequencies of oscillation. These constituent waves travel at all sorts of different speeds, and the same situation is true of light as an electromagnetic wave. Propagating through a given material, there are components which travel faster and slower than the speed of light in that material. This velocity is called the "phase velocity". There have been many experiments which have measured these two velocities and received far more press than they should have for reporting such things as "speed of light broken" and so forth. You can't "separate" these components in the sense that you can't use them to transmit any useful information faster than light speed, which is one colloquial manner of stating the limits placed on velocity by Lorentz invariance (i.e. special relativity).

The rub is that, under QM, all of these behaviors apply to matter and I seem to recall more than a few descriptions of wave mechanical nature (or at least what Severian can piece together from what he's been told) in New Sun.

Michael

Tony Martinez — 19 Aug 2003, 19:04 · follows Michael Buice

On this and on the subject of how well Wolfe describes technical concepts in layman's terms, I have picked up a rumor that Father Inire's mirrors operate by quantum tunneling. Is this true and, if so, can any physics grads critique how well he justifies this in the famous "fish" explanation"?

[I'm not a physics grad, so salt cellar at the ready.]

FWIW, I thought the explanation reminiscent of the EPR (Einstein-Podolsky-Rosen) paradox, which is, as you say, an aspect of QM (and a very interesting one, linked to the idea of FTL communication); don't know how it connects to tunneling, though.

--Tony

Josh Geller — 19 Aug 2003, 19:41 · follows Tony Martinez

On Tue, 2003-08-19 at 11:57, Tony Martinez wrote:

[I've assumed you didn't CC the list so as not to murder half of it's readers with dry technical discussion, so haven't followed up there.]

More like I forgot. I don't think they'd mind, I assume you don't mind, and so I am Cc'ing the list now. What the heck, I say.

You'd want a tunable laser.

Could you elaborate a little? (I don't remember all this stuff that well!) Is this to modulate the signal, i.e. achieve different speeds?

Right.

Ah. Perhaps it's a binary transmission, that is, the mirrors set up the monochromatic (FTL) light source, and some other bit handles the rest (binary, perhaps, rather than modulation?).

I sure don't know.

There's another thing about mirrors. Time's a direction at right angles to the three we know about. You get lots of funny angles with multiple mirrors.

Heheheh! I wonder what shaving with them would be like :)

A bit of excitement with the straight razor every morning.

Who **does** shave the Spanish barber?

Thanks for the clarification,

You are generous!

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Michael Buice — 19 Aug 2003, 19:18 · follows Josh Geller

On Tuesday, August 19, 2003, at 02:04 PM, Tony Martinez wrote:
FWIW, I thought the explanation reminiscent of the EPR (Einstein-Podolsky-Rosen) paradox, which is, as you say, an aspect of QM (and a very interesting one, linked to the idea of FTL communication); don't know how it connects to tunneling, though.

It doesn't connect. EPR has to do with Entanglement, which is unique to the mathematical structure of QM. Tunneling is another aspect of wave mechanics which happens to carry over to the QM world. If you shine light through a prism such that total internal reflection prevents the light from escaping the other side of the prism, you can still "pull it out", if you will, by holding another prism close to the first. The light wave will propagate "over" the gap between prisms and continue propagation in the nearby prism, never propagating in the space between. Since QM forces wave-like behavior on matter, it must be able to do this as well. That's what "Quantum" Tunneling is.

Michael

James Wynn — 20 Aug 2003, 04:16 · follows Michael Buice

Tony Martinez wrote:

FWIW, I thought the explanation reminiscent of the EPR (Einstein-Podolsky-Rosen) paradox, which is, as you say, an aspect of QM (and a very interesting one, linked to the idea of FTL communication); don't know how it connects to tunneling, though.

Crush responds:

My ability to defend connecting QT with Fr. Inire's Mirrors pretty weak. However, I thought "Quantum Tunneling" sounded promising because it worked so well within the themes of tBotNS and Wolfe's general themology in general -- specifically, the twinning aspect (as I understand QT).

For other laymen, my understanding of QT is to imagine a bowling ball stationary in a valley between two hills. The ball does not have enough energy to escape the valley based on Newtonian Mechanics, but QM says that it is remotely possible that the ball could suddenly appear on the other side of one of the hills. Since matter (as energy) cannot be created, one of the bowling balls would have to be destroyed -- if the bowling ball in the valley is destroyed then the ball has moved beyond the valley without any energy expended. This analogy works just as well if the "hill" is 500 million light years. I don't really understand math enough to believe this could actually happen -- but I did find a website that offers an experiment that permits one to see it in action (also I'm led to understand transistors incorporate QT???):

<http://www.altair.org/Qtunnel.htm>

While this experiment involves a prism instead of a mirror, one could *imagine* it being done with mirrors. Also, QT seems to have been observed only in discrete particles over minute distances, but theoretically one could use this method to instantly transport from one end of the universe to the other.

Well, all this seemed so relevant to Severian whose name implies twinning, who is repeatedly annihilated and recreated.

Another way to imagine QT is to imagine matter as a wave passing through the hill -- just as Tzadkiel's ship became a wave to move beyond Space, Time, and Universes.

It seemed to work so nicely, I wondered whether there was any basis to it in the Fish explanation.

-- Crush

matthew.malthouse — 20 Aug 2003, 07:19 · follows James Wynn

On 19/08/2003 18:26:57 Josh Geller wrote:

I don't know about any of this. I do know that time is really interesting, and has a number of poorly documented features.

That's "bugs" isn't it?

Matthew

Josh Geller — 20 Aug 2003, 12:18 · follows matthew.malthouse

On Wed, 2003-08-20 at 00:19, matthew.malthouse at guardian.co.uk wrote:

On 19/08/2003 18:26:57 Josh Geller wrote:

I don't know about any of this. I do know that time is really interesting, and has a number of poorly documented features.

That's "bugs" isn't it?

No, bugs are undocumented features. These are merely poorly documented. Most of them have been well documented at one time or another, but the documentation has been lost, suppressed, ignored or whatever. A lot of it is actually still around, even quite widely distributed, but most people - even the people who have the most to do with it - don't understand it.

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Michael Buice — 20 Aug 2003, 15:14 · follows Josh Geller

On Tuesday, August 19, 2003, at 11:16 PM, James Wynn wrote:

but I did find a website that offers an experiment that permits one to see it in action (also I'm led to understand transistors incorporate QT???):

<http://www.altair.org/Qtunnel.htm>

I don't want to be obnoxious, but this is the same experiment I described in my previous post about tunneling, and it is completely accounted for by Classical Physics, no Quantum Mechanics required.

While this experiment involves a prism instead of a mirror, one could *imagine* it being done with mirrors.

I don't understand what experiment you're proposing.

It seemed to work so nicely, I wondered whether there was any basis to it in the Fish explanation.

If you're interested, when my copy of Shadow & Claw is returned to me I'll endeavor an examination of the matter.

Michael

James Wynn — 20 Aug 2003, 16:12 · follows Michael Buice

After Crush posted the following:

but I did find a website that offers an experiment that permits one to see it in action (also I'm led to understand transistors incorporate QT???):
<http://www.altair.org/Qtunnel.htm>

Michael Buice helped well as he could:

I don't want to be obnoxious, but this is the same experiment I described in my previous post about tunneling, and it is completely accounted for by Classical Physics, no Quantum Mechanics required.

Crush responds:

After stating "I don't want to be obnoxious" you should have said "but I can't help myself". That would have at least engendered some sympathy.

I didn't receive your post before writing mine, nor did I get a chance to read your post before sending it - although I'm sure you can imagine that I normally let nothing interfere with the chance for your wisdom to drop upon my ignorance-parched tongue. If I confirmed your explanation, what of it?

I think I made it clear that I am not an expert in physics -- nor that I should be trusted with higher mathematics. That's why I posed the questions to experts. The website presents the experiment as an example of quantum tunnelling. If quantum tunneling does not require quantum mechanics, then that's fine by me.

After Crush posted the following

While this experiment involves a prism instead of a mirror, one could *imagine* it being done with mirrors.

Michael Buice said:

I don't understand what experiment you're proposing.

Crush responds:

That because I didn't propose an experiment. However, the first prism *does* operate *practically* as a mirror tilted at a 45 degree angle. I recognize that no genuine mirror would be practical for the experiment described. Yet, I can *imagine* that if one *did* successfully replace the first prism with a mirror that the second prism could be replaced as well -- I was thinking in terms of plot-device rather than practical engineering. But Father Inire's mirror's are not real mirrors either. Perhaps they're some sort of cosmic prisms.

Michael Buice said:

If you're interested, when my copy of Shadow & Claw is returned to me
I'll endeavor an examination of the matter.

Please, please don't make me wait too long.

-- Crush