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Pharyngula

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PZ Myers is a biologist and associate professor at the University of Minnesota, Morris.


…and this is a pharyngula stage embryo.

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I reserve the right to publicly post, with full identifying information about the source, any email sent to me that contains threats of violence.

Random Quote

All our experience with history should teach us, when we look back, how badly human wisdom is betrayed when it relies on itself.

[Martin Luther (1483-1546), German Protestant leader]

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- Botanical Wednesday: Cacti aren't astronomers, silly!
- It never ends — Bemidji is afflicted with the toxin of creationism
- Mary's Monday Metazoan: The color of awe is BLUE
- *Titanoboa!*
- Friday Cephalopod: They're evolving wings!

A Taste of Pharyngula

Recent Comments

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Blogroll

Other Information

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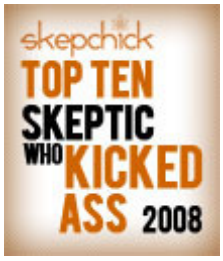
2006 Weblogs Award



« See? Exercise will kill you! | Main | Australians are laughing at us Americans! »

More articles by PZ Myers can be found on Freethoughtblogs at the *new* Pharyngula!

It almost makes me disbelieve that HIV causes AIDS!

Category: Skepticism
Posted on: January 24, 2011 8:55 PM, by PZ Myers

Nah, not really — that work has been independently confirmed many times over. Recently, though, Deepak Chopra has been praising Luc Montagnier, the Nobel prize winning co-discoverer of the human immunodeficiency virus, for tumbling down the walls of science — which ought to be enough to condemn the poor guy right there. But I had to take a look at exactly what Montagnier is claiming, and I'm afraid the only thing tumbling is his credibility.

Montagnier claims in several papers that the DNA of pathogenic bacteria emits an electromagnetic signal, and further, that if you dilute that DNA homeopathically so that no DNA is actually present, the water continues to emit that same signal. Further, if you put two vials of homeopathically diluted EMS emitting water next to each other, the signal can move from one to another. And further, only bacteria and viruses pathogenic to humans produce this signal; ordinary *E. coli* does not. It's madness piled upon madness.

There is no sensible explanation given for this phenomenon, only some wild-eyed speculation that "water molecules can form long polymers of dipoles associated by hydrogen bonds" that may be "self-maintained by the electromagnetic radiations they are emitting". More madness!

I'm not going to criticize the paper because it postulates a mysterious mechanism with no coherent physical cause, though. I read the paper and call it crap by virtue of the sloppiness of the work. I disbelieve it, not because I'm predisposed to find it unlikely (although I do), but because it's an appallingly bad paper.

First, let's look at the gadget he uses to record these signals.

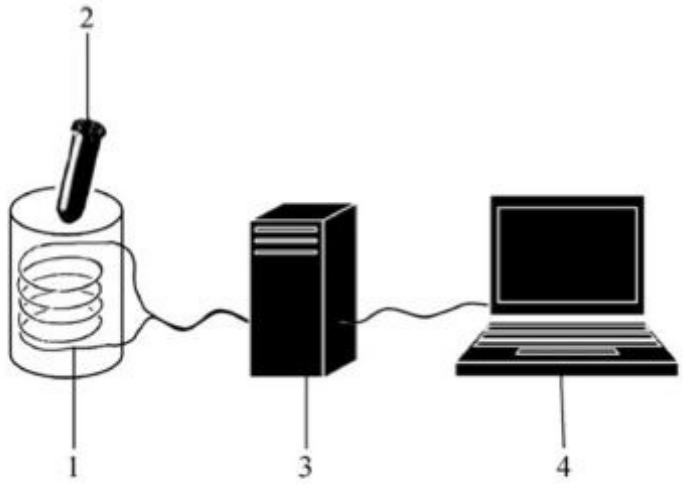


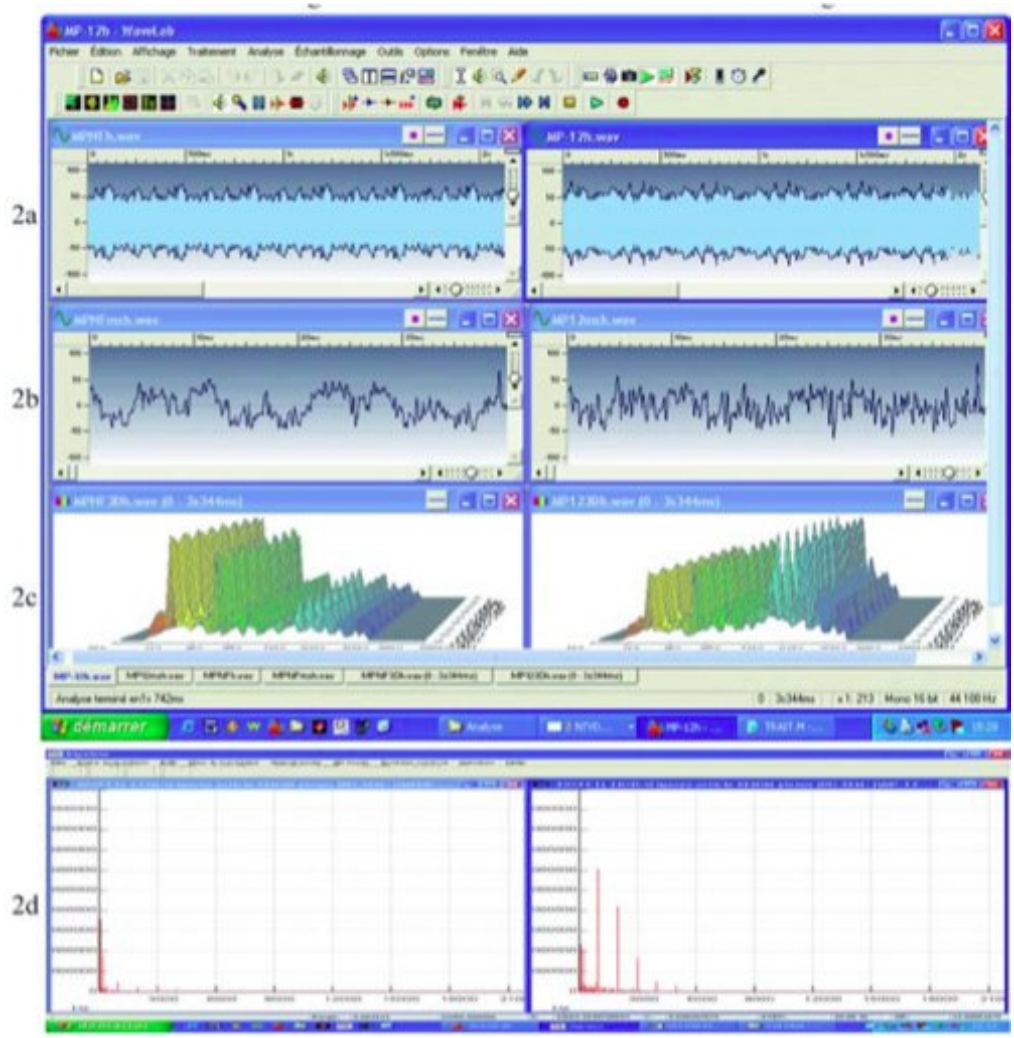
Fig. 1 Device for the capture and analysis of electromagnetic signals (EMS): (1) Coil: a bobbin of copper wire, impedance 300 Ohms; (2) Plastic stoppered tube containing 1 mL of the solution to be analyzed; (3) Amplifier; (4) Computer with softwares.

Awesome, isn't it? He uses a laptop PC with a Soundblaster audio card for analog to digital signal conversion, plugged into a hifi amplifer, which is in turn hooked up to a coil of copper wire. A vial contain the solution to be tested is dropped into the coil. Un-freaking-believable.

It's not at all impossible to measure electrical signals with an apparatus like this. I've done it myself; when I was a graduate student, I built a fun little gadget which consisted of an electronic circuit board that I etched to create a fine meshwork of thin interdigitating copper lines, on which I would place a larval zebrafish, and with it I could record the action potentials from the Mauthner neuron, a large cell that mediates an escape reflex in the fish. It actually worked reasonably well, but was a bit finicky — the fish had to be oriented just right, there couldn't be too much water on the plate or it would float away from the contact, and the signals were highly variable in strength. But yes, when an extraordinarily large cell fired off a massive signal (many tens of millivolts!) within a millimeter of the plate, we could pick it up with our apparatus. Of course, it was also wildly sensitive to all kinds of external signals — we'd do our experiments with the apparatus in a Faraday cage, and you could have great fun wiggling your fingers near the plate and picking up all kinds of spurious signals.

So now I look at Montagnier's apparatus, which looks even more rinky-tink than my old gadget, and what I see is a sensitive noise detector. It's little more than a fancy small-scale version of a Scientology e-meter, a gadget that picks up on noise in the environment and makes a needle on a dial wiggle.

Now look at the 'data' that comes out of it.



Detection of EMS from a suspension of Mycoplasma pirum: Left: background noise (from an unfiltered suspension or a negative low dilution). Right: positive signal (from a high dilution D-7 (10-7)). (a) actual recording (2 seconds from a 6 second recording) after WaveLab (Steinberg) treatment; (b) detailed analysis of the signal (scale in millisecondes); (c) Matlab 3D Fourier transform analyzis (abcissa: 0-20 kHz, ordinate: relative intensity, 3D dimension: recording at different times); Frequencies are visualized in different colors; (d) Sigview Fourier transform: note the new harmonics in the range of 1 000-3 000 Hz.

Apparently, all a Nobel prize winner can do is raw screen dumps from his PC, and he can get away with publishing that. But look at the raw data on the top — background noise from a cell-free vial on the left, and a massive homeopathic dilution of a *Mycoplasma* suspension on the right. Woo hoo! How many of you would like to be able to get crap data like that and *publish it*?

By the way, it's not just my tiny reduction of the figure that makes the scale invisible. They don't say anywhere what the magnitude of the EMS is. I suspect they don't know; they just crank up the amp to the max to get a lot of jangly jitter, and don't bother to calibrate anything.

There are a couple of other indicators that this is pathological science. They're looking at a minuscule, variable result that is prone to be picking up all kinds of irrelevant signals, yet nowhere in the entire paper can I find the word "blind". This is the kind of experiment that *demands* extreme rigor and care, yet the authors don't even bother to describe the protocols used. That's a warning sign.

Another sign is that the paper flits from topic to topic, doing quick superficial experiments with dilutions and crosstalk and chemical treatments. The paper itself is a welter of noise, and is one of the more unprofessional write-ups I've ever

run across — and remember, I teach undergraduates. They are claiming the existence of a truly remarkable phenomenon. A good scientist would focus on *one* fundamental observation, the claim that they can record species-specific bacterial signals with their crude apparatus, and nail that one down good and hard and believably. But no. They show off some very poor raw data and then rush off to dilute the experiment a trillion fold and claim to see the same signal. I found the first observation dubious, why are you showing me something even more unlikely?

And finally, another suspicious sign are the dates. This paper was submitted on 3 January 2009, revised on 5 January 2009, and accepted on 6 January 2009. That's an unbelievable turnaround, especially for a paper with such incredible results, and the revisions must have been trivial to be able to be whipped around in a day. Yet it's an awful paper that I would have shredded in a sea of red ink if it had come to me. Who reviewed this, the author's mother? Maybe someone even closer. Guess who the chairman of the editorial board is: Luc Montagnier.

The work does have some historical precedent, though. This is the same nonsense and the same apparatus that Benveniste was peddling. Is there something in the wine in France? I could almost believe this terrible waste of time was done under the influence of a hogshead or two of the cheap stuff.

Montagnier L, Aissa J, Ferris S, Montagnier J-L, Lavallee C (2009) Electromagnetic Signals Are Produced by Aqueous Nanostructures Derived from Bacterial DNA Sequences. Interdiscip Sci Comput Life Sci 1: 81-90.

Find more posts in: Life Science

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Comments

Posted by: Glen Davidson | January 24, 2011 9:16 PM #1

Ooooh, *Twilight Zone.*

Gee, a Nobelist can get away with a lot, huh?

Anyhow, it looks sloppy all right, but the great thing is that attempts at replication are certain, and will knock it down if it's wrong (the good money), or confirm it if the longshots get their day.

Meanwhile, how far have the IDiots gotten with any sort of replicable work confirming magic? Oh yeah, they don't dare propose any meaningful mechanism whatsoever.

Glen Davidson

Posted by: James F | January 24, 2011 9:18 PM #2

The first issue of *Interdisciplinary Sciences: Computational Life Sciences* was published in March 2009. People, quit sending manuscripts to these McJournals that keep springing up, it only encourages them!

Posted by: Cuttlefish, OM, CR | January 24, 2011 9:20 PM #3

Oh, what tangled shite we find
When first we drop our double blind

Posted by: Blake Stacey | January 24, 2011 9:25 PM #4

> First, let's look at the gadget he uses to record these signals.

It appears to be made out of clip art.

Posted by: chigau (◦_◦) | January 24, 2011 9:27 PM #5

Another Nobel Scientist
http://en.wikipedia.org/wiki/Kary_Mullis
barking mad

Posted by: tallman | January 24, 2011 9:29 PM #6

Why is it that the supposed significance of a proposition is inversely proportional to the font size of the website?

Posted by: Timaahy | January 24, 2011 9:30 PM #7

Haha, Cuttlefish and Blake Stacey... tops

I'm curious as to:
(a) what he proposes this "discovery" be used for; and
(b) when he's appearing on Oprah.

Posted by: stopthatastronaut | January 24, 2011 9:34 PM #8

So, highly sensitive apparatus, a spurious mechanism of action, and an explanation from actual science that the author has entirely ignored?

He's DOWSING for homepathy. It's like a perfect storm of bollocks.

Posted by: Ross | January 24, 2011 9:36 PM #9

I seem to remember a idiot on TV a few years ago (here in Australia) claiming that homoeopathy was true and that the effect was transferable via the intertubes. The idea is to create a homeopathic solution in one country, hold it front of a web-cam and in another country place a glass of water in front of the a monitor showing the web shot of the original solution... Amazing what shit people will believe, however I suppose you could argue that all of the curative effects in the new solution are identical to the original homeopathic solution (i.e. none). For the Aussie readers it was probably on Today Tonight or A Current Affair.

Posted by: bowlesjd | January 24, 2011 9:42 PM #10

A coil of wire hooked up to an audio amplifier? That's going to pick up every stray EM field for miles.

Posted by: SWH | January 24, 2011 9:42 PM #11

A nobel gets you in the journal's door certainly - but I'm very surprised that someone of his seniority would even be

knocking at this one - let alone on the editorial board. This Journal is too new to have an impact factor, which, at least in my field (unless it was a new journal in the Cell or Nature family) would make it the sort of place that you might let a desperate graduate student who needed a pub to graduate publish (quietly, where nobody will notice).

If this were really the great discovery it should be presented as (if true) he could probably have used his gong to get it reviewed somewhere a bit more high profile. Then again perhaps he's just exercising his inner thetan.

Posted by: Ross | January 24, 2011 9:44 PM #12

Just looked up Water Memory on Wikipedia and it has reference to the above transmission via the internet.

Posted by: BoxNDox | January 24, 2011 9:44 PM #13

So biochemistry now has it's own version of cold fusion. It's that just lovely?

Speaking of cold fusion, apparently there's a new claim in that area; details here.

Having once spent over a month carefully measuring what turned out to be a parasitic capacitance that managed to creep in to a very sensitive experiment, I can understand how this silliness might have started. But not how it kept going to the point of publishing drivel.

Posted by: Carlie of the lacy, gently wafting adjectives | January 24, 2011 9:47 PM #14

Hey now, he has a "computer with softwares". Those can do *anything*.

Posted by: Aliasalpha | January 24, 2011 9:47 PM #15

@Ross

> For the Aussie readers it was probably on Today Tonight or A Current Affair.

You started off by saying "idiot on TV a few years ago (here in Australia)", that kind of narrows it down to the point where ACA or TT are the most likely options. The homeopath should have said it can also cure shonky builders, he'd never be off either show

Posted by: Bill Door | January 24, 2011 9:50 PM #16

Symptoms of Pathological Science, according to Langmuir:

1. The maximum effect that is observed is produced by a causative agent of barely detectable intensity, and the magnitude of the effect is substantially independent of the intensity of the cause.
2. The effect is of a magnitude that remains close to the limit of detectability; or, many measurements are necessary because of the very low statistical significance of the results.
3. Claims of great accuracy.
4. Fantastic theories contrary to experience.
5. Criticisms are met by ad hoc excuses thought up on the spur of the moment.
6. Ratio of supporters to critics rises up to somewhere near 50% and then falls gradually to oblivion.

Posted by: Blake Stacey | January 24, 2011 9:50 PM

> There is no sensible explanation given for this phenomenon, only some wild-eyed speculation that "water molecules can form long polymers of dipoles associated by hydrogen bonds" that may be "self-maintained by the electromagnetic radiations they are emitting". #17

Ah, polywater.

Posted by: Larry | January 24, 2011 9:52 PM #18

Based on that schematic of the test setup, I'd be surprised if they weren't recording energy emanating from the Rush Limbaugh show on the local AM station. A pathogenic virus to be sure, but not the one they were looking for.

Posted by: Nerd of Redhead, OM | January 24, 2011 9:54 PM #19

My SWAG guess is they are seeing harmonics from the display of a lap top computer.

Posted by: rather be fishing | January 24, 2011 10:00 PM #20

I try to teach high school kids how to present their results from lab investigations. If anyone dared to submit such outrageous claims on such weak evidence, I would refuse to accept it, make them come in at lunch and do it all over again.

The evaluation of the results could be summed up as “my co-author is an idiot”.

Posted by: Epikt | January 24, 2011 10:03 PM #21

He's French; shouldn't he be proposing n-rays as the underlying mechanism?

Posted by: Blake Stacey | January 24, 2011 10:04 PM #22

OK, scientists, let's devise our protocol for replicating this experiment. First step is to choose the fluid which will be diluted. Other than the genuinely scary stuff in the back of my undergraduate friend's refrigerator, I'm not sure where I can get a microbial growth culture . . . but I do have a well-stocked bar at home.

Hard cider? Vodka? Tequila?

. . . No, I'm not sure those are quite appropriate . . . we need a substance more . . . renewable . . .

Let's replicate the Montagnier experiment with semen.

(For sufficiently large *N,* will the experimentalists go double-blinded? Inquiring minds want to know.)

Posted by: A Bad Idea (♀) | January 24, 2011 10:06 PM #23

The knowledge I gleaned from my radio astronomy phase is telling me that unless they did this in a bona-fide faraday cage withOUT the computer in it... well... do you have any idea how radio LOUD those things are?! And what a bizarre variety of different "sounds" they generate?!

The "softwares" thing is driving me crazy... but he appears to not be a native English-speaker so I'll give it a pass... but he is taking meaningless noise that looks slightly denser than different meaningless noise in a noisy environment and saying that empty water is generating a signal? Am I reading this right?

Posted by: James F | January 24, 2011 10:08 PM #24

#17

Blake, I knew that sounded familiar! It was on "The Naked Now" from *Star Trek:The Next Generation,* a.k.a the Data and Tasha episode.

Posted by: Dae | January 24, 2011 10:10 PM #25

My significant other showed me the article that figure's from and my immediate response was "looks like some grad student's very elaborate troll" (there was no journal citation on the copy I saw). But if he really did write and publish it... wow.

Posted by: lykex | January 24, 2011 10:11 PM #26

> we'd do our experiments with the apparatus in a Faraday cage

Ah, but that's not possible here, since:

> The emission of such waves is likely to represent a resonance phenomenon depending on excitation by the ambient electromagnetic noise

In other words, if they filter out the noise, they get no effect.

Surely you see how misguided your criticism is now, right, PZ?

Posted by: No One | January 24, 2011 10:12 PM #27

Yo Luc!

Your guitar is unplugged.

Posted by: PZ Myers | January 24, 2011 10:12 PM #28

Yeah, I've done some electrophysiology years ago, and I know how tricky this stuff is to set up. Ground loops. Man, I hate ground loops.

One giveaway: they talk about unplugging the computer and running it on batteries during the experiment, to reduce all the 50/60 cycle noise they were getting. They seem to think a computer isn't pumping out all kinds of strange EM signals if it isn't connected to an outlet.

Posted by: 'Tis Himself, OM | January 24, 2011 10:14 PM #29

Actually Montagnier did use a control, he's just interpreting it incorrectly. His homeopathic solution, the DNA diluted such that no DNA remains, returns the same signal. That tells us there's no difference in the signal between a DNA rich solution and a DNA poor solution. Ergo the DNA has no effect on the signal.

I wonder if they got a different signal each time a car drove by the lab. I suspect they did.

Posted by: Blake Stacey | January 24, 2011 10:15 PM #30

BoxNDox (#13):

I saw some good comments by a condensed-matter physicist on the recent cold fusion hype here.

Posted by: lykex | January 24, 2011 10:21 PM #31

Good news, though; they've made testable predictions:

> Experiments to be reported elsewhere indeed indicate that this detection applies also at the scale of the human body: we have detected the same EMS in the plasma and in the DNA extracted from the plasma of patients suffering of Alzheimer, Parkinson disease, multiple Sclerosis and Rheumatoid Arthritis. This would suggest that bacterial infections are present in these diseases.

Of course, they don't say that bacterial infections *cause* these diseases, only that they are *present*.

Remember, kids, when talking bullshit, always leave yourself plenty of wiggle room.

Posted by: Antony | January 24, 2011 10:23 PM #32

Of course it makes much more sense if you assume he set out to destroy his credibility as a scientist.

Posted by: Blake Stacey | January 24, 2011 10:23 PM #33

PZ (#28):

> They seem to think a computer isn't pumping out all kinds of strange EM signals if it isn't connected to an outlet.

Poor Luc Montagnier: from Nobel laureate to world's least competent Van Eck phreak. Le sigh.

Posted by: kraut | January 24, 2011 10:25 PM #34

Freaking nonsense. I was measuring with tubes signal output of animal brains in the 60's, and remember the care we took to eliminate all kinds of noise. I think we even used a faraday cage to measure the animals in.

Posted by: Thaddeus G. Blanchette | January 24, 2011 10:27 PM #35

Wow.

How sad.

Looks like Nobel Ego Syndrome has struck another pathetic victim. I haven't seen it this bad since that noted African-American Nobel prize winner James D. Watson remarked on the supposed effects of melanin on the human sex drive.

Posted by: Laplace's Demon | January 24, 2011 10:38 PM #36

So this'll make him the first person to win an Ig Nobel *after* a Nobel, amirite?

Andre Geim, step aside.

Posted by: co | January 24, 2011 10:51 PM #37

And remember, Best Beloveds, that Benneth often quotes Montagnier as a supporter of his ridiculous homeopathy

mechanisms. When reading B's blog for the first time, I came upon reference to that paper, PZ, and puked a little in my mouth.

Sometimes self-publishing is necessary and turns out to be a good thing for the world; I can only hope this happens to be one of those times (likely if his intestines hurtle up his throat in embarrassment and throttle him).

Posted by: david.utidjian | January 24, 2011 11:01 PM #38

Later this semester we will be doing an experiment in first year Physics measuring the strength of magnetic fields. We use a (sort of) similar setup though I like to think that my diagram is more clear than the one in the paper.

Anyhow.... a coil (bobbin) of wire with 300 Ohms impedance will have a lot of turns. It will be very sensitive to any stray magnetic fields.

In our lab we use ten turns of copper wire to produce the field we want to measure. We use a hall-effect magnetometer to measure the strength of the magnetic field. There is a LOT of noise in the signal and we take a reading for about 5 seconds and take a mean from the data during that period as the value. We perform the experiment in a room that is entirely enclosed in metal. It is not a proper Faraday cage because there are a lot noise sources inside the room (fluorescent lights and computers to name a few.) If there is a cell phone any where near the apparatus that is "checking in" (or whatever) the signal goes absolutely haywire. Therefore we instruct students to turn off all wireless devices when doing the lab IF they want to get good data. They reluctantly comply.

Posted by: mike | January 24, 2011 11:08 PM #39

Prof Montagnier has been busy - this similarly dubious article on the related topic of EM signals emanating from solutions of HIV DNA is published in the same journal. Same homebrewed apparatus, dodgy screenshot figures, lack of observer blinding, and absolutely no mention of replication or statistical analysis. Interestingly, this article has a similarly short time from submission to acceptance - a mere three weeks. If only my manuscripts could be reviewed and accepted so quickly!

Posted by: gobaskof | January 24, 2011 11:28 PM #40

The editorial staff also failed to notice that every time nanometres are used they are written nM not nm. As a nanoscience PhD student I had to actually reread to check he was talking about length, and check that M is not some crazy French unit or an obscure convention for metre (like crazy Americans calling it a meter!). Sticks out like a fucking sore thumb. I haven't got past the first page and I am angry.

Posted by: scotticus | January 24, 2011 11:29 PM #41

How can we quash this shit without unduly silencing dissent and usefully wacky ideas in the scientific community? I am extremely disturbed that stuff like this manages to get published *somewhere*, thus enabling it to declare equal footing with other published science. If people actually believe what he says (and this is the internet, so I can only assume this will happen), people will die. MS and Parkinson's are just bacterial infections?
If we're talking about the scientific community, this is beyond irrelevant, but we're not. We're in a whole different world where the rules of a fair process are abused by crazies and snake oil salesmen- with real consequences. How can we deal with that and save people from themselves?

Posted by: eigenperson | January 24, 2011 11:39 PM #42

Somewhat related story:

A while ago I noticed that my LED computer monitor (not the speakers -- the monitor) was making a strange (and loud!) high-pitched noise, but only while a particular spreadsheet was in the foreground. If I pressed Alt-Tab, the noise would stop.

Eventually, I realized that the sound was caused by the repeating pattern of horizontal lines in the spreadsheet. This particular sheet had the cell borders set to black -- when I changed them to a lighter gray the sound was decreased, and when I changed them to white it went away.

I'm still not sure what was causing the sound, but I assume there was a corresponding EM signal as well. The NSA could probably have picked it up from miles away, to say nothing of a completely unshielded coil right next to it on my desk.

Posted by: Markita Lynda: Healthcare is a damn right | January 24, 2011 11:44 PM #43

He's using this 'research' to prop up other 'research' in which he'll be unethically giving children antibiotics for too long to see if that will cure autism (if he can sneak it by an ethics review board).

> ...With support from the Autism Research Institute (ARI), based in San Diego, California, the Nobel laureate is about to launch a small clinical trial of prolonged antibiotic treatment in children with autism disorders. The trial will also use techniques based on Montagnier's research into the notion that water can retain a 'memory' of long-vanished pathogens, and that DNA sequences produce water nanostructures that emit electromagnetic waves, published last year....
>
> The Infectious Disease Society of America have reviewed long-duration antibiotic treatments in Lyme disease, and concluded in April that the "inherent risks of long-term antibiotic therapy were not justified by clinical benefit". Montagnier acknowledges that safety concerns exist, but argues that opposition to long anti-biotic treatments can also be "dogma".
>
> Besides screening the children for pathogens with conventional DNA-amplification techniques, the researchers will use a diagnostic test based on the controversial idea championed by the late French scientist Jacques Benveniste, who claimed that water can retain the memory of substances it contained even after they have been diluted away. Studies have failed to confirm the claim, but Montagnier thinks that the 'memory' structures in the water can resonate with low-frequency electromagnetic signals, which he hopes can be transmitted over the Internet. He claims that very dilute solutions of pathogen DNA also emit such signals, and he intends to use this as a sensitive 'biomarker' for chronic infection.

What a waste of money!

He also plays the martyr card:

> Asked why he didn't try to publish his astonishing findings in a higher-profile journal, Montagnier explained that he was sure that if he had sent them to Nature or Science, he would have run foul of experts who, on seeing mention of Benveniste or 'memory-of-water', would "reach for their revolvers".

Posted by: https://me.yahoo.com/a/jUTXSNMKyYn2dV474eld47MpbTucJpCAHw--#636c6 | January 24, 2011 11:46 PM #44

> Another Nobel Scientist http://en.wikipedia.org/wiki/Kary_Mullis barking mad

You should read his Nobel speech. I mean it was brilliant, but also kinda nuts. He basically just thought up PCR out of

the blue. But thank... well whatever you want to thank... that he did.

Posted by: foolish-rain | January 24, 2011 11:47 PM #45

Greedy bastard. The Nobel is not enough. He wants an Ig Nobel too.

Posted by: Anri | January 24, 2011 11:51 PM #46

You know, eigenperson, I have often noticed a very high at-the-edge-of-hearing discordant tone associated with a CRT not receiving any data... I used to call it 'monitor whine' and I hated it. A room full of old Apple's with the systems off but the monitors still powered up could reduce me to tears. If it was just a dingle unit, I would walk around until I could pinpoint it by sound.

As I age (the Apple's were in my HS classes, so I'm certainly aging) and my high-range hearing is beginning to go, the effect is substantially less. Also, nicely enough, modern displays seem to be much less prone to it.
I can still tell when our TV is set on 'video' when the device it is switched to is powered down. But at least I can't tell from the *kitchen* anymore...

(I assume this is totally unrelated... just tossing my personal oddness out for others to nod sagely at and then carry on..)

Posted by: John Harshman | January 24, 2011 11:53 PM #47

Adding to the list of weird Nobelists in medicine, Roger Sperry was convinced that ordinary cellular metabolism violated the 2nd law of thermodynamics. I don't know that he ever published anything on the subject, which if so is fortunate. But he tried to convince a roomful of Caltech freshman of this in 1972, and we weren't buying.

Posted by: Sonja | January 24, 2011 11:57 PM #48

Chopra is doing more than praising it. He is claiming that Spirituality Is the New Science in his HuffPo column.

Chopra says:

> What delights me about this controversy, which will be won by the skeptics, naturally, is that conventional science is fraying around the edges, and the fraying is being done by scientists themselves.

The rest of the article is a scrambled, rambling summation of the quantum woo he's been pitching for decades. At least he admits he will lose the argument.

I recall that he told Dawkins in an interview that he only used the language of quantum theory as a metaphor. I guess he was lying to Dawkins, because he's back at it.

Posted by: Markita Lynda: Healthcare is a damn right | January 25, 2011 12:05 AM #49

Pound on three key points:

* What mechanism do they propose for the observed results? No mechanism, no theory. No theory, nothing worth testing. And that includes for the "memory of water" or the "pass through the Internet" parts.

* What would they do to exclude stray signals from outside? And why aren't they doing it?

* They're not allowed to "fish" in the data for random correlations. They must specify the results they expect to see or the method by which they will analyze the data up front.

And complain violently to Springer for publishing bumf.

Posted by: johnsma11berries | January 25, 2011 12:08 AM #50

> a Scientology e-meter, a gadget that picks up on noise in the environment and makes a needle on a dial wiggle.

Sorry, but that's actually not true. An E-Meter is a Wheatstone Bridge circuit with a bunch of bells and whistles attached to make it look more complicated; it measures galvanic skin response, not "noise in the environment".

It's basically a crude "lie detector"; cult members being "audited" hold onto metal cans which serve as terminals for the Wheatstone Bridge. As they recount painful memories, the changes in skin resistance read on the E-Meter, and the "auditor" has them repeatedly describe the memory until it no longer produces a reaction on the meter (much in the same way that repeating a word can temporarily disassociate it from its meaning).

Of course, they claim that the E-Meter measures "mental mass and energy", and that auditing "releases the mental mass of engrams". So it's still bullshit, but it's not bullshit based on "noise in the environment".

Posted by: Markita Lynda: Healthcare is a damn right | January 25, 2011 12:11 AM #51

Anri, you're probably hearing the 15 kHz horizontal sync signal. Cheap TVs have it really loud.

In my youth, I could hear the 18 kHz cycle of some alarm systems, so there was a jewellery store that I couldn't go into because they didn't turn off the signal, just turned off the alarm part.

Posted by: evilDoug | January 25, 2011 12:21 AM #52

It is convenient that the mystical frequencies fall within the audio spectrum.
There are several features of the two 2b waveforms that are very similar, and notably occur at exactly the same times, relative to the start of the sample period. Unless the control and specimen were sampled (I misspelled that as *sham*pled the first time) simultaneously, the probability of that would be extremely low. If the two were sampled simultaneously, there would have to be two pickup coils. Since they could not occupy the same space at the same time, they would pick up different magnitudes of interfering signals, unless the interference source was a very long way away. There would also be a problem with the control coil picking up the residual bacterial brain waves from the specimen.
I wonder if he ever connected earphones or speakers to the output of the amplifiers.
~~~
I used to occasionally build circuitry for researchers at the local U's med school. I've never before or since seen so many big boxes made with copper "window screen".
~~~
Ground loops are easily solved by using local zero volt nodes. I can't count the number of times I've wished someone actually manufactured them.

Posted by: https://me.yahoo.com/a/abEArdFwn9_cgFyUODO3TloMfrfOGIbT#7357f | January 25, 2011 12:22 AM #53

Eigenperson, you might appreciate this article:
http://www.newscientist.com/blog/technology/2007/04/seeing-through-walls.html

Apparently though the technique (Van Eck Phreaking) is relatively trivial for CRT monitors, it's still possible to pick the transmission of the VGA cable going to a LCD display. I'm curious as to whether anyone has figured out how to do this with HDMI cables...

Posted by: A Bad Idea (♀) | January 25, 2011 12:35 AM #54

eigenperson: Bust out an analog AM radio and turn the dial while holding it up to your monitor. You will hear all sorts of freaky stuff, especially when there is a simple repeating pattern on the screen like you described. Your speakers/audio cables must have a shielding problem.

This Linux program will generate screen patterns that result in music you can pick up on a radio. It is calibrated for shortwave but you can hear very interesting harmony on AM :)

When my autistic brother was very small, he would NOT walk through security scanners and behind computers, and everyone chalked it up to him being funny like that. Of course this happened even when the scanners were concealed, so it was not him acting up. When he got older and more articulate, he told us that he could hear a high-pitched whine inside his head that went away eventually.

Posted by: Rick Miller | January 25, 2011 12:36 AM #55

This EM radiation baloney sounds like the old "vibrations" bullshit Chopra used to peddle.

Posted by: H.H. | January 25, 2011 12:39 AM #56

Ross @ #9 said:

> I seem to remember a idiot on TV a few years ago (here in Australia) claiming that homoeopathy was true and that the effect was transferable via the intertubes. The idea is to create a homeopathic solution in one country, hold it front of a web-cam and in another country place a glass of water in front of the a monitor showing the web shot of the original solution... Amazing what shit people will believe

Yeah, homeopathy is essentially very primitive magical thinking. The type of experiment you describe--and the expectation that such a thing *could* work--is very clearly an example of what's called sympathetic magic.

From wiki:

> Sympathetic magic, also known as imitative magic, is a type of magic based on imitation or correspondence. The theory of sympathetic magic was first developed by Sir James George Frazer in The Golden Bough. He further subcategorised sympathetic magic into two varieties: that relying on similarity, and that relying on contact or 'contagion':
>
> > "If we analyze the principles of thought on which magic is based, they will probably be found to resolve themselves into two: first, that **like produces like**, or that an effect resembles its cause; and, second, that **things which have once been in contact with each other continue to act on each other at a distance after the physical contact has been severed**. The former principle may be called the Law of Similarity, the latter the Law of Contact or Contagion. From the first of these principles, namely the Law of Similarity, the magician infers that he can produce any effect he desires merely by imitating it: from the second he infers that whatever he does to a material object will affect equally the person with whom the object was once in contact, whether it formed part of his body or not." (bolding mine)

Posted by: carbone1853 | January 25, 2011 12:47 AM #57

As long as we are pilling on...

"(c) Matlab 3D Fourier transform analyzis (abcissa: 0-20 kHz, ordinate: relative intensity, 3D dimension: recording at different times);"

Fig 2(c) Looks more like he did a 1D Fourier transform on 3D Data. (and then displayed a 2D slice of the data) A rookie error.

Posted by: Pareidolius | January 25, 2011 12:57 AM #58

Markita
I totally empathize about the alarms. When I was a kid the jewelry department at I. Magnin's Felt like a knife in the middle of my head. Now I have tinitus to take it's place:/

Posted by: Midnight Rambler | January 25, 2011 12:59 AM #59

> But look at the raw data on the top — background noise from a cell-free vial on the left, and a massive homeopathic dilution of a Mycoplasma suspension on the right.

Funny you mentioned blinding, because after seeing the figure but before reading this I was thinking the supposed throbbing Mycoplasma* would be the left one. That at least seems to have sort of a pattern to it for some reason.

* - incidentally, "Throbbing Mycoplasma" would make an awesome band name

Posted by: omatix | January 25, 2011 1:16 AM #60

So, they do describe a double-blind protocol they used. Which I guess is good. But it doesn't make up for total lack of reporting of experimental variation, units or proper controls.

So, say we grant them that they're getting real, reproducible readings. They still don't demonstrate the source of the readings correctly: their dilutions contain all kinds of other crap (the 1:10 and 1:100 dilutions are always in RPMI media, which contains a bunch of ions and organic molecules, ostensibly to "avoid eventual protein precipitation" - WTF?). And they keep comparing different dilutions to each other, rather than the same dilutions of a no-DNA control vs their experimental sample. Blech.

What's more, their DNAse smoking gun is poorly controlled: adding DNAse plus MgCl2 removes the signal, yet they compare it to a sample with nothing added, rather than MgCl2 plus (for example) heat-denatured DNAse. But, really, even bothering to address obvious experimental flaws like this lends undue respect to the whole thing.

Oddly, they mention that vortexing (= extremely vigorous mixing, in case those machines aren't familiar to all) of the samples for 15s prior to measurement is essential for them to get any result. Any physicists able to propose why that might be?

For all I know, DNA causes magical water resonance. But this paper doesn't get anyone much closer to a demonstration of it, let alone a mechanism.

Posted by: Moggie | January 25, 2011 2:29 AM #61

#9:

> I seem to remember a idiot on TV a few years ago (here in Australia) claiming that homoeopathy was true and that the effect was transferable via the intertubes. The idea is to create a homeopathic solution in one country, hold it front of a web-cam and in another country place a glass of water in front of the a monitor showing the web shot of the original solution

One of Benveniste's claims was that the "memory effect" of water could be digitised and transmitted. It was amusing to witness the facepalming this caused among the less wild-eyed homeopathy supporters. As long as Benveniste could be claimed as a "serious scientist" offering experimental support for homeopathy, he was a woo hero, but when he went (more) off the rails and began touting homeopathic email, he became a joke.

Posted by: MadScientist | January 25, 2011 3:01 AM #62

I have to take a poke and guess what some of those plots are - but the series of mountains with no units on the Y axis looks suspiciously like a Fourier Transform of a rectangular pulse. If only I could see the axes clearly labeled, I could tell you some of the operating characteristics of the laptop's power supply, such as its fundamental switching frequency.

Even 30 years ago it was annoyingly difficult to screen out all sorts of electromagnetic noise from experiments; this is why radio engineers have a nice copper-clad room to work in.

The setup reminds me of something from Scientific American from the 1980s (or perhaps early '90s). Anyone care to dig up the original SciAm article?

Anyway, on the left hand side Montagnier is getting noise + induced signals, and on the right hand side he's got the same but with a slight decrease in the induced signal. The change in signal is fairly typical of what you'd get by merely changing the distance between your hand and the coils. If Montagnier were in one of my classes, he'd likely get a failing grade due to his inability to comprehend how to measure electrical signals without getting too much noise.

Posted by: AJ Milne OM | January 25, 2011 3:17 AM #63

I can haz the JREF's prize? I'm about to make a prophecy...

(Holds card to forehead, Carnac-style...)

I see an easy refutation, with a coupla wags forming a research team, and getting random 'signatures' using this apparatus from a handful of liquids chosen for their comic effect. One of them, necessarily, a hogshead of Château du Plonk, in honour of this post... It will be pointed out that the 'signal' recorded is, in fact, in no particular way a function of the sample tested, and if you're careful not to nudge stuff too wildly in moving stuff around, and honestly and consistently report your amplitudes, you can get the same 'signature' from a 30C dilution of MRSA and, appropriately, a vial of Kool-Aid. For additional entertainment value, the Linux program generating music on the shortwave bands via monitor noise will be repurposed to generate an easter egg in the data, and it will be noted that if you treat the high peaks in several of the plots as binary ones, and lower ones as zeros, these plots just happen to spell out 'Fail!' in unicode...

... aaaaand the original paper will continue to be cited by homeopathy-pushing frauds and their fans for decades to come all the same, never mentioning the notable failure to replicate and the damning refutations that such attempts had yielded, the claims even exaggerated, on occasion, to pile it into an even higher mound of BS. Sample claim: 'Specific bacteria leave specific signatures... there's a database of 'em in the Pentagon for identifying dilutions, one for every genotype of every known pathogen... I saw it on *Oprah*!'

(/Please to deposit my prize in twenties, non-consecutive serial numbers...)

Posted by: Markita Lynda: Healthcare is a damn right | January 25, 2011 3:22 AM

OK, if they think they are measuring a special property of *water*, let us replicate the experiment using something else, like oil or sawdust, and see if the results differ. #64

Posted by: Markita Lynda: Healthcare is a damn right | January 25, 2011 3:26 AM #65

Or... an empty test tube!

Posted by: christophe-thill.myopenid.com | January 25, 2011 3:57 AM #66

In the name of everything that's French, I humbly ask the honorable assembly for forgiveness.

Posted by: eigenperson | January 25, 2011 4:02 AM #67

Melissa #54: I'll have to give that program a try. I knew that CRTs failed TEMPEST tests, but I wasn't aware that the same thing was true of just the VGA cable.

I guess I must have been hearing some kind of harmonic of the RF noise.

Posted by: Phodopus | January 25, 2011 4:32 AM #68

> Montagnier claims in several papers that the DNA of pathogenic bacteria emits an electromagnetic signal,

What a loser, everybody knows that only Radiolarians do that...

Posted by: drbunsen | January 25, 2011 5:11 AM #69

Anri #49 re: 'monitor whine'

The windings (very fine copper wires) of the deflection coils in CRT monitors & TVs are under a reasonably large amount of physical stress because of the oscillating magnetic fields they are surrounded by. They are glued down to prevent them moving. If this glue is old, or insufficient, sometimes a section of winding will be loose enough to oscillate physically, thus creating an audible tone. The frequency they vibrate at is right on the upper edge of human hearing, so only those with good high frequency hearing will be able to detect it.

Posted by: Rorschach | January 25, 2011 5:44 AM #70

I read this in the New Scientist the other day. The article stated that in homeopathic concentrations beyond 10^12, the effect was not measurable. Maybe that was just a ploy to detract those who see it as a sham to boost "water memory", and hence homeopathy.

Posted by: Stephen Wells | January 25, 2011 6:11 AM #71

Hmmm. Pardon me for being a terribly naive and old-fashioned physicist, but if the solutions are constantly emitting electromagnetic radiation... where is the energy coming from?

Posted by: geraud | January 25, 2011 6:15 AM #72

I really think that the peer review system doesn't stand the fame.

Another affair called the bogdanov affair:

http://en.wikipedia.org/wiki/Bogdanov_Affair

When two brothers are famous on Tv for their science show and manage to have a Phd, they end publishing a paper about what's before the big bang. Everything doesn't make any sense. But what the fuck? nobody understand really the rope theory and millions of vulgarization books are sold.
The most funny is how they try to escape the whole thing once unmasked.

Posted by: geraud | January 25, 2011 6:30 AM #73

maybe "string theory" was a better expression. I forgot to tell you that their book is called "the visage of god" and it was a more sold in France than "a bried history of time" by hawking.

Poor science.

Posted by: Muskiet | January 25, 2011 6:49 AM #74

Ummm.... forgive me, but a coil used with a SIGNAL amplifier could indeed be used to monitor minuscule electro magnetic signals which then are amplified and routed to a laptop that runs an appropriate type of software to show the output of the amplifier.
Of course you wouldn't be plugging the amplifier into the sound card of the laptop.

Posted by: Tualha | January 25, 2011 6:59 AM #75

I see Montagnier is 78 years old. Antony Flew comes to mind.

Posted by: David Marjanović | January 25, 2011 7:14 AM #76

> As a nanoscience PhD student I had to actually reread to check he was talking about length, and check that M is not some crazy French unit or an obscure convention for metre (like crazy Americans calling it a meter!).

M = mole/liter = "molar". nM = nanomole/liter = "nanomolar".

If he's really* talking about lengths rather than concentrations, though, he's... slightly crazier than I already thought.

* I don't see a reason to read the paper.

> I am extremely disturbed that stuff like this manages to get published somewhere

"Manages to" isn't the right term. It's self-published (first author = editor) without any peer review (look at the dates). I don't see how that could be made impossible. It's of course already impossible in good journals.

> I can still tell when our TV is set on 'video' when the device it is switched to is powered down.

So can I. A very annoying sound.

> What a loser, everybody knows that only Radiolarians do that...

Win.

> I really think that the peer review system doesn't stand the fame.

What do you mean? Anyway, that paper clearly wasn't peer-reviewed.

Posted by: guillm | January 25, 2011 7:44 AM #77

From what I read earlier, Montagnier was due to retire in France, having reached by far the limit legal age to work. Some Chinese university jumped on it and offered him a position to perform these homeopathic 'stunts' (would you call it 'research'?) in an newly-created institute bearing his name. Hence his probable presence on the editorial board of this crappy Elvesier (sorry for the pleonasm) journal, majoritarily composed of Chinese academics.

All 'regular' and honest Chinese scientists who in addition of fighting the world stereotypes now have those quacks led by a marble-loosing Nobelist with a dusty rep.

Sigh

Posted by: geraud | January 25, 2011 7:51 AM #78

Even if the peer review system is the better, it has his owns flaws and limits.
i mean that the reviewers are maybe too busy from times times to take a good look on the papers and when a name like montagnier comes in they are maybe too confident with the content and try to earn time with it. i don't know.
But there's a sociology of the science field which has been well described by Bourdieu. Your place in this field might be important to get money for your work but it can also affect the way you're reviewed, i guess.

For the bogdanov brother, it's another problem because they're few people able to review theoritical physic as it gets more and more complicated with high level mathematics. They just throwed very complicated notions of all sort in their papers, it was only buzzwords that made no sense but it has been accepted too.
Following this affair, some physicist declared that the reviewing was becoming a problem in their field.

Posted by: Flex | January 25, 2011 7:55 AM #79

Something related to my current job. I do electromagnetic compatibility testing for a major automotive supplier.

We have a large collection of Faraday cages and three anechoic chambers (one big enough for whole vehicle testing).

Even so, a certain amount of noise gets into the chambers and can influence testing. While the lower frequencies of laptop switching power supplies are rather well shielded, both cell phones (~850Mhz) and WiFi (2.4GHz) can penetrate our walls fairly easily. (We rarely test to the higher WiFi frequencies, we normally stop at about 2.7GHz.)

The purpose of such testing is two-fold. It developed in order to ensure that customers didn't get noise on their radios or other electronic devices. It also ensures that interactions with the various fields don't do anything like fire the airbag. No, I don't know of any case where the airbag has gone off because of EMF, but we do test to ensure that it won't.

The FFT of what Montagnier is seeing looks like someone's GSM phone.

Posted by: Garnetstar | January 25, 2011 8:33 AM #80

So you think it's senility, or an advanced stage of compartmentalization, or was M. never truly rational, just well-camouflaged?

Is this the first time M. has lost it, or did he show preliminary symptoms in any past work?

I hope this isn't contagious.

Posted by: Otis | January 25, 2011 8:36 AM #81

Has anyone noticed that this guy is reporting signals in the range of 1,000 to 3,000 Hz? These are EM photons of enormous wavelength. He's probably picking up signal from the Clam Lake facility communicating which submarines under polar ice caps.

Posted by: Otis | January 25, 2011 8:44 AM #82

Who knows? Maybe he has detected a "gravity wave" and we're laughing at this true genius.

Posted by: Gyro A. Gearloose | January 25, 2011 8:54 AM #83

Dear Scientists,

I have prepared a manuscript that I am planning to send to Interdiscip Sci Comput Life Sci and I would like the approval of my peers, just out of curiosity of course (it is not necessary for great discoveries, think about Galileo).

My theory revolves around the discovery and mathematization of the "Quack ratio", formulated as follows:

Qr = I(res) / I(jour)

"Quack ratio" = "claimed impact of the result" / "have you ever heard about the publishing journal?"

We can easily find scientific publications in the natural habitat that are very well described using the Qr:

Qr -> >1 and above
ex: Prof Montagnier's aforementioned (and remarkably flawless) research.

Qr -> 0
ex: http://scienceblogs.com/pharyngula/2010/12/its_not_an_arsenic-based_life.php ?

Qr -> 1
A rare example, only a few specimen are reported to have been read in obscure peer-reviewed journals.

I am very excited, and I hope my paper will be accepted for publication by Friday (as I have other plans for next week).

Best regards,

Gyro

Posted by: Hemogoblin | January 25, 2011 8:56 AM #84

#69: What you're describing is the "pathological" sound from old/shoddy/dying monitors. The *regular* (as in "affects every single CRT") annoying-as-hell CRT whine comes from its flyback transformer, not its deflection coils.

Posted by: Victor | January 25, 2011 9:16 AM #85

That device looks like a science fair project. I used a similar device to pick up the presence of a (relatively) strong magnetic field present and regular intervals and even then there was almost too much noise for it to work.

Posted by: https://www.google.com/accounts/o8/id?id=AItOawnwX_vXZjOlKfGC5q-glIh-tmfIJ6PDLR4 | January 25, 2011 9:21 AM #86

@david.utidjian:

> Anyhow.... a coil (bobbin) of wire with 300 Ohms impedance will have a lot of turns. It will be very sensitive to any stray magnetic fields.

Actually I strongly suspect that the "300 ohms impedance" only refers to the characteristic impedance rating of the cable they used. These guys aren't exactly electrical engineers, you understand.

Posted by: https://www.google.com/accounts/o8/id?id=AItOawkJauL_32PlibPyTzhnZJBna5axbCGALdk | #87
January 25, 2011 9:50 AM

I have a pretty good background in audio recording and I have to say that what he is doing is an outright farce. Lets start with the copper coil, essentially he has created a very bad microphone, and if it is unshielded it will pick up all kinds of stray electronic signals, from the lights to the computer to the amplifier to the monitor. Trusting anything that came from an unshielded copper coil would be the ridiculous. 2nd, most hi-fi amplifiers are not hi-fi at all. What he would want to use is a pre-amp, preferably a solid state professional one that is straight wire gain, or with no coloration. 3rd, he would want to use a professional A-D (audio to digital)converter, if he really used a soundblaster audio card,I cant state how ridiculous that is, might as well use a boombox. 3rd, he would need some kind of digital timepiece, relying on the computer to reduce jitter from the A-D converter is very low tech and would introduce all kinds of artifacts. With his setup, I could not charge a penny to record the worst garage band in the world.

Posted by: KG | January 25, 2011 9:55 AM #88

> So this'll make him the first person to win an Ig Nobel after a Nobel, amirite? - Laplace's Demon

Nah. Work worthy of an Ig Nobel is supposed to "make you laugh, then make you think." Seeing a once-fine scientist make a fool of himself in this manner, probably through incipient dementia given his age, is more likely to "make you laugh, then make you weep."

Posted by: Ing: PhD Trollologist | January 25, 2011 10:06 AM #89

This is why I am against the Nobels

It sets up a science knight/saint hood and just offers the danger of legitimizing later wrong or insane ideas

also it boils great breakthroughs down to one or a handful of people ignoring the many behind the scenes people, other contributors, previous research, etc etc.

Posted by: sqlrob | January 25, 2011 11:15 AM #90

> I'm curious as to whether anyone has figured out how to do this with HDMI cables...

I would guess it's a moot point. The signal is encrypted.

Posted by: siflrock | January 25, 2011 11:40 AM #91

Sure, the computer has softwares. But does it have internets?

Posted by: Dude... Real Men Watch Ponies! | January 25, 2011 12:08 PM #92

> My SWAG guess is they are seeing harmonics from the display of a lap top computer.

I'm going to guess it's the 60 Hz powerline. In all my experiments with electronics, the two primary noises we keep getting. 1. 60 Hz from powerline. 2. 10k Hz from the fluorescent lamp (we guess its the fluorescent lamp, because the one we had operate at that range, and the frequency is an exact match).).

Posted by: wyogold | January 25, 2011 12:13 PM #93

For followup research, how about:
The international journal of high dilution research

http://www.feg.unesp.br/~ojs/index.php/ijhdr/index

Like High Times Magazine! They should publish on the properties of highly diluted bong water.

Posted by: Dude... Real Men Watch Ponies! | January 25, 2011 12:18 PM #94

> The FFT of what Montagnier is seeing looks like someone's GSM phone.

I remember the following conversation in lab before. "Someone's mom is looking for them." *RING* "Turn your damn phone off!"

For those who don't know, there's a distinct signal from the GSM phone communicating with tower before the phone rings. You can sometime hears it coming from speaker as a series of unique beeps. But if you're staring at an oscilloscope hooked up to an antenna, you can see spikes right before their phone goes off.

Which is why phones are not allowed to be on in the lab.

Posted by: Gyro A. Gearloose | January 25, 2011 12:22 PM #95

#93 I am very surprised that they are still not published by Elsevier!

Posted by: Gyro A. Gearloose | January 25, 2011 12:47 PM #96

Seen on the Nature News website:

> Montagnier, who says that he is planning independent replication of his findings, published both papers in a new journal from Berlin-based Springer — Interdisciplinary Sciences: Computational Life Sciences, the editorial board of which he chairs. Asked why he didn't try to publish his astonishing findings in a higher-profile journal, Montagnier explained that he was sure that if he had sent them to Nature or Science, he would have run foul of experts who, on seeing mention of Benveniste or 'memory-of-water', would "reach for their revolvers".

Seriously? Right after Nature/Science, your choice just fell on Interdisciplinary Sciences: Computational Life Sciences? Oh boy, they should have just awarded the Nobel to Robert Gallo and leave grandpa in his homeopathologic fantasies.

Posted by: https://me.yahoo.com/a/O.jullMj0I2VvJaxMMVeNKSfOPf73voLSxJAe9PdlOWwi8Y-#258ec | January 25, 2011 1:00 PM #97

You know, eigenperson, I have often noticed a very high at-the-edge-of-hearing discordant tone associated with a CRT not receiving any data... I used to call it 'monitor whine' and I hated it.

Well when I was a child I could not sleep very easily if the TV was on in thee other room if the door was open. I could tell if it was on and could "feel" it go off.
I have come to learn that what I was "hearing" was the horizontal oscillator physically vibrating. All CRT have them I can still "barely hear" the Computer monitors some times. I have not had much experience with the flat panel type monitors yet but your comment gives me reason to investigate maybe the LED's back-lit operate at a very high "flicker" rate to increase brightness which might be at the high audio range.

I also do not like the buzz from florescent lamps much either.

what is it with some seemingly smart people that they do not seem to have the patience to do the proper study to find out if their idea might be true but instead go off with only inspiration to go on ??

Uncle Frogy

Posted by: drbunsen | January 25, 2011 1:21 PM #98

evilDoug:

> Ground loops are easily solved by using local zero volt nodes. I can't count the number of times I've wished someone actually manufactured them.

Do you have schematic or a circuit diagram for these? They're a particular bane in stage audio work, and if they're simple enough, I could see possibly making a few or having them whipped up.

Posted by: evilDoug | January 25, 2011 1:30 PM #99

Since this thread seems to be nearing the point where the doffing mistress is about to shout "Damn you doffers, tie up your ends!" ...

> ...naive and old fashioned ... where is the energy coming from?

Aye, there's **the** rub!
Being naive and old-fashioned, you probably don't understand *quantum* stuff, like Deepthought Porkchop does. You can just make energy with quantum stuff, can't you?

> Oddly, they mention that vortexing...

I'd be suspicious of buildup of triboelectric static charge in the tube. A sample tube held with fingers in the elastomer cup of a vortex mixer is likely to pick up some charge that may persist for some time, depending considerably on humidity. A coil that is not electrostatically shielded from the tube will also behave to some extent as a capacitive sensor. This would make the whole assembly into a capacitance microphone. With an ordinary audio amp, the sensitivity of this microphone would depend greatly on whether the inner layer of the coil was connected to "signal" or to "ground".

Regarding the Fourier transforms:
I wish I could read the scales on the plots. 2d, left column appears to be of very high spectral purity, which is wholly at odds with the waveform and with the 2c plot. Something is grossly wrong. The 2d right column appears to me much

more consistent with the 2c left column.

> Has anyone noticed that this guy is reporting signals in the range of 1,000 to 3,000 Hz?

Quite an accomplishment for a 1mL sample, probably with a length of sample of a couple of centimetres at most, isn't it? Those "long polymers of dipoles" must be coiled up into springs (oooh - like DNA!) to get something going on at such low frequencies. Like I said before, it sure is convenient that the frequencies of interest are in the audio spectrum.

> Actually I strongly suspect that the "300 ohms impedance" only refers to the characteristic impedance rating of the cable they used.

Probably not. To make a 300 ohm pair, the conductors have to be spaced about 8mm apart (think TV "twinlead"). It isn't at all difficult to make an air-core coil that is 300 ohms in the audio range (about 9.5mH @ 5kHz). Of course it will have that impedance at only one frequency, and will probably have a pretty low self-resonant frequency due to winding capacitance.

Regarding monitor audible noise:
In CRT TVs, the flyback "transformer" is part of the horizontal deflection circuit (the very term "flyback" refers to horizontal retrace). Audible noise can come from the flyback transformer, but it can come from the deflection coils too. The biggest offender is usually the mating faces of the two halves of the core of the yoke. The vertical deflection also makes really annoying noise in lots of TVs, and the only place for that to come from is the yoke.
In computer CRT video monitors, the high voltage generation is often independent of horizontal deflection circuitry, since the latter may be required to operate at a number of frequencies.
LC displays simply don't have any of this circuitry. They do use "inverters" to generate the high voltage for the cold-cathode fluorescent tubes for the backlight. These can operate near the upper end of the audio spectrum. Very high frequencies can cause some severe efficiency issues.

> Of course you wouldn't be plugging the amplifier into the sound card of the laptop.

You would if your sound card had digitizing inputs - lots of them do.

> I could tell you some of the operating characteristics of the laptop's power supply, such as its fundamental switching
> frequency.

The fundamental of the switchers will be well above his highest frequency of measurement. Switching frequencies of 100kHz to 300kHz are very common these days.

> I'm curious as to whether anyone has figured out how to do this with HDMI cables...

HDMI uses "transition minimized differential signaling". The signal amplitudes are quite small, and most important they are "differential" and carried on proper twisted-pair transmission lines. This makes them much less susceptible to EMI/RFI and greatly reduces the EMI/RFI they produce. If I were designing an amp for a magnetic pickup coil for L.M.'s experiments, it would be differential, not "single ended".

On Faraday cages:
Copper screen and thin copper sheet can be very effective at shielding electrostatic noise, but are dismal for low-frequency magnetic fields. For low frequency magnetic fields, high permeability ferromagnetic materials are much more practical. L.M. needs to pony up the dough to buy some Mu-Metal. It is expensive and a pig to work with - needs to be carefully annealed after any forming operations.
Large test chambers are usually lined with tiles made from high-permeability ferrite (underneath the cool electro-anechoic big foam wedges).

> only Radiolarians...

This would be what Ferlinghetti would describe as "clever cornball", in *Christ Climbed Down*.
I like it! And radiolarians are so much prettier than icky old Mycoplasma.

Posted by: Flex | January 25, 2011 1:41 PM #100

> Mu-Metal

Even Mu-Metal is only as good as how you use it.

The reason our anechoic chambers, lined with Mu-Metal, still leak in the high frequency ranges is because we didn't line the floor, and there needs to be some bulkhead connectors for our instrumentation where noise greater than 1 GHz can sneak through.

Not that we need them to be any better. They are perfectly adequate for our testing. We just have to recognize the limitations of our tools. And occasionally put aluminum foil over the bulkhead connectors. ;)

Posted by: evilDoug | January 25, 2011 1:45 PM #101

@drbunsen @ 98

Wouldn't it be great if such a thing really existed! Right up there in utility with a non-inverting single-supply virtual-ground summing node.
I'd buy reels and reels of them! (I do low-level analog design and switched mode power supply design [foolish me], and zero damned near doesn't exist **anywhere** in either.)

Posted by: Joffan | January 25, 2011 2:08 PM #102

> I could almost believe this terrible waste of time was done under the influence of a hogshead or two of the cheap stuff.

I wish it had been. Any level of inebriation would be an improvement on the state of mind that is willing to believe, act on and attempt to propagate this nonsense.

Posted by: QuestionAuthority | January 25, 2011 2:14 PM #103

Reminds me of a comment by Wolfgang Pauli:
"This paper is so bad it is not even wrong."

Posted by: Peter Ashby | January 25, 2011 2:36 PM #104

A cautionary tale about the power of PCR to mislead you. I was once doing some pcr mutagenesis but it wasn't working too well. So I fiddled the conditions a bit (as you do) and got a band of roughly the right size. Except it wouldn't cut with the diagnostic enzyme. After fiddling the enzyme conditions and indulging in a major cleanup of the dna prior to cutting it and still failing I admitted defeat and redesigned and reordered the primers. it then worked with standard conditions.

In that lab when doing pcrs to test whether the mice were transgenic or not we had to be careful not to do too many cycles of pcr and include a couple of negative controls (wells with just water added to the pcr mix). This was because there was so much of the dna floating around you could get a signal off water if you pushed it enough. You could pcr up pBluescript (KS+) from the air of that lab too.

In another lab a co worker trying to pcr clone dogfish genes had to move far away from the rest of us as she kept cloning chicken and mouse genes from us and zebrafish genes from her own bench.

I had a complete separate set of Gilsons that were used only for making up and aliquoting pcr mix. They only got used with filter tips. It was the only way to avoid contamination.

Moral of the story: pcr is a very, very powerful and sensitive technique and you have to take elaborate and careful precautions to avoid contamination. Some time look up the extreme hoops the guy who first clone Neanderthal mtDNA had to go through to be sure the sequences were real and not modern contamination. He is legendary.

Posted by: 'Tis Himself, OM | January 25, 2011 2:55 PM #105

evilDoug #99

> Damn you doffers, tie up your ends!

Tie up our ends, we will surely do
Our hands are steady and our touch is true
Tie up our ends, we will surely do
All for Lizzie Murphy but not for you

Posted by: evilDoug | January 25, 2011 4:34 PM #106

Ah, *Pharyngula* Comments. Where the obscure has no place to hide.

Posted by: Hemogoblin | January 25, 2011 5:44 PM #107

> I'm going to guess it's the 60 Hz powerline.

I haven't read the paper, so I can't tell if the experiments were carried out in France or in China - but either way, it'd be 50 Hz, not 60.

Posted by: lumberjackninja | January 25, 2011 6:41 PM #108

I think I'm going to repeat this experiment. I just need to figure out if 12-bit ADC resolution is great enough.

What kind of odds do you think I'll have of getting published if I, an unpublished undergraduate physics student, fail to reproduce this guy's results?

Posted by: SquidBrandon | January 25, 2011 7:23 PM #109

I don't have access to the full article, but the first page is pretty bad from a basic editing standpoint. As an introduction to this revolutionary discovery, it feels pretty awkward and has sort of a stream of conscious vibe to it. I am not impressed.

"E. Coli"
"M. [extra spaces] pirum"
"peer-shaped organism"
"ressembling"

No one reviewing this article picked up on any of these formatting oddities? Even basic spell check should have picked up the last one. I enjoy that the rationale for choosing E. coli is that is simply that it is more "classical." Whatever that means.

Posted by: centralroute | January 25, 2011 7:24 PM #110

Damn, I'm just a housewife who reads James Randi, and I could see that was a pile of horseshit. I felt very smart and scientific when PZ echoed my thoughts about blinding. . . . Perhaps I should try to get published, since it seems so easy!

Posted by: salgood | January 31, 2011 4:33 PM #111

All kinds of things wrong with this of course, but i wanted to ask about the question of dna, or any molecule, giving off Electro Magnetic Signals or having an EMF without a current running though it. They could carry a charge of course, but give off a signal or field? ...hmm, Magnetite would i guess.

But this seems funky to me, but being not much more than an armchair fan of the sciences, could not be sure.

Posted by: mail.greg.smith | March 20, 2011 12:14 AM #112

There's a description of a similarly absurd measurement apparatus here - with lots of screen shots and gloating over how this 'proves' something.

http://forums.hpathy.com/forum_posts.asp?TID=9047&title=easy-proof-of-homeopathy-on-1-in-lab-gear

So if all that stuff is true, it should be trivial for these guys to distinguish two different remedies blind, right? Or at least to tell magic water from distilled water. Let's see that, then.

Has it occurred to anyone that if magic water signals can move from one container to another, then maybe those dozens of little vials in the racks in stores are turning into a mixed-up soup of homogeneous woo. Oh dear, that would mean that it wouldn't make any difference what remedy is prescribed by the homeopath.

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