Published Third Party Reports On The Science of QE

Blackboard-based physicists sometimes claim that only CERN, Boeing or Stanford University has all the huge gear to make quantum entanglement broadcasting. They are wrong! Small, cheap devices are already doing it!

In a critical step toward creating a global quantum communications network, researchers have generated and detected quantum entanglement onboard a CubeSat nanosatellite weighing less than 2.6 kilograms and orbiting the Earth.

"In the future, our system could be part of a global quantum network transmitting quantum signals to receivers on Earth or on other spacecraft," said lead author Aitor Villar from the Centre for Quantum Technologies at the National University of Singapore. "These signals could be used to implement any type of quantum communications application, from quantum key distribution for extremely secure data transmission to quantum teleportation, where information is transferred by replicating the state of a quantum system from a distance."

In *Optica*, The Optical Society's (OSA) journal for high impact research, Villar and an international group of researchers demonstrate that their miniaturized source of quantum entanglement can operate successfully in space aboard a low-resource, cost-effective CubeSat that is smaller than a shoebox. CubeSats are a standard type of nanosatellite made of multiples of 10 cm × 10 cm × 10 cm cubic units.

"Progress toward a space-based global quantum network is happening at a fast pace," said Villar. "We hope that our work inspires the next wave of space-based quantum technology missions and that new applications and technologies can benefit from our experimental findings."

Miniaturizing quantum entanglement

The quantum mechanical phenomenon known as entanglement is essential to many quantum communications applications. However, creating a global network for entanglement distribution isn't possible with optical fibers because of the optical losses that occur over long distances. Equipping small, standardized satellites in space with quantum instrumentation is one way to tackle this challenge in a cost-effective manner.

As a first step, the researchers needed to demonstrate that a miniaturized photon source for quantum entanglement could stay intact through the stresses of launch and operate successfully in the harsh environment of space within a satellite that can provide minimal energy. To accomplish this, they exhaustively examined every component of the photon-pair source used to generate quantum entanglement to see if it could be made smaller or more rugged.

"At each stage of development, we were actively conscious of the budgets for mass, size and power," said Villar. "By iterating the design through rapid prototyping and testing, we arrived at a robust, small-form factor package for all the off-shelf components needed for an entangled photon-pair source."

The new miniaturized photon-pair source consists of a blue laser diode that shines on nonlinear crystals to create pairs of photons. Achieving high-quality entanglement required a complete redesign of the mounts that align the nonlinear crystals with high precision and stability.

The researchers qualified their new instrument for space by testing its ability to withstand the vibration and thermal changes experienced during a rocket launch and in-space operation. The photon-pair source maintained very high-quality entanglement throughout the testing, and crystal alignment was preserved even after repeated temperature cycling from -10 °C to 40 °C.

The researchers incorporated their new instrument into SpooQy-1, a CubeSat that was deployed into orbit from the International Space Station on 17 June 2019. The instrument successfully generated entangled photon-pairs over temperatures from 16 °C to 21.5 °C.

"This demonstration showed that miniaturized entanglement technology can work well while consuming little power," said Villar. "This is an important step toward a cost-effective approach to the deployment of satellite constellations that can serve global quantum networks." The project was funded by Singapore's National Research Foundation.

AAH-HA!So The Feds Really Do Have Mind And Body Control Beams!

http://www.dailymail.co.uk/sciencetech/article-5638069/Government-accidentally-sends-strange-conspiracy-theory-file-describing-remote-mind-control.html

Government accidentally sends file on "remote mind control" methods to journalist

When journalist Curtis Waltman filed a Freedom of Information Act request with **Washington State Fusion Center** (which is partnered with Department of Homeland Security) to obtain information about Antifa and white supremacist groups, he got more than the information he was looking for – he also accidentally received a mysterious file on "psycho-electric weapons" with the label “EM effects on human body.zip.” The file included methods of "remote mind control."

Creepy images like these were included:

So what gives?

Via the **Daily Beast**:

> According to **Muckrock**, a nonprofit that publishes government information gathered through FOIA requests, the mind-control documents came from the Department of Homeland Security-linked agency in the form of a file called “EM effects on human body.zip.” The file reportedly contained various diagrams detailing the horrors of “psycho-electronic weapon effects.”
>
> One diagram lists the various forms of torment supposedly made possible by using remote mind-control methods, from “forced memory blanking” and “sudden violent itching inside eyelids” to “wild flailing” followed by “rigor mortis” and a remotely induced “forced orgasm.” It was not immediately clear how the documents wound up in the agency’s response to a standard FOIA request, but there was reportedly no indication the “remote mind control” files stemmed from any government program.

And according to **Popular Mechanics**:

> The federal government has absolutely experimented with mind control in a variety of methods, but the documents here do not appear to be official.
>
> Waltman had no idea why these documents were included in his request and

> isn't sure why the government is holding them. The WSFC did not respond to requests for more information.

As fun as conspiracy theories are, Muckrock doesn't believe the images are "government material."

> One seems to come from a person named “Supratik Saha,” who is identified as a software engineer, the brain mapping slide has no sourcing, and the image of the body being assaulted by psychotronic weapons is sourced from raven1.net, who apparently didn’t renew their domain.

Muckrock put out a call to WSFC but hasn't yet heard back from them.

For more details, go to **Muckrock**.

It’s strongly reminiscent of what Jon Ronson covered in “The Men Who Stare at Goats” (rather different from the Clooney film it inspired).

en.wikipedia.org 14

The Men Who Stare at Goats

The Men Who Stare at Goats (2004) is a non-fiction work by Jon Ronson concerning the U.S. Army's exploration of New Age concepts and the potential military applications of the paranormal. The title refers to attempts to kill goats by staring at them and stopping their hearts. The book is companion to a three-part TV series broadcast in Britain on Channel 4—Crazy Rulers of the World (2004)—the first episode of which is also entitled "The Men Who Stare at

Goats". The same title was used a third tim...

But the diagrams make me think of the work of John Qunicy St. Clair – who is not affiliated with the government, despite his filings with the US Patent Office.
https://zapatopi.net/blog/?post=200604284330.st_clair_hyperinventor 30

> TSA blows a billion bucks on unscientific "behavioral detection" program,...

TSA blows a billion bucks on unscientific "behavioral detection" program, reinvents phrenology

Well, being as the “benevolent” govt ran grossly unethical syphilis experiments/studies on its own citizens, wiped entire islands off the face of the globe with nuclear blasts, deliberately exposed its own soldiers to radiation effects, spies on its citizenry wholesale (see for example Snowden and other consequent revelations that are not disputed), routinely runs psy-ops against (once again) its own citizens, and obviously thinks The People serve the bureaucrats, you’ll forgive me if I forgo yukking it up with the rest of the flippant morons.

john_ohno
1h

> sugarnspice

I’m saying this isn’t an accidental leak of classified material. This is an intentional leak of material that’s been floating around the internet for many years.

Don’t get me wrong: the US government (and most every government with sufficient resources) does shady stuff that is both morally unjustifiable and obviously stupid. This particular group of images, however, is clearly sourced from the public internet, and we have no reason to believe that the US

government ever did this particular set of shady and obviously-stupid shit.

We have reasons to believe they did not use the particular techniques described: notably, some of those techniques are patented, and while the patent process makes no attempt to test if applications are remotely feasible and patents largely aren't effectively tested for novelty in claims during the application process, a patent whose claims overlap with classified research would absolutely be rejected and censored. (We know, from the non-destroyed declassified portions of the MKULTRA documentation, that similar ideas were considered interesting enough to research, of course.)

Had these documents been genuine classified leaks, we would have seen some attempt at censorship in 2008, when other leaks were being tracked down aggressively and before the Snowden leaks changed the PR around material of this type.

Mind-reading device invented by scientists to eavesdrop on ...

Scientists at the University of California were able to pick up several words that subjects **thought**using a **new** mind-**reading** ... In **Science News** . ... The **remote** ...

https://www.telegraph.co.uk/news/science/science-news/11199031/Mind-r...

'Mind-reading machine' can convert thoughts into speech ...

'Mind-**reading** machine' can convert **thoughts** into speech ... In **Science News** . ... The **remote**economy of the Svalbard archipelago .

https://www.telegraph.co.uk/news/science/science-news/7987821/Mind-re...

Scientists develop thought-controlled gene switch - BBC News

http://www.bbc.com/**news**/**science**-environment-29974833. Read more about ... Developments include a **thought** powered **remote** control helicopter and paralysed humans have ...

bbc.com/news/science-environment-29974833

Experiment allows scientists to 'read' volunteers' thoughts ...

Science; Experiment allows scientists to 'read ... We are not at the point of being able to put people in a scanner and read their **thoughts**. ... Independent **News** ...

https://www.independent.co.uk/news/science/experiment-allows-scientists...

Evidence of ancient communities found in remote parts of ...

Archaeologists have discovered manmade earthworks in the **remote** rainforest of Brazil, a region **thought** uninhabited by humans. Top **News**. ... Home / **Science News**.

https://www.upi.com/Science_News/2018/03/28/Evidence-of-ancie...

The brain scan that can read people's intentions | Science ...

The brain scan that can read ... people's minds and eavesdrop on their **thoughts**, and raises serious ethical issues over how brain-**reading** technology ...

https://www.theguardian.com/science/2007/feb/09/neuroscience.ethicsof...

Science and technology news | New Scientist

Breaking **science** and technology **news** from around the world. Exclusive stories and expert analysis on space, technology, health, physics, life and Earth

https://www.newscientist.com/section/news/

Science News, Articles, and Information - Scientific American

Scientific American is the essential guide to the most awe-inspiring advances in **science** and technology, explaining how they change our understanding of the world and shape our lives.

https://www.scientificamerican.com

Science News | Daily news articles, blogs and biweekly ...

Science News online features daily **news**, blogs, feature stories, reviews and more in all disciplines of **science**, as well as **Science News** magazine archives back to 1924.

https://www.sciencenews.org

Controlling genes with your thoughts -- ScienceDaily

Scientists have developed a novel gene regulation method that enables **thought**-specific brainwaves to ... read more. Computation ... Get the latest **science news** with ...

https://www.sciencedaily.com/releases/2014/11/141111111317.htm

Mind-reading program translates brain activity into words ...

The research paves the way for brain implants that would translate the **thoughts** ... "This is exciting in terms of the basic **science** ... The prospect of **reading** ...

https://www.theguardian.com/science/2012/jan/31/mind-reading-program-...

This mind-reading machine translates thoughts to text ...

News; **Science**; This **new** mind-**reading** machine translates your **thoughts** as ... Scientists have developed a machine which can read your mind and translate **thoughts** to text.

https://www.express.co.uk/news/science/939870/mind-reading-machine-...

A Neuroscience Startup Uses Helmets to Measure Brain Activity

Ashlee Vance

(Bloomberg Businessweek) -- If you want your mind read, there are two options. You can visit a psychic or head to a lab and get strapped into a room-size, expensive machine that’ll examine the electrical impulses and blood moving through the brain. Either way, true insights are hard to come by, and for now, the quest to know thyself remains as elusive as ever.

Kernel, a startup based in Culver City, Calif., says it aims to transform brain science from an esoteric art to a big business. It's found a way to shrink the machines used by researchers and make them cheaper. In an interview with *Bloomberg Businessweek*, Kernel unveiled for the first time a pair of devices—basically helmets—that can see and record brain activity, enabling scientists to more easily analyze neurons as they fire and reveal more about how the mind works. "This triggers a new era of access to the mind and the ability to ask all sorts of new questions about ourselves," says Bryan Johnson, the company's founder and chief executive officer. (Kernel will not reveal the helmets to the public until later this year.)

Johnson, 42, doesn't have a typical résumé for a brain researcher. He made several hundred million dollars in 2013, when PayPal Holdings Inc. acquired his digital payments startup Braintree and its Venmo subsidiary for $800 million. Johnson spent a couple of years deciding what to do with his fortune before settling on brain science as his next venture. He founded Kernel in 2016 and put $54 million toward it, hiring 80 people with expertise in fields ranging from neuroscience to lasers and chip design. Until now, the team has operated largely in secret.

We know precious little about how the brain works, but technology companies hope to figure it out. Neuralink Corp., a startup backed by Tesla Inc. CEO Elon Musk, showed off prototype brain implants last year. The company found a way to insert tiny wires into the brains of mice and primates that can analyze information about the workings of the mind. Neuralink says it plans to put the technology into humans and eventually create an information swap between brains and computers. Facebook Inc. is also researching the field of brain-machine interface, or BMI, and last year acquired CTRL-Labs, a pioneering company in the field of reading motor neuron signals.

There's no shortage of science fiction that shows how such technology might go wrong. Companies such as Facebook and Google already do questionable things with our clicks. Giving them a direct feed into our synapses could be a profoundly bad idea. "Like any technology, this can be abused," says Christof Koch, the chief scientist at the Allen Institute for Brain Science. "No question about it." For his part, Johnson says he created Kernel with the aspiration of helping humanity solve some of its biggest problems. "I hope we can graduate past trying to addict each other to digital systems," he says. "We want our customers to come to us with objectives that improve people."

He's optimistic that people who have suffered from paralysis and strokes could use Kernel's devices to communicate just by thinking of words. Those dealing with paranoia or anxiety may get access to brand-new therapies. "Most brain studies are so hard to do that you look at only a handful of patients," says Koch, who has tried Kernel's machines. "If it now just requires a helmet, I can look at 200, 2,000, or even 20,000 people."

Scientists and doctors already have some tools to study brain activity, but the equipment is expensive, costing upward of $1 million, and highly trained technicians are needed to run it. Some require extremely cold temperatures to operate or confine patients inside a large machine. "They are, for the most part, very difficult to use," Koch says.

Companies such as Kernel want to make it easier for scientists to study the mind, and there's potential for these devices to become mainstream in the future. One day consumers might be able to track brain metrics such as anxiety, creativity, even self-deception, just as Fitbits and Apple Watches monitor steps and heart rates.

Kernel had initially planned to develop implants, since they provide direct access to neurons, aka brain cells, and deliver the clearest signals. But Johnson has doubts as to how many people want to surgically add a computer chip in their head. This led Kernel to focus on developing a removable helmet.

The team built a system dubbed Flux, which measures electromagnetic activity, and another called Flow that pulses the brain with light to gauge blood movement. Engineers spent years perfecting hardware that blocks outside interference, as well as custom microchips for processing signals and software algorithms that analyze brain activity. Bit by bit, Kernel took things that started out as room-size contraptions and shrank them to the size of bicycle helmets covered in sensors. It also found ways to let people move and act more naturally while they're being monitored, instead of being strapped to a machine and forced to sit still. "What is revolutionary here is not the fact that you can do it, but how quickly and inexpensively it can be done—and with so few constraints," says Koch. "It lets people do experiments vastly easier and gets you much more direct access to the brain."

Johnson estimates that the first devices will cost several thousand dollars each to manufacture, but he expects the price will come down over time and be in line with high-end, mass market consumer electronics products. Kernel, though, doesn't plan on selling the hardware until late next year. In the meantime, it's going to offer results to scientists or customers through something the company calls Neuroscience as a Service. Kernel will work with customers to set up studies, reviewed by an outside ethics committee, and then recruit paid volunteers, analyze their brains at its offices and send back the results. Companies such as Spotify and Headspace, say, might try to use the results to improve their music and mindfulness services, while a politician might test a speech to see what emotions its elicits.

Steve Aoki, the DJ and music producer, recently tried one of Kernel's helmets. He calibrated the machine for a couple of minutes by listening to recordings of speech and music, and Kernel's software went to work analyzing his brain activity. Next, a technician began playing different Aoki songs for the musician. A computer—unaware of the tracks being played—was able to tell which song he was listening to by looking at Aoki's brain activity. "That blew my mind," Aoki says. "I started to get chills down my spine and my arms."

Kernel has run other experiments like this where it can detect any song someone is listening to just by observing their brain, a sort of Shazam for the mind. The company is calling this technology Sound ID. Aoki, who donates money to various brain research causes, plans to use the data in his work. "I want to know if this kind of technology will make me more effective as a producer," he says. "I want to have the deepest, most meaningful connection possible with my audience. I think this will be exciting for a lot of artists."

It’s the promise of a flood of new brain data that excites Johnson the most. He likens the Kernel devices to the arrival of fast, cheap gene-sequencing machines that made it possible for thousands of people to study DNA. “We can measure pretty much everything in the known universe, from black holes to atoms to calories,” Johnson says. “The only thing we can’t measure is our brains and our minds, which is what makes us ‘us.’ It’s this blind spot we have.”

Most electrical activity in vertebrates and invertebrates occurs at extremely low frequencies, and the origin—and medical potential—of these frequencies have eluded scientists. Now a Tel Aviv University study provides evidence for a direct link between electrical fields in the atmosphere and those found in living organisms, including humans.

The study's findings may change established notions about electrical activity in living organisms, paving the way for revolutionary, new medical treatments. Illnesses such as epilepsy and Parkinson's are related to abnormalities in the electrical activity of the body.

"We show that the electrical activity in many living organisms—from zooplankton in the oceans, to sharks and even in our brains—is very similar to the electrical fields we measure and study in the atmosphere from global lightning activity," explains Prof. Colin Price of TAU's Porter School of the Environment and Earth Sciences, who led the research for the study, published in the *International Journal of Biometeorology* on February 8.

Colleagues from the Massachusetts Institute of Technology and the University of Alaska also contributed to the study.

"We hypothesize that over evolutionary timescales living organisms adapted and evolved to actually use the electricity in the environment—global lightning," Prof. Price continues. "This has likely not changed over billions of years and is similar to the evolution of our eyes, which evolved using the sunlight nature gave us."

As living organisms evolved over billions of years, the natural electromagnetic resonant frequencies in the atmosphere, continuously generated by global lightning activity, provided the background electric fields for the development of cellular electrical activity. Prof. Price's research found that, in some animals, the electrical spectrum is difficult to differentiate from the background atmospheric electric field produced by lightning.

"Neither biologists nor doctors can explain why the frequencies in living organisms (0-50 Hz) are similar to those in the atmosphere caused by lightning," adds Prof. Price. "Most of them are not even aware of the similarity we presented in our paper."

"Our review of previous studies revealed that lightning-related fields may have positive medical applications related to our biological clock (circadian rhythms), spinal cord injuries and maybe other bodily functions related to electrical activity in our bodies," says Prof. Price. "The connection between the ever-present electromagnetic fields, between lightning in the atmosphere and human health, may have huge implications in the future for various treatments related to electrical abnormalities in our bodies."

The study comprised a retrospective review of previous studies on the link between lightning-related fields in the atmosphere and human and animal health. "We collected many different studies over the years to build a clear picture of this link," concludes Prof. Price. "Going forward, we need to design new experiments to see how these extremely low frequency fields from lightning may impact living organisms, and to investigate how these fields can be used to benefit us. One new experiment we are now planning is to see how these fields may impact the rate of photosynthesis in plants.

Brain Energy Shifts

Can you change your brain cells with electrical energy? Molly Sharlach of Princeton University reports that you can.

Princeton researchers have created a device that can herd groups of cells like sheep, precisely directing the cells' movements by manipulating electric fields to mimic those found in the body during healing. The technique opens new possibilities for tissue engineering, including approaches to promote wound healing, repair blood vessels or sculpt tissues.

Scientists have long known that naturally occurring electrochemical signals within the body can influence the migration, growth and development of cells—a phenomenon known as electrotaxis. These behaviors are not nearly as well understood as chemotaxis, in which cells respond to chemical concentration differences. One barrier has been a lack of accessible tools to rigorously examine cells' responses to electric fields.

The new system, assembled from inexpensive and readily available parts, enables researchers to manipulate and measure cultured cells' movements in a reliable and repeatable way. In a paper published June 24 in *Cell Systems*, the Princeton team described the assembly and preliminary studies using the device, which they call SCHEEPDOG, for Spatiotemporal Cellular HErding with Electrochemical Potentials to Dynamically Orient Galvanotaxis. (Galvanotaxis is another term for electrotaxis.)

Previous systems for studying cells' responses to electric fields have been "either bespoke and handmade, with issues of reproducibility, or requiring fabrication facilities that make them expensive and inaccessible to many labs," said co-lead author Tom Zajdel, a postdoctoral research fellow in mechanical and aerospace engineering. "We wanted to use rapid prototyping methods to make a well-defined device that you could just clamp onto your petri dish."

While there is a long history of work on electrotaxis, said Zajdel, the phenomenon is not well understood. Evidence shows, for example, that reversing the direction of a natural electric field can inhibit wound healing in animal models, while amplifying the existing field might improve healing.

"There are a lot of unknowns about how individual cells detect such fields," said senior author Daniel Cohen, an assistant professor of mechanical and aerospace engineering. "But the beauty of crowd dynamics is that even if you don't understand everything about the individuals, you can still engineer behaviors at the group level to achieve practical results."

The SCHEEPDOG device contains two pairs of electrodes that are used to generate electric fields along horizontal and vertical axes, as well as recording probes to measure voltage and integrated materials to separate the cells from chemical byproducts of the electrodes. The voltage level is similar to that of an AA battery concentrated over the centimeter-wide chamber containing the cells.

"It's kind of like an Etch A Sketch," said Zajdel, referring to the classic drawing toy in which lines can be created in any direction by turning two control knobs. "We've got the horizontal and the vertical knobs, and we can get the cells to trace out arbitrary trajectories in the whole 2-D space just by using those two knobs."

The team tested SCHEEPDOG using mammalian skin cells and epithelial cells from the lining of the kidney, which are often used to study cells' collective movements. They found that the cells time-averaged signals generated along the two axes over a time window of about 20 seconds: Turning on the vertical electric field for 15 seconds and the horizontal field for 5 seconds, for instance, would cause the cells to migrate more in the vertical than in the horizontal direction.

"What the cells perceive is sort of a virtual angle, and that allows us to program any complex maneuver, like a full circle," said Cohen. "That's really surprising—that's an amazing level of control that we wouldn't have expected to be possible, especially with thousands of neighboring cells executing these maneuvers on command."

The study "adds to the growing appreciation of cells' responses to bioelectric aspects of their environment," said Michael Levin, who directs the Center for Regenerative and Developmental Biology at Tufts University and was not involved in the research. "It demonstrates a technique to address not just individual cells' activities in response to bioelectric cues, but the action of a cell collective, which is essential to understand how physical forces play into the kind of cooperativity we see in embryogenesis, regeneration and cancer."

Using SCHEEPDOG, the team is expanding their studies to different cell types and contexts. Graduate student Gawoon Shim is investigating how varying levels of cell-cell adhesion impact directed cell migration—key information for eventual applications like regenerating skin, blood vessels and nerve cells in damaged tissue.

"This is the first step for whatever healing and regeneration we may need" in a variety of clinical contexts, said Shim, co-lead author of the study along with Zajdel. "We're learning how to direct the cells where we need them, and then we can figure out what they're going to do afterwards."

Applying engineering principles to understand and control electrotaxis will deepen understanding of its role not only in cell movement, but also in growth and differentiation, said Cohen. While today's cutting-edge tissue regeneration techniques usually involve pre-patterning new tissues, sculpting tissues with electric fields may allow for more flexibility and better outcomes. "In the long term, this might offer some very exciting, completely new ways of thinking about working with living tissues," he said.

Can Our Brain Waves Affect Our Physical Reality?

The higher the frequency of our thought/brain wave, the higher our consciousness. The level of our consciousness is what makes our reality what it is and what it will continue to be.

By Peter Baksa

So, what is thought and how does it connect up with quantum mechanics?

Your brain is comprised of a tight network of nerve cells, all interacting with one another and generating an overall electrical field. This electric field is detectable with standard medical equipment. Your brain waves are simply the superposition of the multitude of electrical states being formed by your nervous system.

Not only your brain, but your entire body has an electric field. Anywhere there's a nerve cell, there's electricity. It's just concentrated the greatest around your head because that's where the bulk of your nerve cells are. Any time you've felt the shock of static electricity, or used a touch-sensitive screen, you've proven that you have an electric field.

So, nothing mysterious about that part.

Being an electric field, all those overlying electric wave patterns that comprise your brain waves are governed by the same equations governing the electromagnetic spectrum, light, particles and everything else in the universe. The light seen coming from a star and the energy of your mind are one and the same type.

Your thoughts are formed in this electric field. The measurable perturbations and disturbances in the brain's overall electric field are your actual thoughts racing through your mind. As you read this article, the thoughts you are thinking of, the words your mind is processing, are all electrical impulses that can be measured if you had a few wires hooked up between your head and a machine. So thoughts are energy, the same as everything else.

That means they are governed by the rules of quantum mechanics and Schrödinger's wave equations as well. All those same weird things about quantum mechanics that describe how an electron or photon behave, apply to you and your thoughts as well. The particle-wave duality, the uncertainty principle, and of course, entanglement.

This implies that, like any other set of particles or source of energy, we are entangled with everything we've ever encountered, the environment around us and the rest of the universe through the zero point field. We'd mentioned that consciousness is the key to making the mysteries of quantum mechanics work in past articles -- well, this is how it happens.

The one difference between us and a photon is that we can think, we are conscious. As such, we can choose which of the possibilities before us to collapse our wave function into. But more than that, since

we are entangled with our environment we can thus affect that as well and influence the randomness, just as it can influence us.

Since we are conscious, we can choose what part of the randomness around us to be affected by, and how we in turn would like to affect it. It is through the property of entanglement that we can affect change in our environment. Our minds are transceivers, able to receive and send signals into the "quantum soup" of the zero point field by way of the highly coherent frequencies of our thoughts.

The higher the frequency of our thought/brain wave, the higher our consciousness. The level of our consciousness is what makes our reality what it is and what it will continue to be. If you are seeking change, set an intention, declare a path (align your behaviors with your desire), then detach and allow the universe to handle the details.

Could two miniature vacuum tubes with metal plates inside them help you create energy and brain miracles?

Imagine a wearable gadget that can amplify energy, including brain energy (each neuron in your head makes energy)...

Let me introduce you to the Casimir Effect and Quantum Entanglement:

To understand the Casimir Effect, one first has to understand something about a vacuum as it is viewed in quantum field theory. Far from being empty, modern physics assumes that a vacuum is full of fluctuating electromagnetic waves that can never be completely eliminated, like an ocean with waves that are always present and can never be stopped. These waves come in all possible wavelengths, and their presence implies that empty space contains a certain amount of energy--an energy that we could not previously tap, but that is always there.

Now, if structures like mirrors are placed facing each other in a little glass vacuum chamber, some of the waves will fit between them, bouncing back and forth, while others will not. As the two mirrors move closer to each other, the longer waves will no longer fit--the result being that the total amount of energy in the vacuum between the plates will be a bit less than the amount elsewhere in the vacuum. Thus, the mirrors will attract each other, just as two objects held together by a stretched spring will move together as the energy stored in the spring decreases.

This effect, that two mirrors in a vacuum will be attracted to each other, is
the Casimir Effect. It was first predicted in 1948 by Dutch physicist
Hendrick Casimir. Steve K. Lamoreaux, now at Los Alamos National Laboratory, initially measured the tiny force in 1996. Other labs, including CERN, have proved that this is a real thing.

It is generally true that the amount of energy in a piece of vacuum can be altered by material around it, and the term "Casimir Effect" is also used in this broader context. If the mirrors move rapidly, some of the vacuum waves can become real waves. Julian Schwinger and many others have suggested that this "dynamical Casimir effect" may be responsible for the mysterious phenomenon known as sonoluminescence.

One of the most interesting aspects of vacuum energy (with or without mirrors) is that, calculated in quantum field theory, it is infinite! Detection, creation and amplification of hyper-exotic human and ambient energy is here.

While others are working on old-school mechanical solutions, the science of electro-statics and quantum process is zipping far ahead!

Families of MK Ultra Victims File Lawsuit Over Government Mind Control Experiments (thefreethoughtproject.com)

by fluxusp to **news** (+17|-2)

Global Quantum Television Broadcasting Is Now Available

A new quantum communication technique that bypasses normal channels altogether can now be developed. By linking two communication nodes with a channel, one can use this new technique to send information quantum-mechanically between the nodes—without ever occupying the linking channel.

Multiple competing scientific groups in China, Europe and the USA are now working with entangled photons and phonons that defy intuition: these particles can be quantum-mechanically entangled, an entanglement that can survive over large distances including around, or through, the planet. A change in one particle then spookily elicits a change in the other. Quantum communication takes advantage of this phenomenon by encoding information in the particles.

A system that entangles two communication nodes using microwave photons—the same photons used in your cell phone—through a microwave cable has been demonstrated as proof-of-concept. A microwave cable about a meter in length was used as a broadcast structure. By turning the system on and off in a controlled manner, one is able to quantum-entangle the two nodes and send information between them—without ever having to send photons through the cable. The entire planet could be used as a broadcast structure to deliver TV to everyone, everywhere.

The technology could potentially work at room temperature with atoms instead of photons.

Entangled particles aren’t just limited to photons or atoms. Phonons—the quantum particle of sound—have been entangled by scientists.

Once the phonons were entangled, the team used one of the phonons as a “herald,” which was used to affect how their quantum system used the other phonon. The herald allowed the team to perform a so-

called “quantum eraser” experiment, in which information is erased from a measurement, even after the measurement has been completed.

Though phonons have a lot of disadvantages over photons—for example, they tend to be shorter-lived—they interact strongly with a number of solid-state quantum systems that may not interact strongly with photons. Phonons could provide a better way to couple to these systems.

Gravitational wave detectors already detect related effects across galaxies. Distance is not the limiting factor with quantum broadcasting.

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Group affected by CIA brainwashing experiments wants public apology, compensation from government

Survivors Allied Against Government Abuse includes victims in brainwashing experiments in Montreal

Lisa Ellenwood · CBC News ·

Alison Steel, who helped victims and their families connect, was overwhelmed on Sunday that everyone had finally come together. (Lisa Ellenwood/CBC)

A group of Canadians affected by CIA brainwashing experiments conducted at McGill University's Allan Memorial Institute met for the first time on Sunday to start organizing for a public apology and compensation from the federal government through a possible class-action.

Around 40 people gathered at a Montreal condo to share their stories, cry and support each other. The pain, many said, was palpable in the room.

"The government should offer an apology and there should be recognition of the injustice that was done," says Gina Blasbalg, who became a patient at the Allan in her teens in 1959, and drove with her husband from Richmond, B.C., to attend the weekend meeting.

Marilyn Rappaport, whose sister was a patient at the Allan Memorial Institute speaks to the SAAGA group on Sunday in Montreal. (Lisa Ellenwood/CBC)

Survivors Allied Against Government Abuse (SAAGA), as the group calls itself, includes both victims and family members of people who were unwitting participants in brainwashing experiments conducted under the supervision of Dr. Ewen Cameron, director of the psychiatric hospital between 1943 and 1964.

Cameron, co-founder of the World Psychiatric Association and president of various other psychiatric associations over his career, ran "depatterning" and "psychic driving" experiments that attempted to erase a patient's memories and reprogram them with new thoughts.

He tested experimental drugs like LSD and PCP, medically induced sleep for extended periods, and oversaw extreme forms of electroshock therapy and sensory deprivation. Many of his patient's brains were then left damaged.

- **WATCH | The Fifth Estate: Brainwashed: The secret CIA experiments in Canada**

The federal government provided Cameron with more than $500,000 between 1950 and 1965 — $4 million in today's dollars — along with a smaller amount of funding from the U.S. Central Intelligence Agency, using a front organization called the Society for the Investigation of Human Ecology.

Today, many people argue that Cameron's experiments are part of the foundation for contemporary psychological torture techniques.

Children of Violet Winnifred Malboeuf: Laurel Malbeouf, left, Janice Shaw, centre left, Judy Henry, centre right, and Lorraine Taylor, right. (Lisa Ellenwood/CBC)

Four daughters of victim Violet Winnifred Malboeuf came from various towns in Quebec and Ontario to attend Sunday's meeting.

Janice Shaw explained that she and her siblings all had extremely difficult childhoods without their mother, but now they are relieved to know that there are other people to talk to who went through similar experiences.

The sisters and their two brothers were placed in foster care because their mother was incapable of raising them after her stay at the Allan Memorial Institute. A few days ago, they received some of their mother's medical records from the Department of Justice. One of the documents was a handwritten letter by their mother outlining her experience at the Allan.

Intrigued by case of compensation

Sunday's gathering would not have happened without CBC News investigative journalist Elizabeth Thompson. She regularly checks the government public account records for story ideas, and noticed a line about compensation for someone who had been depatterned at the Allan Memorial Institute.

- **Federal government quietly compensates daughter of brainwashing experiments victim**

Thompson, who grew up in Montreal and worked for local newspapers, knew the history of the Allan Memorial Institute and was intrigued.

She called Montreal lawyer Alan Stein, who has represented numerous survivors of the Allan, and he confirmed that one of his clients, Alison Steel, was the person who received the compensation last year — long after her father first attempted to get compensation in the 1990s.

Gina and Ralph Blasbalg, both wearing white shirts, drove from Richmond, B.C., to attend the Montreal meeting. (Lisa Ellenwood/CBC)

They had reached an out-of-court settlement with the Canadian justice department in exchange for dropping the lawsuit, and Steel had to sign a non-disclosure agreement.

The recent CBC News articles and The Fifth Estate documentary Brainwashed led to a flood of emails from victims and their families. People wanted to know how to access medical records and compensation, and more than anything they wanted to connect with each other. Steel agreed to talk with them so The Fifth Estate sent along their emails.

- **Trudeau government gag order in CIA brainwashing case silences victims, lawyer says**

"For awhile there I was receiving two or three calls per day," Steel says. "People didn't want to talk about it, but now they are realizing that so many others are in the same boat."

At the meeting, Steel was overwhelmed that everyone had finally come together.

Last February, they organized a private Facebook group and came up with a name. They created SAAGA, with the goal of seeking justice, a public apology and compensation.

Help in launching class-action suit

SAAGA announced at the Sunday meeting that Stein has agreed to assist the group in launching a class-action lawsuit to sue the Canadian government, maybe also the Quebec government and the Allan Memorial Institute. It would first have to be approved by the Quebec Superior Court, which could take four to six months, Stein said.

In an email, the Justice Department told CBC News that a 1986 inquiry by George Cooper into Cameron's depatterning work "concluded that Canada did not hold any legal liability or moral responsibility in respect of these treatments."

"As this matter may be before the courts it would be inappropriate to comment further."

The Fifth Estate began exposing wrongdoing at the Allan Memorial Institute in 1980 and continues to follow this story. We are in the process of building a website where we will gather together the stories of patients who underwent the brainwashing experiments, and their families.

If you would like to share your family's story, please send us an email: AMIstories@cbc.ca. We will try to include as many stories as possible on the website.

With files from CBC's Elizabeth Thompson

Have We Been Looking At The Electromagnetic Spectrum The Wrong Way?

You have always been taught the the Electromagnetic Spectrum looked like this, a line:

Our eyes are naturally designed to detect visible radiation, or visible light waves.

This is the type of light or radiation that penetrates our atmosphere, and can be detected on the Earth's surface by the naked eye.

Some radiation we can see, but there are many types of radiation that we actually can't see, this is referred to as the electromagnetic spectrum, which is made up of 8 different parts:

- Radio Waves
- Microwaves
- Terahertz Radiation
- Infrared Light (IR)
- Visible Light
- Ultraviolet Rays (UV)
- X-Rays
- Gamma Rays

All of this radiation travels at the speed of light…

The only difference between these types of radiation, is their wavelength (which increases) or frequency (which decreases).

- Radio
- Visible light
- Some infra red
- A tiny amount of ultraviolet radiation

This is the radiation that reaches us on the Earth's surface, from outer space.

We are lucky that the atmosphere helps to block out all the rest which is deadly.

The Weaponization Of The Electromagnetic Spectrum

Jayshree Pandya Contributor

COGNITIVE WORLD Contributor Group

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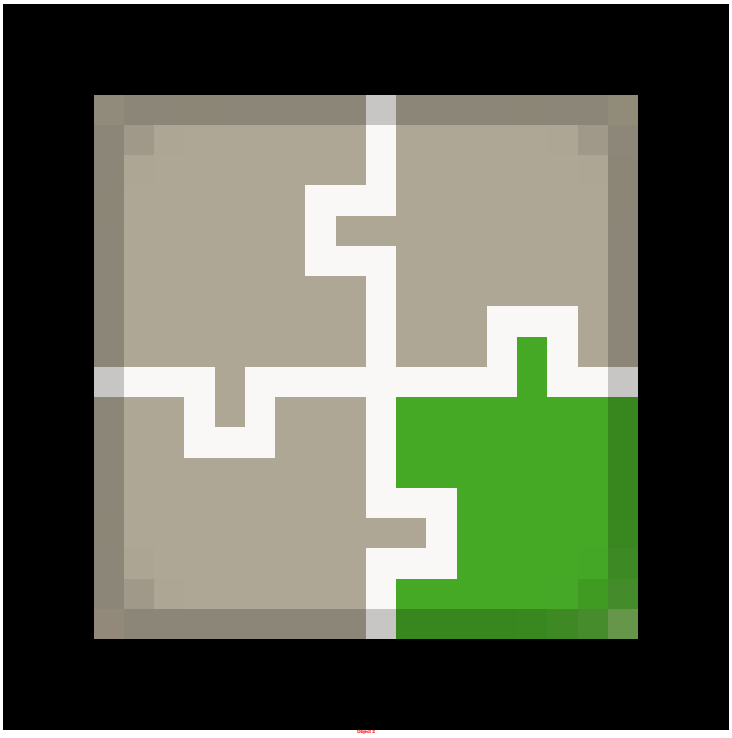
Introduction

The information age is evolving the very nature of warfare. Today, each nation increasingly depends on closely integrated, high-speed electronic systems across cyberspace, geospace, and space (CGS). But, it's a cause of great concern if an enemy can easily use a weapon like a small, inexpensive EMP device. An EMP weapon can deny any individual or entity across a nation the ability to use electromagnetic waves for their digital infrastructure and digital connectivity, e.g. radio, infrared, and radar. Moreover, a nuclear blast can also trigger an EMP effect, as can a solar storm. Individually and collectively, this emerging reality understandably changes the nature of warfare, the focus of the war, and the target of warfare, shaking up the very foundation of security.

Electronic warfare is on our doorstep, and no nation seems to be fully prepared. Since electronic warfare appears to already be on our doorstep, in order to meet the complex EMP warfare challenges that are seriously threatening the very progress and advances nations have made in CGS, it is essential to evaluate how prepared each nation is today in their defensive as well as offensive capabilities. *How are nations addressing the security challenges to their CGS?*

The weaponization of the electromagnetic spectrum is becoming a reality. Acknowledging this emerging reality, Risk Group initiated a much-needed discussion on Electromagnetic Warfare with Colonel Avraham Cohen, Head of National Security Cyber Research Group and the Co-Founder and Chief Technology Officer (CTO) of Sphere-SOC based in Israel on Risk Roundup.

Today In: Innovation



Risk Group discusses Electromagnetic Warfare with Colonel Avraham Cohen, Head of National Security Cyber Research Group and the Co-Founder and Chief Technology Officer (CTO) of Sphere-SOC based in Israel.

Changing Nature of Warfare

Rapid advances in science and technology are creating asymmetries across nations: its government, industries, organizations, and academia (NGIOA) in many unforeseen ways. As nations move towards a highly digitalized society, there is increasing uncertainty on all fronts across CGS.

While the emerging technology is on its way to changing the way we communicate, collaborate, work, and socialize, it is also changing the way in which wars can be fought. This is primarily because today a briefcase-sized radio weapon could wreak havoc in our digitally connected world. The threat is genuine and growing. Electromagnetic (EM) attacks are not only theoretically possible, but they are also already happening. Many have been reported previously. A GPS failure was reported in South Korea in 2012, and it is believed that truck-based jamming systems were behind the attack. This is just one example. *So, what threats are nations facing today from the EM weapons? What threats are possible in the coming tomorrow? Is any nation prepared for electronic warfare today?*

EM Warfare

The increased need for information for all our electronics and the rapidly evolving digital systems, 4G/5G, makes many vulnerable to anyone who may wish to create problems. That means any enemy: hackers, criminals, vandals, or terrorists, can easily cause irreparable harm to anyone they want to. *That brings us to an important question: how resilient is each nation's infrastructure in cyberspace, geospace, and space to EM attacks?*

This is a rapidly growing concern because unlike many other means of attack, EM weapons can be used without much risk. For example, in geospace, any terrorist gang with firearms and other weapons are noticeable and can be caught. In cyberspace, a cyber hacker may raise some alarms while attempting to slip through many firewalls. In space, any attempt to launch an attack requires extensive planning and preparation that is visible. However, for an EM attacker, it is challenging to notice any attack until electronics and computer systems begin to fail. Moreover, even when electronics or systems fail, the victims may still not know why they failed.

As seen today, the critical infrastructure across CGS is either controlled by the military, public or private entities. From defense systems to financial systems and communication systems to power systems, each system today is vulnerable to electromagnetic attacks. Not only is the personal digital infrastructure of any individual or a family at risk, but also the smart: meters, homes, enterprises, cars and so on are at risk as well. *That brings us to some important questions: what role does electromagnetic energy play in the digital infrastructure of a digital global age? What kind of EM pulses are more dangerous to digital infrastructure? Also, fundamentally, why is it that easy to destroy electronics?*

The digital revolution is transforming individuals and entities across NGIOA, and the military is no exception. As militaries acquire a host of new sensors and communications systems that allow their forces to establish information dominance in the fight against enemies quickly, the same capabilities can be seized by an electromagnetic weapon and exploited for the tactical advantage of the enemies. This is a complex security risk facing most nations today.

There is a growing concern that nations are vulnerable when it comes to secure communications links or access to GPS signals. *If that is true, in a potential electronic war, can any nation protect its electronics? Who is responsible for safeguarding a nation's electronics? The military? Can a nation's military protect an entire nation worth of electronics?*

Electronics Vulnerability

As we evaluate the complex security risks facing nations' electronics and digital infrastructure, the question arises as to why our electronics are vulnerable? Why have we not designed them to be resilient to EM attacks?

It seems that electronics are vulnerable because they were designed to handle naturally occurring electromagnetic radiation, but not harmful. This understandably makes not only military operations vulnerable, but also perhaps individuals and entities across NGIOA vulnerable. Moreover, unlike other means of attack, EM weapons can be used without much risk as they are almost undetectable. *So, the question is: is there no way to make electronics resilient?* Perhaps chips can be developed that are EM resistant!

That brings us to an important point: whoever owns the electromagnetic spectrum will win the next war. Who owns the electromagnetic spectrum today?

Protecting Electronics from EMP Weapons

What steps can be taken to guard against EM Weapons? While it is recommended to always put as much distance as possible between any electronics and the potential attacker, how do we know who the attackers are, where they come from, and how they look? How can we surround each electronic with a barrier that can resist the EM attack?

It is essential to understand and evaluate how the EM spectrum is being controlled today and what steps can be taken to ensure EM security. The current focus is on securing the critical infrastructure which is vital to everyone: individuals and entities across NGIOA. But it is not just critical infrastructure that is important, for individuals and entities across NGIOA also care about their private infrastructure as well. *That brings us to an important point: is there any practical way to limit the damage to electronic equipment? Is there any way to make electronics EMP resistant?*

What Next?

The electromagnetic spectrum is where the wars of tomorrow will be fought. Since the weaponization of the electromagnetic spectrum impacts our individual and collective security, each one of us has a role in ensuring the safety and security of the electromagnetic spectrum. Let us begin a discussion on how to secure the electromagnetic spectrum, what innovations are essential, how to transform electronics to make them resilient to any EMP attacks, and how to secure the future of humanity in cyberspace, geospace, and space.

How the secret police use Lasers to send messages and thoughts right to a target's ear

The new technique is the first of its kind that proves you can be sent voices in your head

By
Emily Conover

PLAY BY EAR Audible messages can be sent straight to a listener's ear using a new laser technique (illustrated).

Lincoln Laboratory/MIT

Lasers can send sounds straight to a listener's ear, like whispering a secret from afar.

Using a laser tuned to interact with water vapor in the air, scientists created sounds in a localized spot that were loud enough to be picked up by human hearing if aimed near a listener's ear. It's the first time such a technique can be used safely around humans, scientists from MIT Lincoln Laboratory in Lexington, Mass., report in the Feb. 1 *Optics Letters*. At the wavelengths and intensities used, the laser won't cause burns if it grazes eyes or skin.

The scientists tested out the setup on themselves in the laboratory, putting their ears near the beam to pick up the sound. "You move your head around, and there's a couple-inch zone where you go 'Oh, there it is!'… It's pretty cool," says physicist Charles Wynn. The researchers also used microphones to capture and analyze the sounds.

The work relies on a phenomenon called the photoacoustic effect, in which pulses of light are converted into sound when absorbed by a material, in this case, water vapor.

Based on this effect, the researchers used two different techniques to make the sounds. The first technique, which involves rapidly ramping the intensity of the laser beam up and down, can transmit voices and songs. “You can hear the music really well; you can understand what people are saying,” says physicist Ryan Sullenberger, who coauthored the study along with Wynn and physicist Sumanth Kaushik.

That sound, however, is audible anywhere along the beam, rather than being targeted to just one person. So the researchers devised a second method that could localize the sound to one spot: Using a rotating mirror, the researchers swept the laser beam in an arc, like swinging a flashlight beam with a flick of the wrist. The farther down the beam, the faster the spot of light swings. The noise occurs only at the distance along the beam where the light zips by at the speed of sound.

This technique can’t yet send complex messages: It sounds somewhat like a buzzing insect. With future work, the researchers aim to improve this targeted method to send detailed audio messages as well as increase the distance over which it works. So far, the sounds can be sent several meters in the lab.

For now “it’s not as much a practical means of communication, but a very neat demonstration proving the power of photoacoustics,” says applied physicist Jacob Khurgin of Johns Hopkins University.

If perfected, such laser messages could be used to communicate in noisy environments or to warn people of danger, for example, in an active shooter scenario. More prosaic uses might be listening to a TV headphone-free without disturbing others.

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US Patent 6506148 B2 Confirms Human Nervous System Manipulation Through Your Computer & TV

By Arjun Walia

It’s hard to find any information at all on a one “Hendricus G. Loos,” despite the fact that he’s filed multiple patent applications, with success, for apparatuses that deal with the manipulation of the human nervous system via a computer screen or a television monitor. In the abstract, he explains the following,

> Physiological effects have been observed in a human subject in response to stimulation of the skin with weak electromagnetic fields that are pulsed with certain frequencies near ½ Hz or 2.4 Hz, such as to excite a

> sensory resonance. Many computer monitors and TV tubes, when displaying pulsed images, emit pulsed electromagnetic fields of sufficient amplitudes to cause such excitation. It is therefore possible to manipulate the nervous system of a subject by pulsing images displayed on a nearby computer monitor or TV set. For the latter, the image pulsing may be imbedded in the program material, or it may be overlaid by modulating a video stream, either as an RF signal or as a video signal. The image displayed on a computer monitor may be pulsed effectively by a simple computer program. For certain monitors, pulsed electromagnetic fields capable of exciting sensory resonances in nearby subjects may be generated even as the displayed images are pulsed with subliminal intensity.”

The concerning thing about this, as the patent application explains, is that even a very weak pulse can have adverse affects on the human nervous system.

He then goes on to describe that pulse variability and strength can be controlled through software, and explains how, with regards to a computer monitor, DVDs, video tapes and more, and also how it can be remotely controlled from another location.

Perhaps the most concerning part is this,

> Certain monitors can emit electromagnetic field pulses that excite a sensory resonance in a nearby subject, through image pulses that are so weak as to be subliminal. This is unfortunate since it opens a way for mischievous application of the invention, whereby people are exposed unknowingly to manipulation of their nervous

> systems for someone else’s purposes. Such application would be unethical and is of course not advocated. It is mentioned here in order to alert the public to the possibility of covert abuse that may occur while being online, or while watching TV, a video, or a DVD.”

The application is full of cited examples that the “nervous system of a subject can be manipulated through electromagnetic field pulses emitted by a nearby CRT or LCD monitor which displays images with pulsed intensity.”

Our nervous system basically controls everything in our body, including the brain. It’s a network of nerves and cells that carry messages to and from the brain and spinal cord to various parts of the body, and it’s no secret that the United States government, among others, have a long history of experimenting on human beings for mind control purposes. Could television be a mind-control tactic? It would explain why so many people believe stories and explanations of events presented to them by mainstream media, instantaneously, without even questioning.

In some cases, we are made to idolize what we see on T.V, like celebrities, and imitate behaviour and wants.

Sometimes, a perspective that's backed by evidence, which completely counters the story and information we receive from mainstream media, is thrown into the "conspiracy realm." This is dangerous; have we reached a point where our televisions are doing the thinking for us? Could they be using pulse techniques described above to influence our thoughts, behaviours and perceptions?

Given what we know about our governments and the unethical actions they've taken throughout history, it's really not out of the question.

There is a reason why airplanes and hospitals ban the use of cell phones, it's because their electromagnetic transmissions interfere with critical electrical devices. The brain is no different, it's a bioelectric organ that's extremely complex and generates electric fields. Scientists can actually control brain function with transcranial magnetic stimulation (TMS), a technique that uses powerful pulses of electromagnetic radiation beamed into a person's brain to jam or excite particular brain circuits.

This is the same type of thing described in the patent, so to what extent are our computer monitors and television screens doing this? This is why, for example, when somebody turns on their Sony Playstation, the screen warns them to read the important health information before playing. Research has also shown that simple cell phone transmissions can affect a person's brainwaves quite significantly, which in turn leads to effects on their behaviour as well.

> Electromagnetic radiation can have an effect on mental behaviour when transmitting at the proper frequency."
> – James Horne , from the Loughborough University Sleep Research Centre (source)

Not only this, but hundreds of scientists have come together, and are currently creating awareness on and petitioning the United Nations about the health effects of electromagnetic radiation. They've been linked to cancer, and have been shown to manipulate our DNA. You can read more about that here.

The initiative was started by Dr. Martin Blank, Ph.D., from the Department of Physiology and Cellular Biophysics at Colombia University, who has joined a group of scientists from around the world making an international appeal to the United Nations regarding the dangers associated with the use of various electromagnetic emitting devices, like cells phones and WiFi.

“Putting it bluntly they are damaging the living cells in our bodies and killing many of us prematurely,” said Dr. Martin Blank, from the Department of Physiology and Cellular Biophysics at Columbia University, in a video message.

> We have created something that is harming us, and it is getting out of control. Before Edison’s light bulb there was very little electromagnetic radiation in our environment. The levels today are very many times higher than natural background levels, and are growing rapidly because of all the new devices that emit this radiation.”

This information is a separate effect on the body from mind control, but it’s still important to mention and bring light to.

Not only are our electronic devices monitoring, watching, and recording everything we do, they may also be influencing our behaviour, perceptions, thoughts and feelings on a large-scale as well, but who really knows if “the powers that be” are using these devices for mind control, in the same way they use them for surveillance.

Don’t get me wrong, it’s not hard to see how corporations use television to influence our behaviour and perceptions, but perhaps they, and other authorities, are changing things around, as mentioned above, and manipulating our nervous systems purposefully for their own personal gain, and knowingly do so.

Chamath Palihapitiya, the vice-president for user growth at Facebook prior to leaving the company in 2011, said, “The short-term, dopamine-driven feedback loops that we created are destroying how society works. . . . No civil discourse, no cooperation, misinformation, mistruth.” So, we are seeing a similar type of thing there as well.”

When it comes to mind control, project MK ultra was the CIA's baby. It's commonly believed that it was only LSD that was used on human test subjects, but that was just one program. As the US Supreme Court brought to light in 1985, MK ultra consisted of 162 different secret projects that were indirectly financed by the CIA, and contracted out to several universities, research foundations and similar institutions." The majority of the MK Ultra records were actually destroyed, and have never been seen.
Perhaps television programming was a part of the MK Ultra program?

Concluding Comments

It's hard to fathom the idea that we could be manipulated and used so much, for the purposes of profit, control, and other agendas, but it's a reality we have to face. There are limitless examples of this throughout history all the way up to the modern-day, and all aspects of human life seem to be controlled by a select group of very few people from health, to finance, education, entertainment, big food and more. We've become tools for their use, and our thoughts, behaviours, and perceptions, for the most part, seem to be the same. If they're a little different, or don't really fit the frame, one can instantly be labelled, or become a 'social outcast.'

There is no doubt in my mind that our Television, and other electronic devices has detrimental health effects, and that they do/can effect our nervous system in several different ways. The science on this is clear, but what is not so clear is the idea that there are others using these techniques, knowingly, to control our minds.

Based on all of my research into mind control, and the actions our governments have taken and to what extent they've taken them to, I would be surprised if Television was not apart of the MK ultra program.

All and all, it's another great recent to spend less time in-front of your screen, and more time with a book or spending time outside, or with family and friends. If there is one thing that's for sure, our screens are detrimental to our health in several different ways.

This article originally appeared on Collective Evolution.

I can change the way you think, from one block away, with an electromagnetic beam. Here is proof...

- By Patrick Tucker Technology Editor Read bio

This is what Google and Facebook are working on in their secret lab and "bio-hacking" ventures

Newport Brain Treatment Lab

Hundreds of vets have tried out an experimental new treatment that could change how the world addresses mental disorders.

Tony didn't know what to expect when he walked into the Brain Treatment Center in San Diego, California, last spring. The former Navy SEAL only knew that he needed help. His service in Iraq and Afghanistan was taking a heavy toll on his mental and physical wellbeing. He had trouble concentrating, remembering, and was given to explosive bursts of anger. "If somebody cut me off driving, I was ready to kill 'em at the drop of a hat," he said. And after he got into a fistfight on the side of a California road, his son looking on from the car, he decided he was willing to try anything — even an experimental therapy that created an electromagnetic field around his brain.

What Tony and several other former U.S. Special Operations Forces personnel received Newport Brain Research Laboratory, located at the Center, was a new treatment for brain disorders, one that might just revolutionize brain-based medicine. Though the FDA clinical trials to judge its efficacy and risks are ongoing, the technique could help humanity deal with a constellation of its most common mental disorders — depression, anxiety, aggressiveness, attention deficit, and others—and do so without drugs. And if its underpinning theory proves correct, it could be among the biggest breakthroughs in the treatment of mental health since the invention of the EEG a century ago.

At the lab, Tony (whose name has been changed to protect his identity) met Dr. Erik Won, president and CEO of the Newport Brain Research Laboratory, the company that's innovating Magnetic EEG/ECG-guided Resonant Therapy, or MeRT. Won's team strapped cardiac sensors on Tony and placed an electroencephalography cap on his skull to measure his brain's baseline electrical activity. Then came the actual therapy. Placing a flashlight-sized device by Tony's skull, they induced an electromagnetic field that senta small burst of current to his brain. Over the course of 20 minutes, they moved the device around his cranium, delivering jolts that, at their most aggressive, felt like a firm finger tapping.

For Tony, MeRT's effects were obvious and immediate. He walked out of the first session to a world made new. "Everything looked different," he told me. "My bike looked super shiny."

He began to receive MeRT five times a week— each session lasting about an hour, with waiting room time — and quickly noticed a change in his energy. "I was super boosted," he said. His mood changed as well.

Today, he admits that he still has moments of frustration but says that anger is no longer his "go-to emotion." He's developed the ability to cope. He still wants help with his memory, but his life is very different. He's taken up abstract painting and welding, two hobbies he had no interest in at all before the therapy. He's put in a new kitchen. Most importantly, his sleep is very different: better.

Tony's experience was similar to those of five other special-operations veterans who spoke with *Defense One.* All took part in a double-blind randomized clinical trial that sought to determine how well MeRT treats Persistent Post-Concussion Symptoms and Post-Traumatic Stress Disorder, or PTSD. Five out of the six were former Navy SEALS.

In many ways, SEALS represent the perfect test group for experimental brain treatment. They enter the service in superb health and then embark on a course of training that heightens mental and physical strength and alertness. Then comes their actual jobs, which involve a lot of "breaching": getting into a place that the enemy is trying to keep you out of. It could be a compound in Abbottabad, Pakistan—or every single door in that compound. Breaching is so central to SEAL work that it's earned them the nickname "door kickers." But it often involves not so much kicking as explosives at closer-than-comfortable range. "I got blown up a lot in training," says Tony, and a lot afterwards as well. Put those two factors together and you have a population with a high functioning baseline but with a lot of incidents of persistent post-concussive syndrome, often on top of heavy combat-related PTSD and other forms of trauma.

One by one, these former SEALs found their way to Won's lab. One — let's call him Bill — sought to cure his debilitating headaches. Another, Ted, a SEAL trainer, had no severe symptoms but wanted to see whether the therapy could improve his natural physical state and performance. A fourth, Jim, also a former SEAL, suffered from severe inability to concentrate, memory problems, and low affect, which was destroying his work performance. "I was forcing myself to act normal," Jim said. "I didn't feel like I was good at anything."

Yet another, a former member of the Air Force Security Forces named Cathy, had encountered blasts and a "constant sound of gunfire" during her deployments to Iraq and Afghanistan. She suffered from memory problems, depression, anger, bouts of confusion, and migraines so severe she had to build a darkroom in her house.

Like Cathy, the rest had difficulty sleeping. Even Ted, who had no severe PTSD-related problems, reported that he "slept like crap," before the treatment began.

All said that they saw big improvements after a course of therapy that ran five days a week for about four weeks. Bill reported that his headaches were gone, as did Cathy, who said her depression and mood disorders had lessened considerably. Jim's memory and concentration improved so dramatically that he had begun pursuing a second master's degree and won a spot on his college's football team. Ted

said he was feeling “20 years younger” physically and found himself better able to keep pace with the younger SEALS he was training. All of it, they say, was a result of small, precisely delivered, pops of electricity to the brain. Jim said the lab had also successfully treated back and limb pain by targeting the peripheral nervous system with the same technique.

Inside the Brain Treatment Center in San Diego, the location of the Newport Brain Research Lab, a wall displays paintings of patients who have undergone MeRT therapy, the tone, mood, and control in the paintings evolves as the patient continues through the treatment.

Won, a former U.S. Navy Flight Surgeon, and his team have treated more than 650 veterans using MeRT. The walls of the lab are adorned with acrylic paintings from veterans who have sought treatment. The colors, themes, and objects in the paintings evolve, becoming brighter, more optimistic, some displaying greater motor control, as the painter progresses through the therapy.

The lab is about one-third of the way through a double-blind clinical trial that may lead to FDA approval, and so Won was guarded in what he could say about the results of their internal studies. But he said that his team had conducted a separate randomized trial on 86 veterans. After two weeks, 40 percent saw changes in their symptoms; after four weeks, 60 did, he said.

“It’s certainly not a panacea,” said Won. “There are people with residual symptoms, people that struggle…I would say the responses are across the board. Some sleep better. Some would say, very transformative.” (Won doesn’t even categorize the treatment as “curing,” as that has a very specific meaning in neurology and mental health, so much as “helping to treat.”)

Won believes the question might ultimately be not “Does MeRT work?” but “What therapies can it replace?”

“I think, in the future, there will be a discussion about whether this should be first-line management. What can we do to address the functional issues at play? There’s a whole lot of science to do before we get there,” he said.

Your Brain is Electric

The idea that electricity, properly administered, could treat illness goes back to 1743 when a German physician named Johann Gottlob Kruger of the University of Halle successfully treated a harpsichordist with arthritis via electrical stimulation to the hand. John Wesley, the father of Methodism, also experimented with electricity as a therapeutic and declared it “The nearest an Universal medicine of any yet known in the world.”

But the idea remained mostly an idea with no real science to back it up, until the 20th century.

Enter Hans Berger, a German scientist who wanted to show that human beings were capable of telepathy via an unseen force he referred to as “psychic energy.” He believed this energy derived from an invisible relationship between blood flow, metabolism, emotion, and the sensation of pain and thought that if he could find physical evidence that psychic energy existed, perhaps humanity could learn to control it.

To test his theory, he needed a way to record the brain's electrical activity.In 1924, he applied a galvanometer a tool originally built to measure the heart's electrical activity, to the skull of a young brain-surgery patient. The galvanometer was essentially a string of silver-coated quartz filament flanked by magnets. The filament would move as it encountered electromagnetic activity, which could be graphed. Berger discovered that the brain produced electrical oscillations at varying strengths. He dubbed the larger ones, of 8 to 12 Hz, the alpha waves, the smaller ones beta waves, and named the graphing of these waves an electroencephalogram, or EEG.

Berger's telepathy theories never panned out, but the EEG became a healthcare staple, used to detect abnormal brain activity, predict potential seizures, and more.

The separate notion that electricity could be used to treat mental disorder entered wide medical practice with the invention of electroconvulsive therapy, or ECT, in Italy in the 1930s. ECT — more commonly called shock therapy — used electricity to induce a seizure in the patient. Its use spread rapidly across psychiatry as it seemed to not only meliorate depression but also to temporarily pacify patients who suffered from psychosis and other disorders. Before long, doctors in mental institutions were prescribing it commonly to subdue troublesome patiets and even as a "cure" for homosexuality. The practice soon became associated with institutional cruelty.

In the 1990s, a handful of researchers, independent of another, realized that electricity at much lower voltages could be used to help with motor function in Parkinson's patients and as an aid for depression. But there was a big difference between their work and that of earlier practitioners of ECT: they used magnetic fields rather than jolts of electricity. This allowed them to activate brain regions without sending high currents through the skull. Seizures, it seemed, weren't necessary.

In 2008, researchers began to experiment with what was then called transcranial magnetic stimulation to treat PTSD. Since then, it's been approved as a treatment for depression. Won and his colleagues don't use it in the same way that doctors do when they're looking for something simple and easy to spot, like potential signs of a seizure or head trauma. Won uses EEG/ECG biometrics to find the subject's baseline frequency, essentially the "normal" state to return her or him to, and also to precisely target the areas of the brain that will respond to stimulation in the right way.

YOU Have a Signature. Your Signature is YOU

No two people experience mental health disorders in the same way. Some PTSD sufferers have memory problems; others, depression; still others, uncontrollable anger. But people that are diagnosed with depression are more likely to suffer from another, separate mental health issue, such as anxiety, attention deficit, or something else.

A data visualization of brain electrical activity mapped via EEG. Courtesy of the Newport Brain Research Lab

The theory that underpins MeRT posits that many of these problems share a common origin: a person's brain has lost the beat of its natural information-processing rhythm, what Won calls the "dominant frequency."

Your dominant frequency is how many times per second your brain pulses alpha waves. “We’re all somewhere between 8 and 13 hertz. What that means is that we encode information 8 to 13 times per second. You’re born with a signature. There are pros and cons to all of those. If you’re a slower thinker, you might be more creative. If you’re faster, you might be a better athlete,” Won says.

Navy SEALS tend to have higher-than-average dominant frequencis, around 11 or 13 Hz. But physical and emotional trauma can disrupt that, causing the back of the brain and the front of the brain to emit electricity at different rates. The result: lopsided brain activity. MeRT seeks to detect arrhythmia, find out which regions are causing it, and nudge the off-kilter ones back onto the beat.

“Let’s just say in the left dorsal lateral prefrontal cortex, towards the front left side of the brain, if that’s cycling at 2 hertz, where we are 3 or 4 standard deviations below normal, you can pretty comfortably point to that and say that these neurons aren’t firing correctly. If we target that area and say, ‘We are going to nudge that area back to, say, 11 hertz,’ some of those symptoms may improve,” says Won. “In the converse scenario, in the right occipital parietal lobe where, if you’ve taken a hit, you may be cycling too fast. Let’s say it’s 30 hertz. You’re taking in too much information, oversampling your environment. And if you’re only able to process it using executive function 11 times per second, that information overload might manifest as anxiety.”

If the theory behind MeRT is true, it could explain, at least partially, why a person may suffer from many mental-health symptoms: anxiety, depression, attention deficits, etc. The pharmaceutical industry treats them with separate drugs, but they all may have a similar cause, and thus be treatable with one treatment. That, anyway, is what Won’s preliminary results are suggesting.

“You don’t see these type of outcomes with psychopharma or these other types of modalities, so it was pretty exciting,” he said.

There are lots of transcranial direct stimulation therapies out there, with few results to boast of. What distinguishes MeRT from other attempts to treat mental disorders with electrical fields is the use of EEG as a guide. It’s the difference between trying to fix something with the aid of a manual versus just winging it.

If the clinical trials bear out and the FDA approves of MeRT as an effective treatment for concussion and/or PTSD, many more people will try it. The dataset will grow, furthering the science. If that happens, the world will soon know whether or not there is a better therapeutic for mood and sleep disorders than drugs; and a huge portion of the pharmaceutical industry will wake up to earth-changing news.

But there’s more. Won believes that MeRT may have uses for nominally healthy brains, such as improving attention, memory, and reaction time, as Ted discovered. It’s like the eyesight thing, the sudden, stark visual clarity. “These were unexpected findings, but we’re hearing it enough that we want to do more studies.”

Performance enhancement is “not something that we’re ardently chasing,” says Won. ”Our core team is about saving lives. But so many of our veterans are coming back asking.”

Already, there's evidence to suggest that it could work. "What we've noticed in computerized neuro-psych batteries is that reaction times improve. Complex cognitive processing tasks can improve both in terms of speed to decision and the number of times you are right versus wrong. Those are all things we want to quantify and measure with good science," he says.

What is one person's therapy, in the years ahead, could be another person's mental health regimen. Signs of that future are already here. Like so many strange portents, their origin is the tech field.

More and more high-level executives, including at technology companies, are seeking him out, asking to be strapped in and zapped for a few weeks. "That's been a recent evolution. There's a company" — he declined to name it — "a lot of programmers, engineers, etc. … One of their C-suite members got treatment and was so blown away that they want all of their key team members to get it…They're ruthlessly competitive…They want an edge."

So does the American military.

- Patrick Tucker is technology editor for Defense One. He's also the author of The Naked Future: What Happens in a World That Anticipates Your Every Move? (Current, 2014). Previously, Tucker was deputy editor for The Futurist for nine years. Tucker has written about emerging technology in Slate, ... Full bio

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Spooky Quantum Entanglement Created in Everyday Objects

https://www.popularmechanics.com/technology/gadgets/a7355/spooky-quantum-entanglement-created-in-everyday-objects-6606439/

Quantum entanglement happens when two particles, such as photons or electrons, interact and become linked. Even when the particles are moved miles apart, the molecules' mechanical states (such as their spin, momentum, and polarization) remain mysteriously coupled. If the state of one entangled particle is changed,...

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A quantum case of mind over matter? - Inside The Perimeter

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A **quantum** case of **mind over matter**? New research proposes a way to test whether **quantum** entanglement is affected by consciousness.

Consciousness, Hidden Knowledge, Mind over Matter, Quantum ...

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MIND OVER MATTER Eberhard's Proof shows that altho Earth and Pluto may be instantly connected in Reality, it is impossible in the world of Appearance using current physical processes to send faster than light messages via the **quantum** entanglement channel. However suppose we introduce processes that lie outside of conventional physical measurements.

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QUANTUM SOCIOLOGY - Modifying The Future

There are similarities between the individuals of societies and the particles of matter. Those individuals are made of those particles of matter. The study of the particles using the quantum mechanics conducted over the past century has prepared a way to apply those methodologies for the study of an individual in any society and the future trends of those individuals. Through the application of the process of quantum and entanglement process mechanics to the humanities and the social sciences one can deal with and guide the many complexities of human endeavors. Your brain has 80 billion neurons that generate electrically measurable energy. Let's put all of that power to work.

"...Quantum physics is very hip and attractive thanks to its scientific popularizers, but few people truly understand it yet, and little attention is paid to its developments in the social sciences. Recent literature indicates that a proposed quantum 'turn' may be taking place in the social sciences. It has already taken root in my worldview, so I will try to demonstrate the case why it has to happen. Paradigmatic 'turns' happen often in discourse, as with the constructivist turn (circa '90s) in International Relations, based on the work of Alexander Wendt. Wendt has left that paradigm behind and is now leading a new turn, towards a quantum social science..."

The new APPLE TV movie series "***FOUNDATION***" addresses the possibility of manipulating the future with quantum entanglement types of contrivances.

This may already be happening in real life!

Quantum sociology is an emerging field of interdisciplinary research which draws parallels between quantum physics and the social sciences. Although there is no settled consensus on a single approach, [1] a unifying theme is that, while the social sciences have long modelled themselves on mechanistic science, they can learn much from quantum ideas such as complementarity and entanglement. Some authors are motivated by quantum mind theories that the brain, and therefore human interactions, are literally based on quantum processes, while others are more interested in taking advantage of the quantum toolkit to simulate social behaviours which elude classical treatment. Quantum ideas have

been particularly influential in psychology, but are starting to affect other areas such as international relations and diplomacy in what one 2018 paper called a "quantum turn in the social sciences".[2]

The idea that quantum physics might play an important role in living systems has long been considered by physicists. Niels Bohr for example believed that his principle of complementarity extended into both biology and psychology,[3] while Erwin Schrödinger wrote in his 1944 book *What is Life?* of a "quantum theory of biology" that saw genetic mutations in terms of quantum leaps. In his 1989 book *The Emperor's New Mind*, Roger Penrose hypothesized that quantum mechanics plays an essential role in human consciousness. His 1994 follow-up book *Shadows of the Mind* speculated that these quantum processes take place in microtubules inside neurons.

Some physicists have also been willing to consider an even more direct connection between mind and quantum matter, in a quantum version of panpsychism. In his 1975 book *Disturbing the Universe*, Freeman Dyson wrote that "mind is already inherent in every electron, and the processes of human consciousness differ only in degree but not in kind from the processes of choice between quantum states".[4] David Bohm's 1951 book *Quantum Theory* included a chapter on "Analogies to Quantum Processes" where he considered applications including the understanding of thought processes,[5] and in 1990 he published a paper named "A new theory of the relationship of mind and matter" which asserts that consciousness permeates all forms of matter.[6]

These ideas were popularised and extended by Danah Zohar in books including *The Quantum Self*[7] and (with Ian Marshall) *The Quantum Society*.[8] Karen Barad's 2007 book *Meeting the Universe Halfway* took "Niels Bohr's philosophy-physics" as a starting point to develop her theory of agential realism.[9] Beginning in the 1990s, a separate approach to quantum social science was taken by a number of interdisciplinary researchers, working in what became known as quantum cognition, who argued that quantum probability theory was better than classical probability theory at accounting for a range of cognitive effects of the sort studied in behavioral economics.[10][11][12]

Others worked on developing "weak" or "generalised" versions of quantum theory which extended concepts such as complementarity and entanglement to the social domain.[13][14] In their 2013 book *Quantum Social Science*, Emmanuel Haven and Andrei Khrennikov developed mathematical formalisms for the application of quantum models to topics including psychology, economics, finance, and brain science.[15]

Most researchers in areas such as quantum cognition view the quantum formalism solely as a mathematical toolbox, and do not assume that human cognition is physically based on quantum mechanics. We disagree!

Separately however, researchers in quantum biology have uncovered evidence of quantum effects being exploited in processes such as photosynthesis and avian navigation; and some authors, notably political scientist Alexander Wendt, have argued that human beings are literally what he calls "walking wave functions".[16]

Core ideas

While quantum social scientists are divided on the question of whether social processes are physically quantum in nature, or just happen to be amenable to a quantum approach, there are a number of

common ideas, themes, and concerns. The most fundamental is that, since its inception, social science has been based on a classical worldview, which needs to be updated in accordance with the teachings of quantum physics. In particular, quantum theory disputes the key tenets or assumptions of materialism, determinism, and mechanism.[17] An example is the notion of entanglement. In mechanistic or pre-quantum science, particles are seen as individual entities that interact only in a mechanistic sense. In quantum mechanics, particles such as electrons can become entangled so that a measurement on one instantly affects the state of the other. In quantum social science, people are similarly entangled, whether through shared institutions such as language, or (according to some interpretations) through actual physical processes.[16] An implication is that people are never completely separable, but are entangled elements of society. Another example is the idea of wave function collapse. In standard interpretations of quantum physics, a particle is described by a wave function, and attributes such as position or momentum are only discovered through a measurement procedure which collapses the wave function to one of a number of allowed states. In quantum social science, mental states are best described as potentialities that "collapse" only when a judgement or decision is made.[18] One consequence of wave function collapse in physics is that a measurement affects the system being studied, and therefore any future measurement. A corresponding phenomenon in social science is the so-called order effect, where responses to survey questions depends on the order in which they are asked.[19]

Applications

Ideas from quantum physics have long inspired thinkers in areas such as politics, diplomacy, and international relations. The journalist Flora Lewis spoke of the "Quantum Mechanics of Politics" in 1975.[20] In a 1997 lecture on "Diplomacy in the Information Age", former US Secretary of State George P. Shultz credits the physicist Sidney Drell for coining the term "quantum diplomacy" to describe how diplomats need to account for uncertainty and the fact that "the process of observation itself is a cause of change".[21] In a 2011 paper, James Der Derian proposed quantum diplomacy as a way to understand the entanglements brought about by a globalized media and a multiplicity of actors operating at different levels.[22] These ideas have been a theme of Der Derian's annual Q2-Symposium since 2014. In a 2018 address to the Trilateral Commission, Danah Zohar argued that a mechanistic worldview has led to problems from inequality to climate change, and that we need to shift to a quantum perspective which incorporates effects such as uncertainty and entanglement.[23] While Wendt's 2015 book *Quantum Mind and Social Science*[16] does not focus on political science, it does discuss the applicability of quantum theory to social systems in general, and its publication led to a great deal of analysis and discussion on this topic.[24][25][26] Other related areas where quantum ideas are seeing applications include quantum game theory, quantum decision theory, quantum finance and quantum economics. In a 2019 article for the Bretton Woods Committee, Andrew Sheng wrote that "A quantum paradigm of finance and the economy is slowly emerging, and its nonlinear, complex nature may help the design of a future global economy and financial architecture."[27]

Realism: A topic of controversy is whether quantum science should be applied to social systems only in a metaphorical sense, or whether it should be taken as a physical description of those systems.[28] We are now using this capability to control future trends. This relates to a broader debate in the sciences about scientific realism, which applies also to quantum physics.[1]

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Blackboard-based physicists sometimes claim that only CERN, Boeing or Stanford University has all the huge gear to make quantum entanglement broadcasting. They are wrong! Small, cheap devices are already doing it!

In a critical step toward creating a global quantum communications network, researchers have generated and detected quantum entanglement onboard a CubeSat nanosatellite weighing less than 2.6 kilograms and orbiting the Earth.

"In the future, our system could be part of a global quantum network transmitting quantum signals to receivers on Earth or on other spacecraft," said lead author Aitor Villar from the Centre for Quantum Technologies at the National University of Singapore. "These signals could be used to implement any type of quantum communications application, from quantum key distribution for extremely secure data transmission to quantum teleportation, where information is transferred by replicating the state of a quantum system from a distance."

In *Optica*, The Optical Society's (OSA) journal for high impact research, Villar and an international group of researchers demonstrate that their miniaturized source of quantum entanglement can operate successfully in space aboard a low-resource, cost-effective CubeSat that is smaller than a shoebox. CubeSats are a standard type of nanosatellite made of multiples of 10 cm × 10 cm × 10 cm cubic units.

"Progress toward a space-based global quantum network is happening at a fast pace," said Villar. "We hope that our work inspires the next wave of space-based quantum technology missions and that new applications and technologies can benefit from our experimental findings."

Miniaturizing quantum entanglement

The quantum mechanical phenomenon known as entanglement is essential to many quantum communications applications. However, creating a global network for entanglement distribution isn't possible with optical fibers because of the optical losses that occur over long distances. Equipping small, standardized satellites in space with quantum instrumentation is one way to tackle this challenge in a cost-effective manner.

As a first step, the researchers needed to demonstrate that a miniaturized photon source for quantum entanglement could stay intact through the stresses of launch and operate successfully in the harsh environment of space within a satellite that can provide minimal energy. To accomplish this, they exhaustively examined every component of the photon-pair source used to generate quantum entanglement to see if it could be made smaller or more rugged.

"At each stage of development, we were actively conscious of the budgets for mass, size and power," said Villar. "By iterating the design through rapid prototyping and testing, we arrived at a robust, small-form factor package for all the off-shelf components needed for an entangled photon-pair source."

The new miniaturized photon-pair source consists of a blue laser diode that shines on nonlinear crystals to create pairs of photons. Achieving high-quality entanglement required a complete redesign of the mounts that align the nonlinear crystals with high precision and stability.

The researchers qualified their new instrument for space by testing its ability to withstand the vibration and thermal changes experienced during a rocket launch and in-space operation. The photon-pair source maintained very high-quality entanglement throughout the testing, and crystal alignment was preserved even after repeated temperature cycling from -10 °C to 40 °C.

The researchers incorporated their new instrument into SpooQy-1, a CubeSat that was deployed into orbit from the International Space Station on 17 June 2019. The instrument successfully generated entangled photon-pairs over temperatures from 16 °C to 21.5 °C.

"This demonstration showed that miniaturized entanglement technology can work well while consuming little power," said Villar. "This is an important step toward a cost-effective approach to the deployment of satellite constellations that can serve global quantum networks." The project was funded by Singapore's National Research Foundation.

Terahertz wave energy harvesting can now deliver free energy from waves that are pervasive in our daily lives. People with high virus temperatures emit them.

Anything that registers a temperature, including our own bodies and the inanimate objects around us, including Wi-Fi signals, also emits terahertz waves —electromagnetic waves with a frequencies somewhere between microwaves and infrared light. These high-frequency radiation waves are known as "T-rays". Unlike solar and wind power, you can harvest T-Rays 24-7, rain or shine.

Terahertz waves are pervasive in our daily lives, and if harnessed, their concentrated power could potentially serve as an alternate energy source. Imagine, for instance, a cellphone add-on that passively soaks up ambient T-rays and uses their energy to charge your phone. So you get free cell phone

charging anywhere. MIT, Stanford, Raytheon, etc. scientists have already built working desktop systems.

You can use quantum mechanical, or atomic behaviors, of carbon material graphene, combined with other materials (boron, nitrogen, etc.) to force electrons in graphene to skew their motion toward a common direction. We are looking at this to amplify our electric propulsion systems but it has wonderful side-effects for energy harvesting. Any incoming ambient terahertz waves "shuttle" graphene's electrons, like so many tiny air traffic controllers, to flow through the material in a single direction, as a direct current. Exciting new energy and propulsion products will be coming from this!

The researchers have published their results today in the journal *Science Advances*, and are working with experimentalists to turn their design into a physical device.

"We are surrounded by electromagnetic waves in the terahertz range," says lead author Hiroki Isobe, a postdoc in MIT's Materials Research Laboratory. "If we can convert that energy into an energy source we can use for daily life, that would help to address the energy challenges we are facing right now."

Isobe's co-authors are Liang Fu, the Lawrence C. and Sarah W. Biedenharn Career Development Associate Professor of Physics at MIT; and Su-yang Xu, a former MIT postdoc who is now an assistant professor chemistry at Harvard University.

Breaking graphene's symmetry

Over the last decade, scientists have looked for ways to harvest and convert ambient energy into usable electrical energy. They have done so mainly through rectifiers, devices that are designed to convert electromagnetic waves from their oscillating (alternating) current to direct current.

Most rectifiers are designed to convert low-frequency waves such as radio waves, using an electrical circuit with diodes to generate an electric field that can steer radio waves through the device as a DC current. These rectifiers only work up to a certain frequency, and have not been able to accommodate the terahertz range.

A few experimental technologies that have been able to convert terahertz waves into DC current do so only at ultracold temperatures—setups that would be difficult to implement in practical applications.

Instead of turning electromagnetic waves into a DC current by applying an external electric field in a device, Isobe wondered whether, at a quantum mechanical level, a material's own electrons could be induced to flow in one direction, in order to steer incoming terahertz waves into a DC current.

Such a material would have to be very clean, or free of impurities, in order for the electrons in the material to flow through without scattering off irregularities in the material. Graphene, he found, was the ideal starting material.

To direct graphene's electrons to flow in one direction, he would have to break the material's inherent symmetry, or what physicists call "inversion." Normally, graphene's electrons feel an equal force between them, meaning that any incoming energy would scatter the electrons in all directions,

symmetrically. Isobe looked for ways to break graphene's inversion and induce an asymmetric flow of electrons in response to incoming energy.

Looking through the literature, he found that others had experimented with graphene by placing it atop a layer of boron nitride, a similar honeycomb lattice made of two types of atoms—boron and nitrogen. They found that in this arrangement, the forces between graphene's electrons were knocked out of balance: Electrons closer to boron felt a certain force while electrons closer to nitrogen experienced a different pull. The overall effect was what physicists call "skew scattering," in which clouds of electrons skew their motion in one direction.

Isobe developed a systematic theoretical study of all the ways electrons in graphene might scatter in combination with an underlying substrate such as boron nitride, and how this electron scattering would affect any incoming electromagnetic waves, particularly in the terahertz frequency range.

He found that electrons were driven by incoming terahertz waves to skew in one direction, and this skew motion generates a DC current, if graphene were relatively pure. If too many impurities did exist in graphene, they would act as obstacles in the path of electron clouds, causing these clouds to scatter in all directions, rather than moving as one.

"With many impurities, this skewed motion just ends up oscillating, and any incoming terahertz energy is lost through this oscillation," Isobe explains. "So we want a clean sample to effectively get a skewed motion."

One direction

They also found that the stronger the incoming terahertz energy, the more of that energy a device can convert to DC current. This means that any device that converts T-rays should also include a way to concentrate those waves before they enter the device.

With all this in mind, the researchers drew up a blueprint for a terahertz rectifier that consists of a small square of graphene that sits atop a layer of boron nitride and is sandwiched within an antenna that would collect and concentrate ambient terahertz radiation, boosting its signal enough to convert it into a DC current.

"This would work very much like a solar cell, except for a different frequency range, to passively collect and convert ambient energy," Fu says.

The team has filed a patent for the new "high-frequency rectification" design, and the researchers are working with experimental physicists at MIT to develop a physical device based on their design, which should be able to work at room temperature, versus the ultracold temperatures required for previous terahertz rectifiers and detectors.

"If a device works at room temperature, we can use it for many portable applications," Isobe says.

He envisions that, in the near future, terahertz rectifiers may be used, for instance, to wirelessly power implants in a patient's body, without requiring surgery to change an implant's batteries. Such devices could also convert ambient Wi-Fi signals to charge up personal electronics such as laptops and cellphones.

"We are taking a quantum material with some asymmetry at the atomic scale, that can now be utilized, which opens up a lot of possibilities," Fu says.

Traveling brain waves help detect hard-to-see objects

by Salk Institute

Imagine that you're late for work and desperately searching for your car keys. You've looked all over the house but cannot seem to find them anywhere. All of a sudden you realize your keys have been sitting right in front of you the entire time. Why didn't you see them until now?

Now, a team of Salk Institute scientists led by Professor John Reynolds has uncovered details of the neural mechanisms underlying the perception of objects. They found that patterns of neural signals, called traveling brain waves, exist in the visual system of the awake brain and are organized to allow the brain to perceive objects that are faint or otherwise difficult to see. The findings were published in *Nature* on October 7, 2020.

"We've discovered that faint objects are much more likely to be seen if visualizing the object is timed with the traveling brain waves. The waves actually facilitate perceptual sensitivity, so there are moments in time when you can see things that you otherwise could not," says Reynolds, senior author of the paper and holder of the Fiona and Sanjay Jha Chair in Neuroscience. "It turns out that these traveling brain waves are an information-gathering process leading to the perception of an object."

Scientists have studied traveling brain waves during anesthesia but dismissed the waves as an artifact of the anesthesia. Reynolds' team, however, wondered if these waves exist in the visual part of the brain while awake and if they play a role in perception. They combined recordings in the visual cortex with cutting-edge computational techniques that enabled them to detect and track traveling brain waves.

"In order to understand the neural mechanisms of perception, we needed to develop new computational techniques to track neuronal activity in the visual cortex moment by moment," says co-first author Lyle Muller, BrainsCAN-funded assistant professor in the Department of Applied Mathematics and the Brain and Mind Institute at Western University in Ontario, Canada, and previously a postdoctoral fellow in the Sejnowski lab at Salk. "We then used these computational methods to uncover what change was occurring in the nervous system to suddenly allow for object recognition."

The scientists recorded the activity of the neurons from an area of the brain that contained a complete map of the visual world. They then tracked the trajectories of the traveling brain waves during a visual perception task. The scientists held an onscreen target at the threshold of visibility, so that observers could only detect the object 50 percent of the time, and recorded when the target was spotted. Since the target was not changing, the researchers reasoned that the observer's ability to perceive the object only half of the time had to be due to some change in the neural signals inside the brain.

They found that the brain's ability to recognize targets was directly related to when and where the traveling brain waves occurred in the visual system: when the traveling waves aligned with the stimulus, the observer could detect the target more easily. These traveling brain waves, which occurred several times per second, were similar to a stadium of sports fans successively standing up and raising their arms, then lowering them and sitting down again. It appears that the visual system is actively sensing the external environment, according to the team.

"There is a spontaneous level of activity in the brain that appears to be regulated by these traveling waves," says Salk Professor Terrence Sejnowski, an author of the paper and holder of the Francis Crick Chair. "We think the waves are the product of the activity that is propagating around the brain, driven by local neurons firing."

"We go about our everyday lives thinking that we are accurately seeing the world, but, in fact, our brains are filling in details that are difficult to see," says Zac Davis, co-first and corresponding author of the paper and a Salk postdoctoral fellow in the Reynolds lab. "Now, we have discovered how the brain weaves together hard-to-see information to perceive an object."

In the future, the scientists plan to examine whether these brain waves are coordinated across different brain regions devoted to vision. The researchers theorize that the brain waves could serve as a gate between the sensory processing and conscious perception that emerges from the brain as a whole.

How attention helps the brain perceive an object

More information: Spontaneous travelling cortical waves gate perception in behaving primates, *Nature* (2020). DOI: 10.1038/s41586-020-2802-y , www.nature.com/articles/s41586-020-2802-y