

Ode to E Pluribus Unum for Sunday May 12 2024

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IC 1795: The Fishhead Nebula



Image Credit & Copyright: Roberto Colombari & Mauro Narduzzi

To some, this nebula looks like the head of a fish. However, this colorful cosmic portrait really features glowing gas and obscuring dust clouds in IC 1795, a star forming region in the northern constellation Cassiopeia.

The nebula's colors were created by adopting the Hubble color palette for mapping narrowband emissions from oxygen, hydrogen, and sulfur atoms to blue, green and red colors, and further blending the data with images of the region recorded through broadband filters.

Not far on the sky from the famous Double Star Cluster in Perseus, IC 1795 is itself located next to IC 1805, the Heart Nebula, as part of a complex of star forming regions that lie at the edge of a large molecular cloud. Located just over 6,000 light-years away, the larger star forming complex sprawls along the Perseus spiral arm of our Milky Way Galaxy. At that distance, IC 1795 would span about 70 light-years across.

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Mesmerizing Art of Venetian Glass Making



digitalawards

https://youtu.be/_i_0_h4BF8

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Watch The Peregrine Falcon Nest Webcam On Alcatraz Island

HD bird cam livestream



golden gate conservancy

Peregrine Falcons have nested again on Alcatraz Island! Tune into the livestream from the Rock to see the fledgling family grow before your very eyes.

Known as one of the fastest known birds in the world—and one of the fastest animals on Earth—these powerful birds of prey can dive at speeds of up to 200 mph. They also have a unique conservation success story.

<https://bit.ly/4baFF3s>

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Should Schools Ban Phones?



Fly View Productions/Getty Images

Educators have long pushed back against distraction machines (aka phones), with 77% of schools banning them in the classroom as of 2020, according to a National Center for Education Statistics survey. But as evidenced by the vape clouds wafting from school bathrooms, making rules is the easy part.

<https://bit.ly/3yf5Lnv>

Hey, why have a welfare system if you haven't got a sure-fire way to populate it?

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List Honoring Japanese Americans Incarcerated During WWII



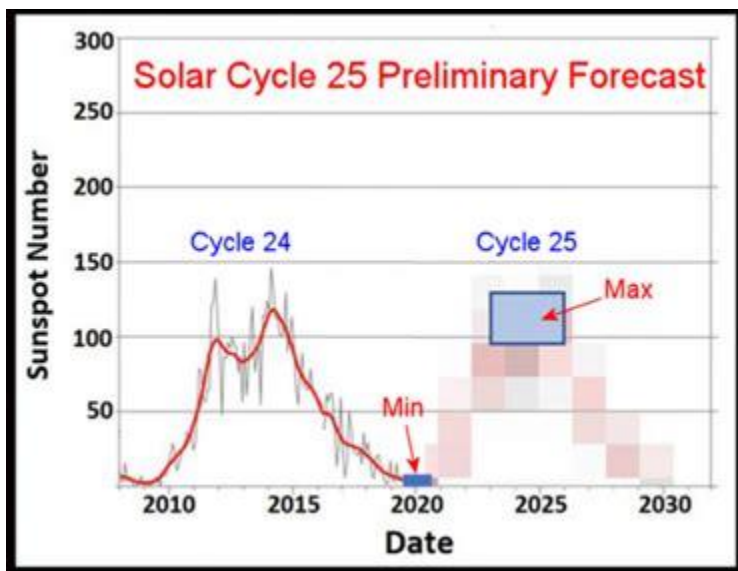
*Detainees at California's Manzanar War Relocation Center.
Hulton Deutsch/GettyImages*

The Irei Project—a nonprofit dedicated to preserving the memories of individuals who were held in these WWII concentration camps—has teamed with Ancestry.com to publish the names of 125,284 people detained in those camps. This digitized, free-to-access list is the most comprehensive of its kind.

<https://bit.ly/3JUF3Tu>

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Solar Maximum: What Is it and When Will it Occur?



auroraborealispage.com

Predicting solar maximum is no mean feat, but we know we are close.

Solar activity has been gradually gaining strength during its current Solar Cycle 25, and the National Oceanic and Atmospheric Administration's (NOAA) Space Weather Prediction Center (SWPC) estimates that solar maximum will occur [between late 2024 and early 2026](#).

<https://bit.ly/3Qsz63W>

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Chords & Riffs

Oscar Peterson (1925-2007)



*Oscar Peterson with his sister Daisy
library and archives of Canada*

Oscar Peterson is one of Canada's most honored musicians. He is widely regarded as one of the greatest jazz pianists of all time. He was renowned for his remarkable speed and dexterity, meticulous and ornate technique and dazzling, swinging style. He earned the nicknames "the brown bomber of boogie-woogie" and "master of swing." A prolific recording artist, he typically released several albums a year from the 1950s until his death. He also appeared on more than 200 albums by other artists, including Ella Fitzgerald, Dizzy Gillespie, Billie Holiday and Louis Armstrong, who called him "the man with four hands." His sensitivity in these supporting roles, as well as his acclaimed compositions such as *Canadiana Suite* and "Hymn to Freedom," was overshadowed by his stunning virtuosity as a soloist.

C Jam Blues <https://youtu.be/NTJhHn-TuDY?t=11>

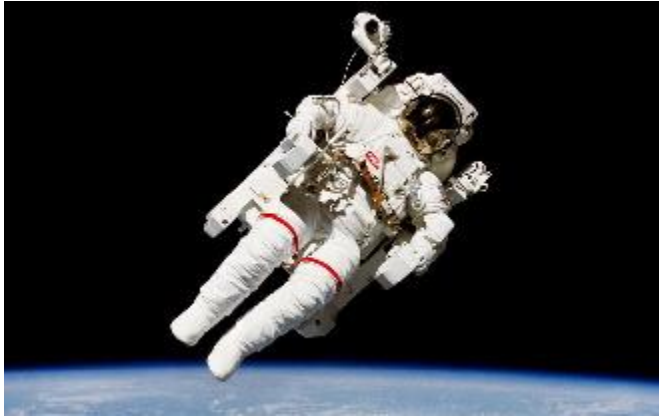
Hymn To Freedom <https://youtu.be/tCrrZ1NnCuM?t=14>

The Greatest Solo of All Time <https://youtu.be/yj93v9j2A4A>

Like to hear that without commentary? <https://youtu.be/xdd5pn1xs7M?t=1>

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The Inside Story of the First Untethered Spacewalk



NASA

On February 7, 1984, astronaut Bruce McCandless ventured out into space and away from shuttle Challenger using only a nitrogen-propelled, hand-controlled backpack

Formally known as the Manned Maneuvering Unit, the first flights of what they called the "Buck Rogers jetpacks" was a massive backpack equipped with gas thrusters that would allow astronauts to leave their spacecraft and float free in space for the first time in history.

<https://bit.ly/44BsUfS>

What a wonderful era of unbridled adventure.

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Are Driverless Dreams Going Up in Flames?



*Waymo robotaxi on fire
San Francisco Fire Department via X*

In the 19th century, Luddites smashed up automatic looms to protest the new technology. Last weekend, people at a San Francisco Lunar New Year celebration seemed to have the same idea—but with more firepower. A mob incinerated an autonomous vehicle (AV) operated by Alphabet subsidiary Waymo after it rolled into a crowded intersection.

After one person jumped on the hood and smashed the windshield of the driverless—and passengerless—Jaguar I-PACE crossover, others began breaking windows and spray-painting the body. The car was eventually set ablaze with fireworks.

Though the mob's motivation is unknown, the attack felt like a comeuppance: Over the past few years, SF has been a major testing hub for AVs, along with Phoenix and Austin. The hundreds of driverless taxis zipping around the city's hills annoy residents almost as much as out-of-towners who call it San Fran. AVs have been filmed causing traffic jams and blocking emergency vehicles on numerous occasions. One has even been at the center of a very serious accident.

The roadblocks have cast doubt on the near-term prospect of a future where getting chauffeured around by AI is mainstream. So, buckle in while we explore the state of the AV industry and what it might take to stop it from inspiring rage.

Industry stuck in a rut

One major setback for a driverless future came in October, when a Cruise AV, operated by GM, struck a woman who was thrown into its path after getting hit by a human driver in San Francisco. Instead of stopping immediately, the Cruise AV dragged the pedestrian 20 feet as it tried to pull over to the side of the road. The woman sustained serious injuries.

California and federal officials are investigating the company, which has been in crisis ever since an investigation by an outside law firm that Cruise hired found that the incident was the result of multiple technical failures. Cruise admitted that it improperly failed to disclose all the details to regulators. The company recalled its entire fleet of 950 AVs, paused all testing countrywide, and sacked top executives. California's DMV has suspended Cruise's permit to test AVs on public roads.

But it's not just about Cruise:

Waymo recalled 444 self-driving cars this week after two of its AVs in Arizona bumped the same towed vehicle minutes apart.

A handful of Chinese companies, including Didi, have recently stopped testing their AVs in California. While friction between the US and China could be to blame, George Washington University Engineering professor John Helveston told Business Insider that

Didi's exit might have to do with the harsher regulatory environment following the Cruise accident.

Experts say that the biggest issues with current AVs occur when they run into unusual situations that might be a no-brainer for a person. It's likely a human driver would've stopped the car to check on a pedestrian they just hit before trying to pull over, while many SF Uber drivers would've probably used common sense and avoided the chaos of the Lunar New Year festivities.

Is it just an image problem?

The industry's problems are its own doing, according to the Verge's transportation editor, Andrew J. Hawkins. He blames the current loss of public trust on years of overpromising by some industry executives (ahem, Elon) that we'll all be cruising around in the backseat while our cars drive themselves in the near future. Hawkins believes a lack of regulation allowed some companies to rush into testing AVs, which ultimately undermined the public's confidence in the tech.

Meanwhile, some say we should remember that while the spate of high-profile AV fails is disconcerting, humans behind the wheel can spell even more trouble—especially since they're not always attentive or sober. Ars Technica reporter Timothy B. Lee, who analyzed Cruise and Waymo crash reports, claims that Waymo AVs already appear safer than human drivers, though he says more research is needed.

While Lee notes that both companies' driverless cars sometimes struggle to avoid hitting inanimate objects and Cruise's AVs need to be better at navigating intersections, they've mostly been involved in minor accidents. He argues that given AVs' potential to become "much safer" than human drivers, ending testing on city streets "could easily cost more lives than it saves."

But the public's perception of AVs doesn't always match the cars' safety record: A study published in Transportation Research in 2021 found that autonomous vehicles will have to be much less likely, "potentially unrealistically," to crash than human drivers for passengers to trust them.

Most people probably have time to get used to the idea...a recent report by S&P Global Mobility predicts that a car "that can go anywhere and do everything a human driver can" will not arrive before at least 2035, while in the meantime, AVs will only be operated in designated areas or as an aid for human drivers.—SK

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Wild Bird Gestures "After You"

Japanese tit uses wing movements for gestural communication.



"After you" The "after you" gesture in the Japanese tit.
© Suzuki and Sugita, 2024/ *Current Biology*

A small-bird species, the Japanese tit (*Parus minor*), uses wing movements as a gesture to convey the message "after you," according to new research at the University of Tokyo. When a mating pair arrives at their nest box with food, they will wait outside on perches. One will then often flutter its wings toward the other, apparently indicating for the latter to enter first. The researchers say that this discovery challenges the previous belief that gestural communication is prominent only in humans and great apes, significantly advancing our understanding of visual communication in birds.

<https://bit.ly/3PF6VOX>

Toshitaka N. Suzuki and Norimasa Sugita, "The 'after you' gesture in a bird," [Current Biology](#): March 25, 2024,

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St. Helena: A Dot in the Atlantic



Will Appleyard

The landscape looks arid, mountainous and with a partially grey sky only occasionally revealing green peaks in the distance. The climate feels something like the Caribbean, warm and exceptionally humid although windy, the ocean a rich blue.

<https://bit.ly/3URQ2Do>

When you think of it, Napoleon spent his last years in a pretty interesting place. Unlike Elba, however, St. Helena doesn't lend itself to a palindrome.

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Geothermal Power Heats Up



The Nesjavellir Geothermal Power Station. Geothermal power has long been popular in volcanic countries like Iceland, where hot water bubbles from the ground.

Credit: Gretar Ívarsson / Wikimedia Commons

Long confined to regions with volcanic activity, geothermal promises to become a much more versatile energy source thanks to new technologies

<https://bit.ly/3JkilnK>

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A 70 year old man asked his wife, "Do you feel sad when you see me running after young girls?"

Wife replied, "No, not at all. Even dogs chase cars they can't drive!"

funny.co

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Winners in Discover Wildlife Close-Up Photography Challenge

A newt feeding on frogspawn at night, a spying snake and a four-eyed frog also clinch prizes in thought-provoking photography challenge.



Slime Moulds And Raindrops.
Credit: Barry Webb | cupoty.com

The photography challenge – which aims to inspire a wider appreciation of nature’s wealth, encourage a deeper connection to often-overlooked animals, plants and landscapes, and kindle a desire to protect them – has a different theme each year – 2023's was 'water'.

<https://bit.ly/49XIOSN>

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On a DC Sidewalk, a Race to Save a Marine General’s Life



Marine Corps Gen. Eric M. Smith poses for a portrait at his residence at Marine Barracks Washington on Thursday, after a ceremony in which he recognized the three people who came

to his rescue.

(Matt McClain/The Washington Post)

Gen. Eric M. Smith collapsed in cardiac arrest while out for a run. This is the remarkable, previously untold story of how he survived.

Gen. Eric M. Smith stepped out on a warm, late-afternoon run last fall, pounding the pavement of Southeast Washington on a routine three-mile loop. Smith, who turns 59 in June, suffered cardiac arrest at the tail end of his run, just a block from his home at Marine Barracks Washington — a crisis in which the speed and quality of medical intervention proved vital.

<https://bit.ly/3UB2fen>

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The Best Gardens in Vogue: A Flower-Filled Look into Our Archive



Four paths meet at a central fountain in the Majorcan home of Celia Forner and Francesco Venturi.

Photographed by François Halard, Vogue, 2010

Throughout its 130-plus years, Vogue has traversed the prettiest corners of the earth and photographed spectacular gardens for readers, from the formal boxwood hedge bordered by towering palms in the Punta Cana, Dominican Republic garden of the late Oscar de la Renta to the much-celebrated country home of Dries Van Noten in Belgium—which, since being photographed for Vogue’s 2014 issue by François Halard, has launched a thousand pins onto mood boards.

<https://bit.ly/3KhNyIJ>

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Tools for Providing Top-Notch Diabetes Care to Everyone



Image: habrovich (stock.adobe.com)

For 30 years, doctors have known that maintaining near-normal blood sugar has huge benefits for people with Type 1 diabetes.

Patients can now wear continuous glucose monitors, which have a sensor inserted under the skin that reads a glucose value every 5 to 15 minutes. This is really helpful because you don't have to poke your finger six to 10 times a day to measure glucose levels, and the monitor can warn you if you're going low or high. If you're the parent of a child with Type 1 diabetes, you can get their glucose data from the cloud and onto your phone.

<https://bit.ly/4dB94VV>

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Small Pump Trial for Kids Awaiting Heart Transplant



Stanford Medicine researchers and their colleagues have found that an implantable ventricular assist device, shown here, allows children with heart failure to live relatively normal lives while they await a transplant.

Courtesy of Jarvik Heart, Inc.

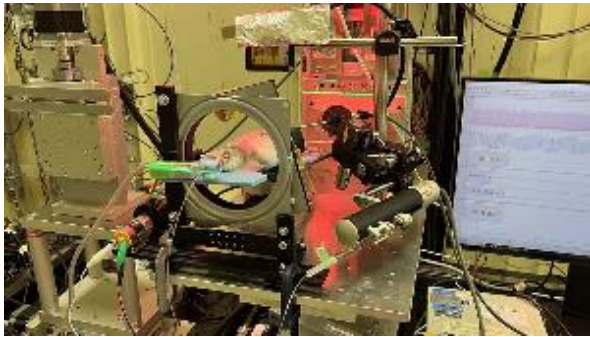
A new type of surgically implanted pump that can support a child's failing heart has passed the first stage of human testing in a Stanford Medicine-led trial.

In a feasibility trial of seven children who received the new pump to support their failing hearts, six ultimately underwent heart transplants and one child's heart recovered, rendering a transplant unnecessary. The results were published May 7 in the Journal of Heart and Lung Transplantation. The study was led by the Stanford School of Medicine and included several medical centers in the United States.

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Dark-Field X-Ray Imaging of Nanoparticle Gene Therapy



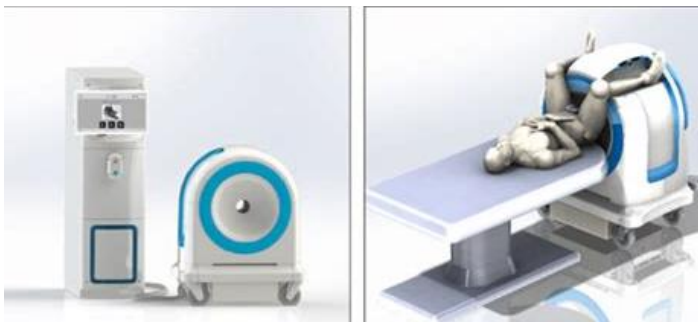
Experimental setup Nanoparticles delivered to anaesthetized rat in a motorized magnetic array. (Courtesy: Ronan Smith)

Researchers at the University of Adelaide are now tackling another pressing challenge for successful gene therapy – visualizing the magnetic nanoparticles within live airways and manipulating them in vivo. To achieve this, they explored the use of dark-field X-ray imaging to enhance nanoparticle contrast and understand how magnetic nanoparticles move within the airway of a live rat, reporting their findings in [Physics in Medicine & Biology](#).

<https://bit.ly/4afpBwa>

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A More Accessible Way for Doctors to Scan People



researchgate.net

Magnetic resonance imaging (MRI), which allows physicians to capture detailed snapshots of almost every internal structure in the human body, has revolutionized multiple fields of medicine. But despite decades of development, MRI scanners are still incredibly expensive to operate, in part because they must be housed in specially shielded rooms to protect them from interference. As a result, for many doctors and patients, this powerful technique remains frustratingly out of reach.

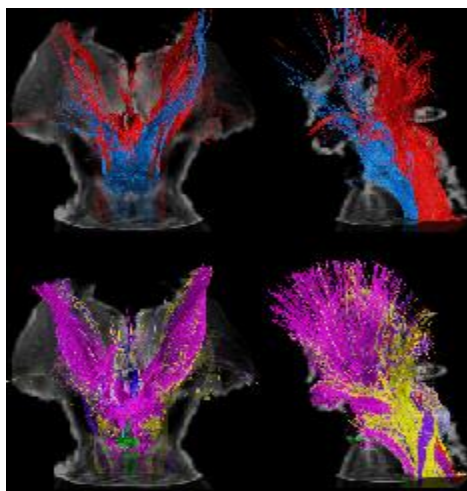
For years, scientists have been trying to develop smaller, cheaper, and more efficient alternatives to traditional MRI machines. Now, the authors of a recent Science study present another breakthrough: a simplified, low-energy scanner that plugs into a standard wall power outlet and can operate safely without any specialized infrastructure.

Because the device emits a relatively weak magnetic field, it can't achieve the same image resolution as conventional MRI, but the researchers were able to boost the quality of these scans with AI—ultimately producing results on par with those obtained by the high-power MRI machines currently used in hospitals. And while other portable, low-field scanners are designed to only image single organs or limbs, this new machine can screen a patient's entire body.

As neuroimaging experts Udanna Anazado and Stefan du Plessis note in a related Science Perspective, some refinements are needed before this technology can go global. "[Low-field MRI](#) has yet to mature to enable cost-effective access to medical imaging," they write. Its potential will be proven, they add, when many communities around the world can use it "without barriers."

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Brain Map May Reveal How to Wake Coma Patients



*The red and blue tracks in the top two figures are arousal-related connections previously described, mostly using non-human animal data. Thanks to their high-resolution mapping, Edlow's team uncovered the additional colorful connections shown in the bottom images, including ones emerging from the ventral tegmental area (pink).
Edlow Et Al. Science Translational Medicine (2024)*

According to the Grimm brothers, the princess Rosamond slipped into a "deep sleep" after pricking her finger on the spindle of a spinning wheel. But if the Grimms had been neuroscientists, they would have likely called the fair maiden's condition a coma. Of course, if that was the case, not even true love's kiss would have been enough to rouse Sleeping Beauty. Waking a person from a coma

is so notoriously difficult that it's often added to the very definition of the state. But now, thanks to a [new map](#) of the parts of the brain responsible for wakefulness, neuroscientists might have figured out how to arouse at least some unconscious patients.

Neuroscientist Brian Edlow and colleagues wanted a better understanding of the neural circuitry that keeps the mind awake. "Our goal was to map a human brain network that is critical to consciousness and to provide clinicians with better tools to detect, predict, and promote recovery of consciousness in patients with severe brain injuries," he explains in a press release. Specifically, the researchers set their sights on a set of interconnected regions deep in the brain, called the default ascending arousal network (dAAN), which many believe sustains the arousal necessary for consciousness.

To get a much higher resolution map of this network than ever before, the team performed detailed postmortem MRI scans on the brains of three middle-aged organ donors who had no documented neurological disorders when they died. According to LiveScience, these scans were so intricate that some of them took two days to run and resulted in a level of resolution that could never be achieved for a living brain. The researchers then studied the brains under the microscope. All of this uncovered what appeared to be previously underappreciated or unreported connections between the dAAN and outer parts of the brain involved in awareness, they report in Science Translational Medicine.

The team then used MRI data from dozens of living people who volunteered as a part of the Human Connectome Project to further explore these connections. They found several key 'nodes' of arousal in the brainstem, thalamus, hypothalamus, and basal forebrain. But one in a region called the ventral tegmental area was especially well-connected. This part of the brain is currently known for its role in reward pathways, but the findings suggest it plays a very fundamental role in consciousness. "Our connectivity results suggest that stimulation of the ventral tegmental area's dopaminergic pathways has the potential to help patients recover from coma because this hub node is connected to so many regions of the brain that are critical to consciousness," Edlow says.

Now, the team aims to test their hypothesis by stimulating the dAAN in real coma patients pharmacologically. Even if it doesn't work, though, the team says the findings could help neuroscientists better understand the root cause of comas and other disorders of consciousness.

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Vintage Airline Posters Show the Golden Age of Air Travel



While we can pretty much all agree that current air travel is unideal, that didn't used to be the case. Air travel in its first several decades was enchanting and downright resplendent.

There was an optimism and adventurous quality to it, as people could for the first time head off to far-flung destinations with ease.

Propeller Propaganda has an amazing collection of vintage airline posters, featuring the artwork of famous graphic designers and artists from the last century.

Here are just a few]favorites.

<https://bit.ly/4dCyOI2>

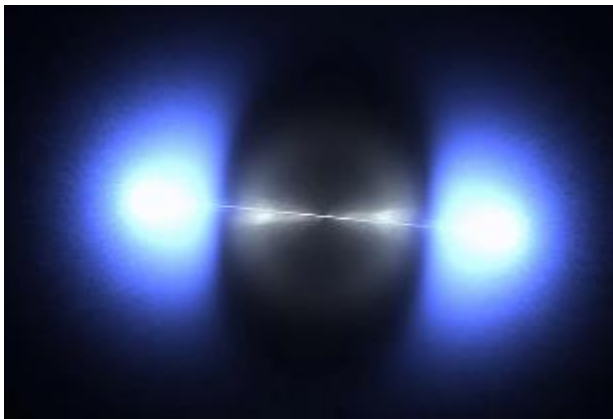
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A Quantum of Quanta

Quantum is a discrete quantity of energy proportional in magnitude to the frequency of the radiation it represents. The fundamental notion that a property can be "quantized" is referred to as "the hypothesis of quantization".

Quantum-Computing Approach Uses Single Molecules as Qubits

Platforms based on molecules manipulated using 'optical tweezers' might be able to perform complex physics calculations.



Quantum entanglement (illustration) is one of the effects that underpins quantum-computing technology.

Credit: Peter Jurik/Alamy

Physicists have taken the first step towards building quantum computers out of individual molecules trapped with laser devices called optical tweezers. Two teams report their results in Science on 7 December^{1,2}, in both cases making pairs of calcium monofluoride molecules interact so that they became entangled — a crucial effect for quantum computing.

<https://bit.ly/48eZXYh>

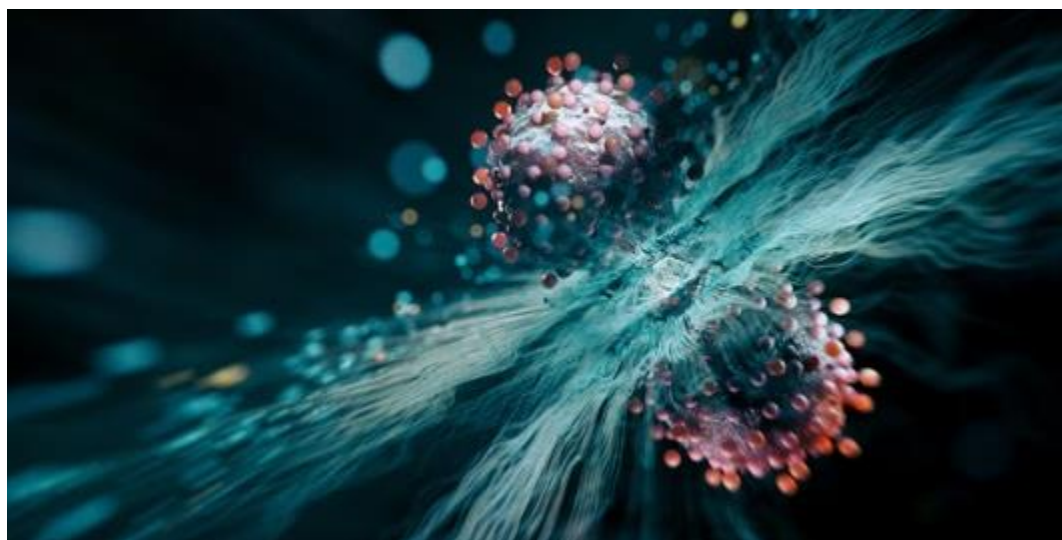
References:

<https://doi.org/10.1126/science.adf8999>

<https://doi.org/10.1126/science.adf4272>

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Unraveling the Bizarre Realm of 'Quantum Superchemistry'



(koto_feja via Getty Images)

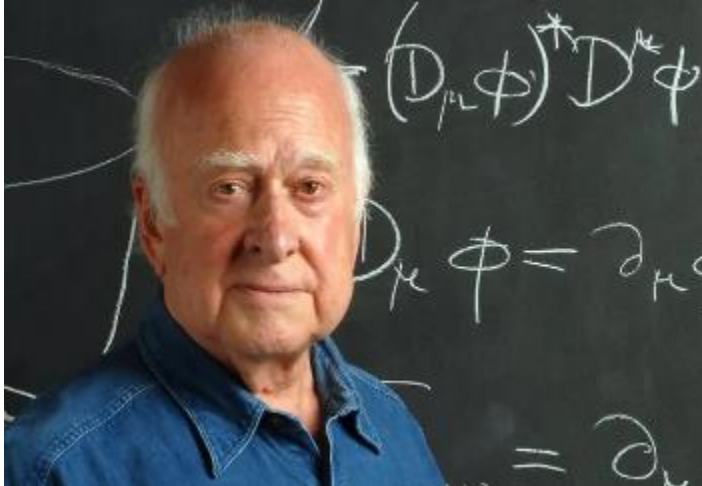
More than two decades ago, scientists predicted that at ultra-low temperatures, many atoms could undergo 'quantum superchemistry' and chemically react as one. They've finally shown it's real.

<https://bit.ly/3TYkJXg>

Care to imagine where this might lead?

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'God Particle' Discoverer Dies



*Boson proposer, Peter Higgs
University of Edinburgh*

Nobel Prize-winning physicist [Peter Higgs](#) has died at age 94 following a short illness, the University of Edinburgh announced yesterday. Higgs, who was an emeritus professor at Edinburgh, is known for discovering the Higgs boson, a subatomic particle known colloquially as the “God particle.”

In 1964, Higgs theorized the existence of an energy field and an accompanying chargeless particle that gives other particles their mass and exists throughout the universe ([see explanation](#)). For decades, physicists relied on the particle's existence to help explain quantum phenomena but could not detect it, leading one scientist to call it the “Goddamn Particle” (shortened to “God particle”).

In 2012, physicists used the Large Hadron Collider in Switzerland to smash two beams of particles together at almost light speed, attempting to recreate conditions moments after the Big Bang ([see how it works](#)). The experiment—considered one of the most sophisticated in human history—detected the Higgs boson for the first time, validating Higgs’ theory.

Today, the European Organization for Nuclear Research, or CERN—which operates the LHC—continues to probe the foundations of particle theory, including a search for never-before-seen [“ghost” particles](#).

Bosons, Ghosts. What comes next, Vampires?

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On-Campus IBM Quantum Computer That Is 'Scientifically Useful'



*IBM's System One quantum computer.
(Image credit: IBM)*

IBM's latest System One quantum computer is based at the Rensselaer Polytechnic Institute (RPI) and is the 1st IBM quantum machine to be installed at a university campus in the U.S.

The new IBM System One quantum computer is powered by a processor called "Eagle" that has 127 quantum bits, or qubits, IBM representatives said April 5 in a statement. This quantum processing unit (QPU) was first announced in 2021 and debuted in a System One machine in November last year that is used by the University of Tokyo. This quantum computer is not based on campus.

<https://bit.ly/4aRtqZ6>

How long will it be before an upstart geek company offers a home version?

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Quantum Simulation of Large-Scale Materials Entanglement



*How entangled is it? The researchers obtained temperature profiles of their system showing that particles that interact strongly are "hot" (red) and those that interact little are "cold" (blue). Entanglement is greatest when interactions are strong.
(Courtesy: Helene Hainzer)*

Physicists in Austria have found a quick and efficient way of extracting information on a quantum material's large-scale entanglement structure thanks to a 50-year-old theorem from quantum field theory. The new method could open doors in fields such as quantum information, quantum chemistry or even high-energy physics.

Quantum entanglement is a phenomenon whereby the information contained in an ensemble of particles is encoded in correlations among them. This information cannot be accessed by probing the particles individually, and it is an essential feature of quantum mechanics, one that clearly distinguishes the quantum from the classical world. As well as being pivotal for quantum computing and quantum communication, entanglement heavily influences the properties of an emerging class of exotic materials. A deeper understanding of it could therefore help scientists understand and solve problems in materials science, condensed-matter physics and beyond.

The problem is that learning about the internal entanglement of a large number of entangled particles is notoriously hard, since the complexity of the correlations increases exponentially with the number of particles. This complexity makes it impossible for a classical computer to simulate materials made from such particles. Quantum simulators are better equipped for this task, as they can represent the same exponential complexity as the target material they are simulating. However, extracting

the entanglement properties of a material with standard techniques still requires an intractably large number of measurements.

Quantum simulator

In their new, more efficient method for evaluating the strength of a system's entanglement, researchers from the University of Innsbruck and the nearby Institute of Quantum Optics and Quantum Information (IQOQI) interpreted entanglement strength in terms of a local temperature. While highly entangled regions of the quantum material appear "hot" in this method, weakly entangled regions appear "cold". Crucially, the exact form of this locally varying temperature field is predicted by quantum field theory, enabling the team to measure temperature profiles more efficiently than was possible with previous methods.

To simulate an entangled quantum material, the Innsbruck-IQOQI team used a system of 51 $^{40}\text{Ca}^+$ ions held in place inside a vacuum chamber by the oscillating electric field of a device called linear Paul trap. This setup allows each ion to be individually controlled and its quantum state read out with high accuracy. The researchers could quickly determine the right temperature profiles by placing a feedback loop between the system and a (classical) computer that is constantly generating new profiles and is comparing them with the actual measurements in the experiment. They then made measurements to extract properties such as the system's energy. Finally, they investigated the internal structure of the system's states by studying the "temperature" profiles, which enabled them to determine the entanglement.

Hot and cold regions

The temperature profiles the team obtained show that regions that are strongly correlated with surrounding particles can be considered "hot" (that is, highly entangled) and those that interact very little can be considered "cold" (weakly entangled). The researchers also confirmed, for the first time, predictions of quantum field theory as adapted to ground states (or low temperature states) of materials via the Bisognano-Wichmann theorem, which was first put forward in 1975 as a way of relating certain Lorentz transformations in spacetime to transformations in charge, parity and time. In addition, the method enabled them to visualize the crossover from weakly entangled ground states to strongly entangled excited states of the quantum material.

Team leader Peter Zoller, who holds positions at both Innsbruck and the IQOQI, says that the results and the techniques – quantum protocols running on a quantum simulator – used to obtain them are generally applicable to the simulation of quantum materials. For this reason, he believes they hold broad importance for quantum information science and technology as well as quantum simulation. "For future experiments we [would] like to do this with other platforms and more

complicated/interesting model systems," he tells Physics World. "Our tools and techniques are very general."

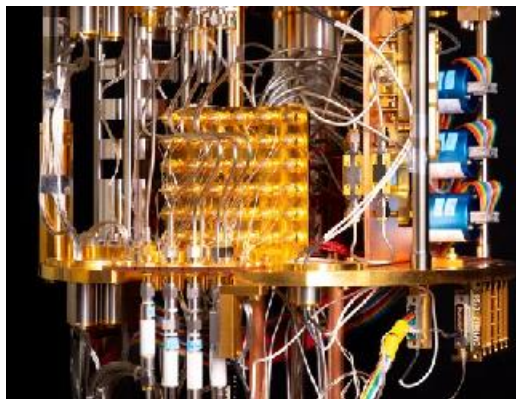
Entanglement gets hot and messy

Marcello Dalmonte, a physicist at the Abdus Salam International Centre for Theoretical Physics in Italy who was not involved in the research, calls the results "a true ground-breaker". In his view, the method brings our experimentally testable understanding of entanglement to a new level by unveiling its full complexity. He also thinks the technique will improve our understanding of the relationship between entanglement and physical phenomena, and is excited by the possibility of using it to solve key questions in theoretical physics, such as reaching a better understanding of the operator entanglement structure for mixed states. Another possible area to explore might be the mutual entanglement between chunks of matter, though Dalmonte adds that this would require further improvements to the protocol, including boosting its scalability.

The research is described in [Nature](#).

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Quantum Computing Breakthrough with Just Hundreds of Qubits



(Image credit: Nord Quantique)

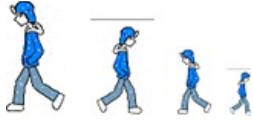
Scientists have designed a physical qubit that behaves as an error-correcting "logical qubit," and now they think they can scale it up to make a useful quantum computer using a few hundred.

That's because the company has built an individual error-correcting physical qubit that could dramatically cut the number of qubits needed to achieve quantum advantage (which is where quantum computers are genuinely useful).

<https://bit.ly/4aWtSWo>

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My Walking Thoughts



For Sunday May 12 2024

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This will be my last look at leadership...at least for a while as the response to the topic has been at best underwhelming. Since many—perhaps the most—of the people I know share my concern for its apparent absence from the characteristics displayed by leaders today, I am forced to conclude my writing skills are not up to the challenge. I apologize while urging you to read the following.

SEALS Leadership Leans on Communication Skills



[Photo: Mass Communication Specialist 1st Class Bill Carlisle/U.S. Navy]

Try the life-changing magic of these 5 Navy SEAL principles to improve communication skills. Embracing these practices boosts leadership and communication, setting a standard for innovation, collaboration, and respect to flourish.

Navy SEAL training focuses on physical fitness, but communication skills are key. From Basic Underwater Demolition/SEAL (BUD/S) onward, there's a strong emphasis on refining communication skills, starting with posture, then hand signals, and commanding.

Leaders' effectiveness hinges on their communication ability, which is vital in extreme conditions like heavy gunfire or pitch-black environments. "Communication congruency" emphasizes the harmony between body language, tone, and words. It underscores the significance of aligning verbal and nonverbal cues to avoid mixed messages, which is crucial for mission success and building strong connections in the workplace.

The 55-38-7 rule

The 55-38-7 rule by psychologist Albert Mehrabian states that in emotional communication, 55% is expressed through body language, 38% through tone, and just 7% through words. This highlights the importance of aligning nonverbal cues with verbal communication for clarity and impact and applies specifically to situations where emotions or attitudes are communicated.

While Mehrabian's research wasn't in Navy SEAL training, its relevance extends to their high-pressure environments. SEAL training emphasizes discipline, precision, and clear communication, aligning with Mehrabian's focus on nonverbal cues. This research validates SEAL communication strategies and highlights their importance in different scenarios.

To reinforce your grasp of "SEAL" communication principles, I've developed an acronym memory aid using "S.E.A.L.S." It's straightforward and highly effective, though challenging to implement. I recommend finding a "swim buddy" (a SEAL term for the smallest team) to provide feedback on effectively integrating these five core communication techniques.

S: Stand Tall

Posture sends the first message: Before you say a word, others have already judged you. At the Naval Academy, we learn that posture matters. In SEAL POW training, instructors focus on those who seem most defeated. SEAL instructors excel at spotting potential quitters by their posture. In civilian settings, evaluations may differ, but the significance remains. There is a profound effect when someone's body language lacks confidence in a speech, sales pitch, or meeting.

Tip: From head to foot—chin slightly up, ears over the shoulders, shoulders rolled back with chest out, pull your belly button in gently as you breathe and keep your knees slightly bent with weight on the balls of your feet—take three deep, slow, controlled breaths to set your posture.

In a workplace, posture speaks volumes before words. Leading a meeting, pitching to clients, or interacting with your team—your posture matters. A confident stance boosts your presence and shapes how others see you. It signals engagement, confidence, and readiness for challenges.

E: Eye Contact

Eyes are the windows to the soul. In many cases, a SEAL can only see their teammates' eyes, and instructors assess determination by observing eye contact. Eyes can convey fear, confidence, humor, and more. Mastering this skill takes practice. Establishing and maintaining eye contact is crucial. A friendly gaze is important when meeting someone

new, but being direct may align better with your communication. This subtle art can have a big impact.

Tip: Eyes and facial expressions are swim buddies—when greeting someone new, start with soft eyes that match a gentle smile; when seeking buy-in, open your eyes wide while connecting with your audience. Be careful though: there is a delicate balance between connecting with intensity and staring with intimidation.

In professional settings, eye contact is key for building connections and credibility. Whether you're in a meeting or presentation, keep eye contact to show engagement and interest. It demonstrates your focus and presence, enhancing connections and respect at work.

A: Arms Open

Arm (hand) movement speaks volumes: SEALs communicate predominantly with their arms and hands whether underwater, free-falling through the air, or under fire on land. Rarely do they cross or close their arms during these intense operations. Be mindful of your arm placement. Do you tend to cross your arms when engaged in conversation? How do you position your hands during important presentations? Effective communication hinges on nuances, with significant body language signals stemming from your arms.

Tip: Not sure where to keep your hands while standing and delivering a message? Open your palms press them on the side of your thighs, and raise them to bring them together as if you were going to clap. Avoid pointing. Instead, use open-palm gestures while ensuring your arms remain uncrossed.

In the workplace, managing your arm and hand movements affects communication. Keeping arms open signals openness, fosters collaboration, and improves teamwork among colleagues.

L: Lean In

Squared shoulders send listening signals: Active listening is crucial for SEALs, salespeople, and leaders. Your listening impacts trust-building. As a young SEAL platoon commander, my evaluation hinged on listening to experienced NCOs (Non-Commissioned Officers). Earning my Navy SEAL trident required being a good listener. Effective listening starts by facing the speaker, and leaning in to show attention. When they sense your respect, they engage with you.

Tip: Imagine a beam of light radiating from your heart toward the person you're listening to. This gesture naturally aligns your shoulders with theirs. As you shift your bodyweight onto the balls of your feet, you subtly lean in towards them. This nonverbal cue conveys their words are important to you.

Active listening is crucial in any professional setting. Physically leaning in towards the speaker demonstrates engagement and respect for their input, enhancing trust among team members. It's a key practice for fostering a culture of respect and understanding among leaders and employees.

S: Salute

Saluting is a gesture that signifies respect and it's not exclusive to the military. Acknowledging people's contributions, hard work, or creativity can be expressed elegantly through a simple salute. While it doesn't have to be a formal military salute, lifting your right hand to your head shows respect and can indicate your comprehension of their message. Seek opportunities to "salute" others frequently and promptly. Your gesture of gratitude and respect will contribute to building a high-performing team.

Tip: Connect your four fingers together and tuck your thumb slightly under your right index finger. How you deliver your salute with words, tone, and arm movement can send a friendly message of appreciation and gratitude.

Translating the salute into a workplace gesture of acknowledgment and respect can boost team morale. Recognizing colleagues' efforts through praise or a simple nod fosters a positive work environment, encouraging a culture of appreciation and boosting team motivation and performance.

Improving communication is more art than science. While science guides our efforts, our unique communication style, body language, and tone determine its impact. Whether leading SEAL teams or salespeople, how you convey your message counts. Effective communication builds trust, a team's key to peak performance.

Incorporating these principles into your professional life can significantly enhance personal effectiveness and workplace dynamics. Every action, from posture to a simple acknowledgment, nurtures a culture of respect, engagement, and high performance. Embracing these practices boosts leadership and communication, setting a standard for innovation, collaboration, and respect to flourish. Purposefully applying these principles will lead to a noticeable transformation in your interactions and organizational culture.

By Alden Mills for Fast Company

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