Ode to E Pluribus Unum for Sunday January 28 2024

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Thor's Helmet

Image Credit & Copyright: Ritesh Biswas

Thor not only has his own day (Thursday), but a helmet in the heavens.

Popularly called Thor's Helmet, NGC 2359 is a hat-shaped cosmic cloud with wing-like appendages. Heroically sized even for a Norse god, Thor's Helmet is about 30 light-years across.

In fact, the cosmic head-covering is more like an interstellar bubble, blown with a fast wind from the bright, massive star near the bubble's center. Known as a Wolf-Rayet

star, the central star is an extremely hot giant thought to be in a brief, pre-supernova stage of evolution.

NGC 2359 is located about 15,000 light-years away toward the constellation of the Great Overdog. This remarkably sharp image is a mixed cocktail of data from narrowband filters, capturing not only natural looking stars but details of the nebula's filamentary structures. The star in the center of Thor's Helmet is expected to explode in a spectacular supernova sometime within the next few thousand years.

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Jester's Cap

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Astrophotography: I had an occasional lunch with a friend I attended junior high with in New Orleans. Since I'm almost 77, you can do the math: it was a while. back. Anyway, Doug wanted to show me what his wife gave him for Christmas. It was

https://bit.ly/3SrPXVM

and the pictures they show on the site don't hold a candle to the ones he showed me that he had taken himself. Takes up to a couple hours to capture enough light to look as good as his did, but everything's built in, so rotation comes with the dinner.

Interestingly, they're not good for planet-gazing. Not much optical magnification; just light gathering. Nebulae are large, but dim, and that's what these puppies are tailored to image. Needless to say, I ordered my own.

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Suicide...isn't painless, at least for those who survive the people who die. What I learned in medical school:

3 times as many women try to commit suicide; 3 times as many men die by suicide (DBS). Which proves that women aren't as competent at committing suicide as men...or that they're not trying to die so much as attract attention.

Warning signs that someone means it: they leave notes, and they have means to do the deed. If those are absent, suicide can still happen, but if they're present, the odds of DBS go way up.

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Rivers--to the degree that rivers dump into the Mississippi--don't go to the Atlantic, as the cartographer says. They go to the Gulf of Mexico. That's its own body of water, not a suburb of the Atlantic.

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Mendelsohn: the E-Minor is easily my favorite violin concerto. Been listening to it since about 1968, and Stern is great. BUT...if you get a chance to listen to Niv Ashkenazi play, do. He studied with Perlman and, like him, is wheelchair-bound. Doesn't seem to have much effect on either of them talent-wise.

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Roundabouts and rotaries--the nomenclature is regional: in Boston, they're rotaries. Everywhere else, it seems, roundabouts. While their practical appeal is obvious, they've been mis-designed and poorly implemented in most places I've seen them. In Pittsburgh, for example, they're installed in tiny intersections and are barely serviceable for a medium SUV just trying to go straight. I have no idea what a moving van is supposed to do with it.

In the 1960s, Piet Hein, a Dane (I think he was Danish; but Scandinavian for sure) was playing with the formula for ellipses:

$(x/a)^2 + (y/b)^2 = c^2$ If a = b, it's a circle, as you can see, with c = the radius.

What would happen, he wondered, if you changed the exponent from 2 to, say, 2.5? Enter the "super-egg."

https://en.wikipedia.org/wiki/Superegg and--why not?--
https://en.wikipedia.org/wiki/Squircle

(I have no clue how the Gamma function got into that....)

He found that making rotaries superegg-shaped rather than round made traffic flow more smoothly. And using that as a transition shape between rectangular and round air ducting made for lower resistance to flow.

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AI drug design: I've taken about 8-10 online courses over the past few years. One of them was drug discovery and design. out of Davidson University. It was well taught and one of the biggest lessons in it was how many websites let you use their software gratis to create and evaluate in silico how what you made would likely work as a drug. That's not groundbreaking. What might be is creating heuristic software (*Relating to or using a problem-solving technique in which the most appropriate solution of several found by alternative methods is selected at successive stages of a program for use in*

the next step of the program) that inputs designs that would be increasingly likely to pass muster.

The junction of computers and chemistry goes back over 50 years. In the '60s we used them to compute molecular orbitals using Hückle's formulae. All you had to do was enter the exact co-ordinates of the atomic nuclei and specify their identities. And a little later, bada bing--out came the printout. You still had to wrestle with visualizing what the data meant, but at least you had something to chew on.

I had imagined being able to design organic syntheses with them: specify possible inputs (like a chemical catalogue) and a target, arm it with known reactions, and press the "go" button. Not long afterward, some Harvard chemists did exactly that. Led by (and reported by) E. J. Corey, the software was configured pretty well. It used powerful algorithms to come up with the synthetic pathways. Interestingly, they thought to include a "reliability" function--how likely any given pathway (or part of a pathway) would be to work in that setting. If they insisted on maximum reliability, it came up with standard-looking syntheses. If they lowered the reliability, though, the software started to display what looked a lot like creativity. Which I found fascinating.

And that's the week in sports....

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MIT Technology Review's 10 Breakthrough Technologies 2024

Every year, MIT looks for promising technologies poised to have a real impact on the world. Here are the advances that they think matter most right now.

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Robotic Exoskeleton Decrease Falls in People with Parkinson's

Image Credits: Harvard Biodesign Lab

In the case of people with Parkinson's disease, "freezing" is a frequent issue that impacts the ability to walk, while increasing the likelihood of falls. The symptom causes people to lose their footing while walking, shortening steps before stopping altogether.New research from a joint team from Harvard and Boston University, published in Nature Medicine, demonstrates how soft robotic exoskeletons can address the issue.

https://bit.ly/41TD4ap

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Meet the First Woman to Fly with the Blues

abcnews

U.S. Navy Lt. Amanda Lee flies left wing in the team's formation.

https://www.youtube.com/watch?v=SfJXLiLawwE

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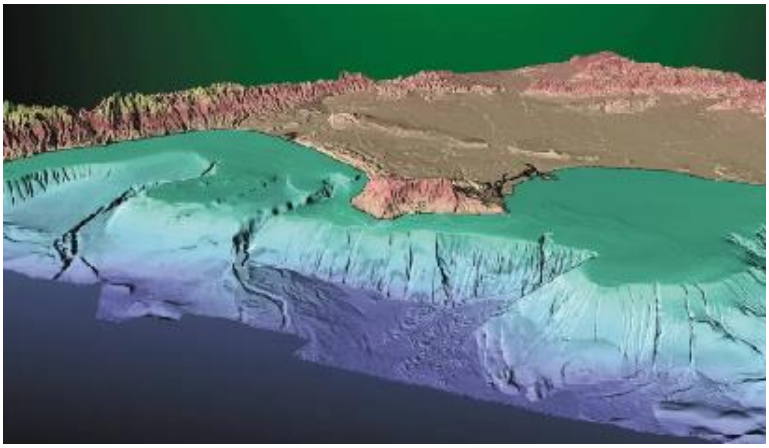
The US Just Grew By 1 Million Square Km^2. Did You Feel It?



The complex rugged nature of the continental shelf off the coast of Los Angeles pictured thanks to bathymetric data.
Image credit: USGS Pacific Sea-Floor Mapping Project

"America is larger than it was yesterday."

Continental shelves are an area of seabed that surrounds large landmasses where the sea is relatively shallow compared with the open ocean. Under international law, countries can claim these continental shelves, allowing them to manage and exploit its resources.

https://bit.ly/3O42Suy

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Michael Davis: The Juggler Pulls Weapons on Politicians

reddit

Watch the SS guy behind the Prez trying not to smile.

https://www.youtube.com/embed/n6mbW-jMtrY?rel=0

Carson Show https://youtu.be/dzBW23VUfM8

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Swirling Photographs Underwater Evoke Baroque Paintings

Moss and Fog Christy Lee Rogers

Submerging models in flowing fabrics underwater (at night!), Christi Lee Rogers is able to light the scene and create these stunning images that look almost like a Caravaggio painting.

https://bit.ly/48CyMXm

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Yelp's Top 100 Burgers in America

#1 in the Nation Jonathan Fox and Justin Fox (left); Fox Bros. "Burger" (right).
Photo: Andrew Thomas Lee, courtesy of the restaurant.

Yelpers love their burgers! From bacon-barbecue burgers to hummus-topped veggie burgers—and even sushi burgers (yes, that's a thing!)—they're one of the most searched foods on Yelp. But this year, forget everything you know about America's favorite comfort fare. Based on our patty-loving community's ratings and reviews, it's clear that a "burger revolution" is underway!

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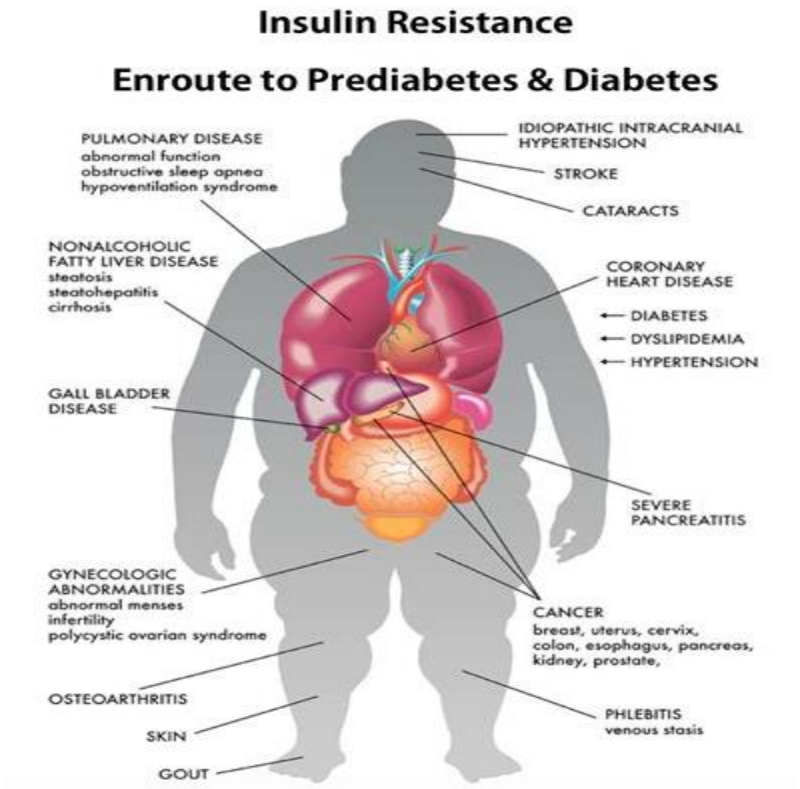
One in Ten of the World's Adults is Affected by Diabetes



diabeteswalls

Diabetes mellitus is a chronic, progressive disease caused by a lack of, or problems with processing, the hormone insulin. The result is persistently high glucose (sugar) in the blood, causing symptoms including slow-healing wounds, exhaustion, and increased thirst.

https://bit.ly/4b9o2kX

The Fox Brothers' burger might be part of the answer.

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"you left the toilet seat up"

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Why 42 Really Is the Ultimate Answer to Everything

Wherever you find big questions, one answer just keeps cropping up.
Image credit: © IFLScien

There are so many things that 42 could be the answer to. In math alone, it's the number of partitions of 10 – that is, the number of ways you can write 10 as a sum of positive integers; it's the first number equal to the sum of its own nonprime proper divisors; the number of triangulations of a heptagon; and it was the last natural number below 100 to reveal a representation as a sum of three cubes – that last one only occurred in 2019.

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The Way We Were in Times Past.

Dressed to impress. (1908)

An album of fascinating photos

https://bit.ly/3RWJLUx

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Laundry Is a Top Source of Microplastic Pollution.

Are there better ways to wash your clothes more sustainably?

/Getty Images, kvsan/Getty Images

A single load of laundry can release several million microfibers. A filter can do much to reduce the problem. Here are a few tips to keep your clothes from shedding this type of pollution.

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SpaceX Says Refueling Its Starship in Space Won't Be Scary

Here's how they'll fill'er up with 11 tons of propellant in orbit.

thespacebucket.com

NASA is depending on billionaire Elon Musk's rocket company to ferry astronauts to the lunar surface for the Artemis III and IV moon missions under a $4.2 billion contract. To do that, SpaceX first has to master how to refuel a Starship in low-Earth orbit, after it has already blasted off the planet. The tricky concept is known as "cryogenic propellant transfer" — something never done before in microgravity.

https://bit.ly/497mR3L

For those of us with tactical aviation experience, airborne refueling is more than a good idea, it is essential. I cannot imagine that this has not been in the playbook for quite some time. Leave it to Musk to make it happen.

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Once There Was a Woman Named BB.

aichitron.com

She stopped pouting in 1973 when she walked away from fame, created an animals' protection organization, and now (pushing 90) wonders why anyone might still be interested.

https://youtu.be/FRhYSrSQGtw

Maybe it was just her hair…Uhh…maybe not.

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The Airlines with the Most Legroom in Economy Seats, Ranked

A new analysis breaks down the legroom available on each major US airline.

which.co.uk

And while we don't have the exact stats on just how much passenger space has shrunk in the past decade, we do have stats on which major US airlines currently have the

most legroom in economy. Upgraded Points just released a new study on which airlines have the most legroom.

https://bit.ly/4b9TFem

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Please note that Elon's left a slot for a battery pack.

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75 Years Later, Palomar Observatory Still Shaping Astronomy

The 200-inch Hale Telescope
Credit: Palomar Observatory/Caltech

Formerly the world's largest working telescope for more than 40 years, the facility remains cutting-edge thanks to new instrumentation.

The Hale Telescope, known affectionately by many during its development as the Big Eye, is celebrating its 75th "first-light" anniversary this month. On January 26, 1949, renowned astronomer Edwin Hubble took the telescope's first picture, a celebratory moment in astronomy known as first light..

https://bit.ly/3Ug3l0F

Huntington Library

I along with my brother arose well before dawn on November 19, 1947, and walked the three miles to Oceanside, CA to watch a solemn procession transporting the mirror from Pasadena to the Palomar Observatory. Obstructions along the route had been removed and we were surprised how many people lined highway 101 to watch could hardly have been called a spectacle. Nevertheless, the event has stuck in my mind all these years, particularly the excited march from Mission Avenue to Vista Road where the caravan turned inland and into history.

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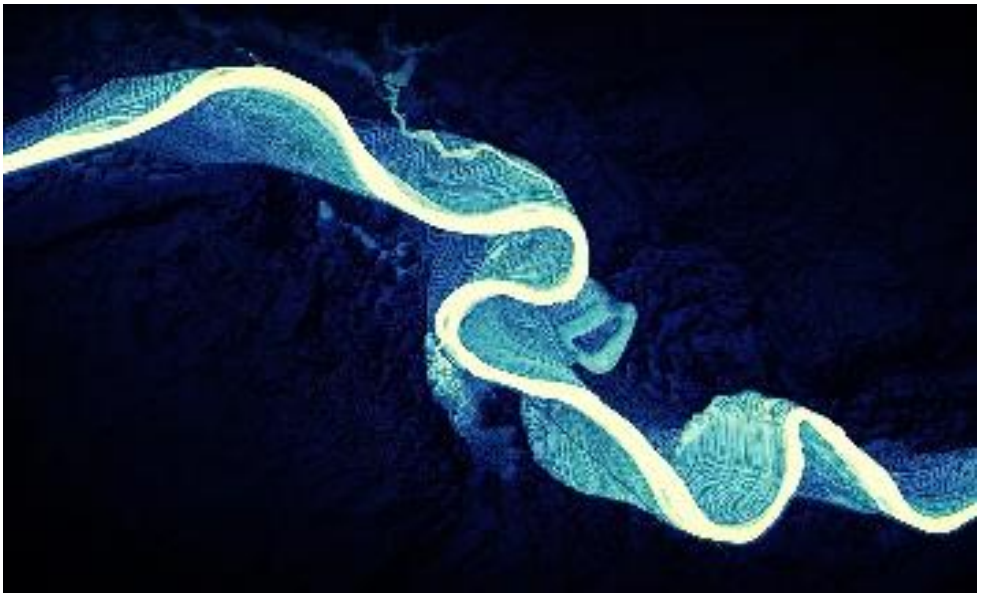
Hi-Res Lidar Views of Rivers and Deltas From Above



Moss&Fog

https://bit.ly/3u0mPMf

Amazing what Lidar allows you to see. Want to see more?

https://bit.ly/3Sz7oD1

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No Wonder We're Lonely

meatheadsmarket.com

https://bit.ly/47DLYK7

Now you know why NASA's contacting aliens ploy is a waste of time

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The Most Important Machine That Was Never Built

When he invented Turing machines in 1936, Alan Turing also invented modern computing.

Kristina Armitage/Quanta Magazine; source: Geopix/Alamy

Turing's great insight was to provide a concrete answer to the computation question in the form of an abstract machine, later named the Turing machine by his doctoral adviser, Alonzo Church. It's abstract because it doesn't (and can't) physically exist as a tangible device. Instead, it's a conceptual model of computation: If the machine can calculate a function, then the function is computable.

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Tastier coffee?

A splash of water before grinding the beans reduces clumping and makes a more consistent cup of joe

science

Grinding coffee builds static electricity, creating messy grounds that stick together—and to the grinder. But moistening beans before grinding solves the problem, researchers reported this week in Matter. Adding about half a milliliter of water before grinding a typical home brew prevented clumping, the team found, boosting the taste of espresso shots and making their flavor more consistent. Less clumping also means water filters through the grounds more easily during brewing, creating strong drinks using fewer beans—a concept that could reduce waste and save coffee companies millions, New Scientist reports.

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Low-Intensity Fires Reduce Wildfire Risk By 60%

High-intensity, often catastrophic, wildfires have become increasingly frequent across the Western U.S. Researchers quantified the value of managed low-intensity burning to dramatically reduce the risk of such fires for years at a time.

A wildland firefighter uses a drip torch to a prescribed fire.
(Image credit: Getty Images)

There is no longer any question of how to prevent high-intensity, often catastrophic, wildfires that have become increasingly frequent across the Western U.S., according to a new study by researchers at Stanford and Columbia universities. The analysis, published Nov. 10 in Science Advances, reveals that low-intensity burning, such as controlled or prescribed fires, managed wildfires, and tribal cultural burning, can dramatically reduce the risk of devastating fires for years at a time. The findings – some of the first to rigorously quantify the value of low-intensity fire – come while Congress is reassessing the U.S. Forest Service's wildfire strategy as part of reauthorizing the Farm Bill.

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Mountain Towns to Visit in America

Time to embrace the high life.

Taos Pueblo
Nick Fox/Shutterstock

A great mountain town isn't just a nice place to crash after you hit the slopes, or a rest stop for leaf peepers. The truly great mountain towns are the places that offer a little bit of bliss for anyone, any season. They're equally appealing for those who explore the trails wearing hiking boots or snow shoes. Campers will find the perfect spot on a nearby lakeshore, while the more luxury minded can hunker down in a gorgeous lodge and enjoy hyper-local food and drink downtown. And no matter the season, you'll find something to help you fall in love amid the fresh air.

https://www.thrillist.com/travel/nation/the-best-mountain-towns-in-america

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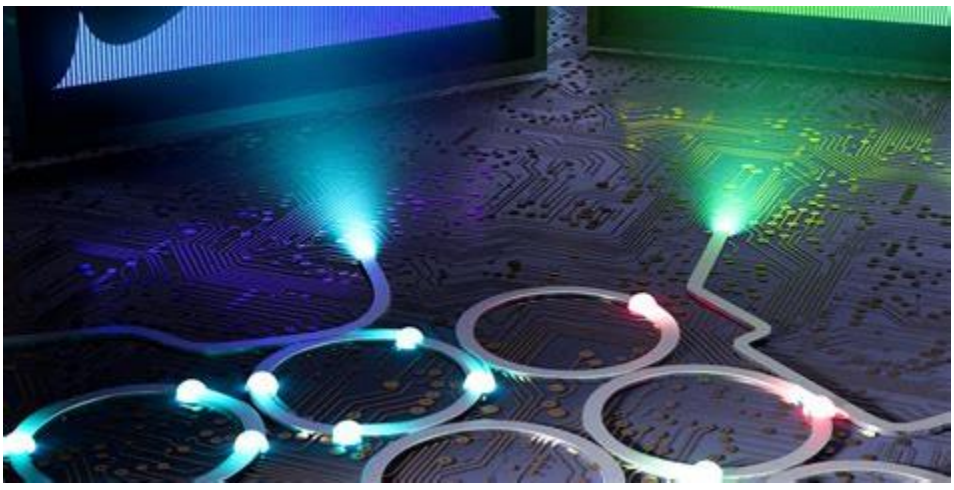
Conjoined "Racetracks" Make New Optical Device Possible



caltech

In a paper appearing in Nature Photonics, the researchers discuss their development of the new microcomb, which overcomes the inherent optical limitations of ULL nitride by generating pulses in pairs. This is a significant development because ULL nitride is

created with the same technology used for manufacturing computer chips. This kind of manufacturing technique means that these microcombs could one day be integrated into a wide variety of handheld devices similar in form to smartphones.

https://bit.ly/3TyfLRn

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Why Are US Suicide Rates So High?

Photo by Jintana Kitchuchittarom/iStock

With the nation's suicide rate at a more than 80-year high, a BU expert on college student mental health explains risk factors and the role of inequality.

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Replacing Plastic Bags with Jute

youtube

Walmart, CVS, and Target are looking at these multi-use bags.

https://youtu.be/h1zDJ1qZTlg

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Innovative Battery Chemistries Help Support US EV Charge

"This is the biggest battery chemistry breakthrough in probably 30 years," one industry CEO said.

Fahroni/Getty Images

Battery chemistry breakthroughs are charging the US EV industry's drive to cut costs and deliver plug-in cars with longer ranges and more affordable price tags.

First, some battery basics. Lithium-ion batteries contain two electrodes: cathodes (the positive electrodes) and anodes (the negative electrodes). Electricity is generated by the movement of electrons between the two. Many of the breakthroughs up to now have been on the cathode side, but anodes are increasingly becoming the site of new innovations.

Among the emerging developments are lithium-silicon batteries, which replace graphite, the dominant anode material used in EV batteries today, with silicon.

One of the companies at the cutting edge of this tech is Sila Nanotechnologies, an Alameda, California-based battery materials company founded in 2011. Its goal is to supply silicon anodes for millions of EV batteries in the coming years. It took strides toward achieving that when it broke ground in November on a new plant in Moses Lake, Washington, that will produce Sila's Titan Silicon anode for Mercedes-Benz and other automotive customers starting in 2025.

Sila says its silicon-based anode delivers 20% higher energy density than the best batteries on the market today. Eventually, it aims to deliver a 40% improvement. These

advances are aimed at boosting the range of EVs and reducing charging times. They can also drive cost reductions, as higher energy density enables battery makers to use fewer battery cells to achieve the same range.

SafeAI wants to bring autonomous vehicles to construction, mining sites

"This is the biggest battery chemistry breakthrough in probably 30 years," Gene Berdichevsky, Sila's CEO and co-founder, told Tech Brew. "The biggest challenge now is scaling up the production of this material."

Industry stakeholders and experts see the development of silicon-based anode material as one of several key innovations enabling battery chemistry breakthroughs, along with solid-state batteries and sodium-ion batteries. Bloomberg NEF estimates that technologies that rely on silicon, lithium, and hard carbon could displace 46% of graphite demand by 2035.

"The chemistries of today, of iron cathodes and nickel cathodes, those are going to stick around for a long time," Berdichevsky said. "But silicon will emerge, and it will enable vehicles that appeal to more and more consumers—vehicles with even longer range, faster recharge times, and lower cost."

Shifting to silicon-based anodes could also help the industry reduce its reliance on graphite at a time when the US is working to move away from China's dominant EV supply chain. The vast majority of the world's graphite is mined, refined, or processed in China, and new export controls the country placed on graphite underscore potential vulnerabilities for the US EV industry.

It's becoming more common for makers of battery materials to mix silicon with graphite for anode material, Sam Abuelsamid, principal research analyst at Guidehouse Insights, told Tech Brew.

"Increasingly it's a mix of graphite with a bit of silicon mixed in there, as well, which helps to improve the energy density," he said.

"Graphite's expensive, and everybody would like to move away from graphite, both for cost reasons and also for supply-chain resiliency," he added. "Silicon—you can find sand anywhere. It's everywhere…You can process the silicon pretty easily; graphite, it's a little more complicated."

Another company that's placing its bets on silicon anodes is OneD Battery Sciences, a Palo Alto-based startup with backing from GM's venture arm.

OneD's technology is centered on a graphite-silicon composite that boosts energy density. The company's technology, Sinanode, fuses silicon nanowires to graphite. CEO and co-founder Vincent Pluvinage told Tech Brew that the innovation could result in as much as a 25% cost reduction for battery packs.

OneD, which is building a pilot plant in Moses Lake, plans to announce the location for a new manufacturing facility in North America early next year. In 2022, OneD completed a Series C funding round that drew investments from GM Ventures and Volta Energy Technologies; its technology could someday be used in GM batteries.

"By having the ability to enhance the graphite that is being processed in North America, we drastically change the strength of the supply chain without disrupting it," Pluvinage said.

By Jordyn Grzelewski for Tech Brew

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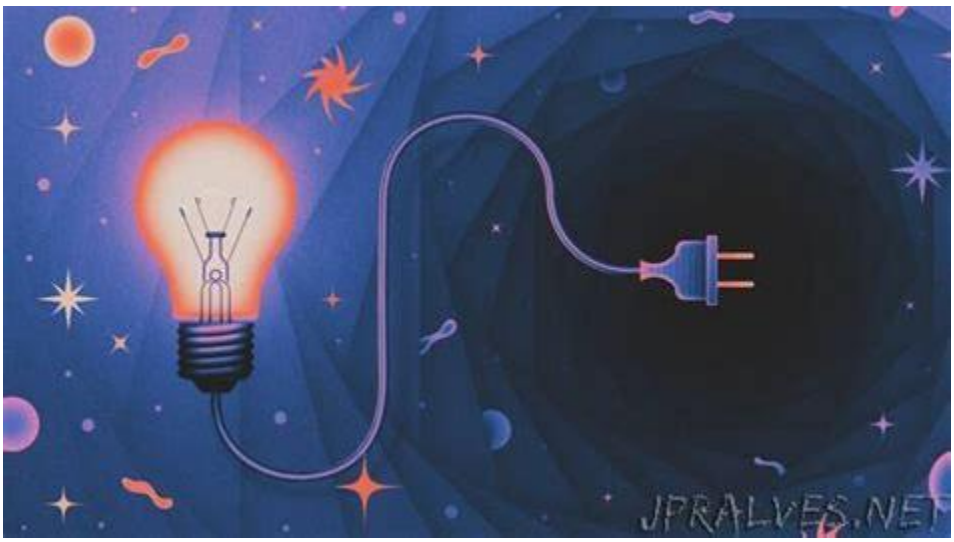
Physicists Use Quantum Mechanics to Pull Energy Out of Nothing



The new quantum protocol effectively borrows energy from a distant location and thus violates no sacred physical principles.
Kristina Armitage/Quanta Magazine

The quantum energy teleportation protocol was proposed in 2008 and largely ignored. Now two independent experiments have shown that it works.

While studying black holes, Hotta came to suspect that an exotic occurrence in quantum theory — negative energy — could be the key to measuring entanglement. Black holes shrink by emitting radiation entangled with their interiors, a process that can also be viewed as the black hole swallowing dollops of negative energy. Hotta noted that negative energy and entanglement appeared to be intimately related. To strengthen his case, he set out to prove that negative energy — like entanglement — could not be created through independent actions at distinct locations.

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Gorgeous Snowflakes

moss and fog

Exquisite Geometry and Limitless Variation

https://bit.ly/47o29ve

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May Mobility

AV startup launches fully driverless service in Arizona.

May Mobility

"We don't see the regulators as the people that we need to navigate; we see the regulators as our customers," CEO Edwin Olson told Tech Brew.

Video

The company has been running in Sun City with safety operators in its vehicles since April 2023; now, the service is going fully driverless. Initially, a group of "early riders" will have the option to request pickup from locations like grocery stores and pharmacies by one of May's autonomous Toyota Sienna minivans, free of charge, with plans to expand in the future. The startup's microtransit model contrasts with the approach of competitors like Cruise, which faced a series of setbacks in its attempts to commercialize a driverless rideshare service.

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Poems from the Song Dynasty

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ttps://bit.ly/3O13bpY

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Huge symphonic & choir flashmob - Budapest, Hungary

pinterest

Bánk Bán's Aria, My homeland, my homeland "https://youtu.be/fTXmaD08-Zs

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No Walking Thoughts this Week. Back on February 4th