U.S. DEPARTMENT OF ENERGY

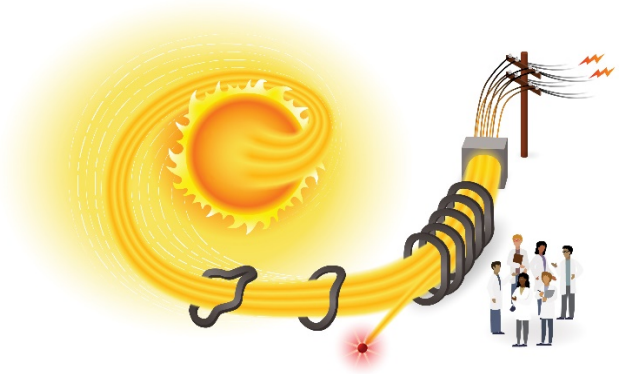
Office of Science

COMMUNIQUE

February 22, 2021

*Comm*unique provides a biweekly review of recent Office of Science Communications and Public Affairs work, including feature stories, science highlights, social media posts, and more. This is only a sample of our recent work promoting research done at universities, national labs, and user facilities throughout the country. *Please note that some links may expire after time.*

Envisioning the Future of Fusion Energy and Plasma Research



Plasma is the amazing fourth state of matter. While not as well-known as solids, liquids, or gases, plasma is far more common in our universe. It is a gas made up of atoms that have had electrons stripped off. It makes up the insides of stars, causes the Northern Lights, and powers the solar winds that bounce off the Earth's magnetic field. It's also fundamental to harnessing nuclear fusion reactions to produce energy. Research funded by the Department of Energy Office of Science has made tremendous strides in understanding plasma and fusion. A new report from the Fusion Energy Sciences Advisory Committee (FESAC) lays out the path forward for fusion technology and plasma research.

Click here to read more about the Office of Science's research in fusion and plasma science as well as the vision for the future.

NEWS CENTER

The Office of Science posted 48 news pieces between 2/9/2021 and 2/22/2021.

To find a drug that can stop the SARS-CoV-2 virus, scientists want to screen billions of molecules for the right combination of properties. An international team of scientists including those from DOE's Argonne National Laboratory says they've found a way to make the process 50,000 times faster using artificial intelligence (AI).

Faster, smaller, smarter, and more energy-efficient chips could soon be on the way after engineers at The University of Texas at Austin created the smallest memory device yet. In the process, they figured out the physics dynamic that unlocks dense memory storage capabilities for these tiny devices.

Converting the tough fibers and complex sugars in plants into biofuels and other products could lead to smarter materials, better medicines, and a more sustainable future. Scientists from DOE's Lawrence Berkeley National Laboratory have been studying microbes in herbivore guts – including goats – to find new ways to process plant material.

Multilayer plastic materials are ubiquitous, but impossible to recycle using conventional methods. Now, University of Wisconsin–Madison engineers have pioneered a method for reclaiming the polymers in these materials using solvents. The team now hopes to use the recovered polymers to create new plastic materials.

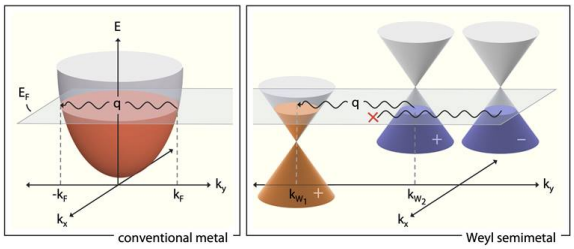
In a study by a team of researchers including those from DOE's Sandia National Laboratory, frozen land that is submerged under the ocean currently traps 60 billion tons of methane and 560 billion tons of organic carbon. It may be a giant input to climate change not yet included in climate projections.

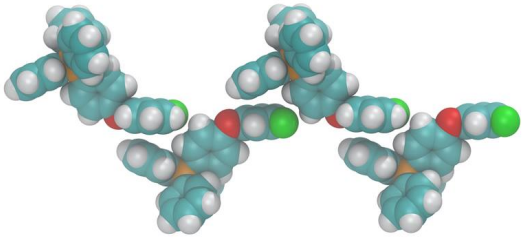
Scientists from Rutgers University have discovered how a common virus in the human gut infects and takes over bacterial cells – a finding that could be used to control the composition of the gut microbiome, which is important for human health.

SCIENCE HIGHLIGHTS

The Office of Science posted three new highlights between 2/9/2021 and 2/22/2021.

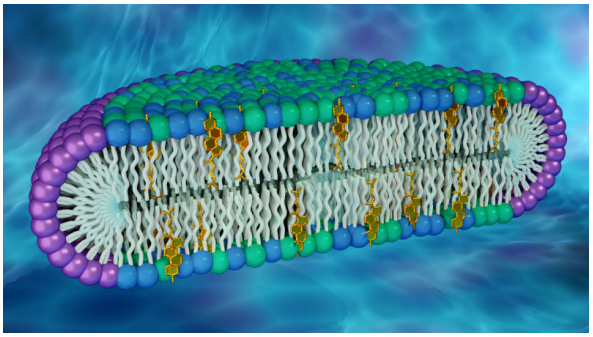
Topological quantum materials could be useful in quantum devices and potential superconductors, but they are difficult to study. Scientists at the Massachusetts Institute of Technology developed a new method that combines theory with advanced neutron and X-ray scattering that will be useful for the discovery and characterization of topological materials.





Many chemical processes require liquids as solvents. However, the liquids often vaporize and create dangerous emissions. Ionic liquids are less likely to vaporize, but their melting points can be too high for practical use. A recent study by researchers at the University of South Alabama provides scientists with a new set of tools to design ionic compounds with lower melting points that can be used in more applications.

The cell membrane is the wall-like outer layer that separates the inside of a cell from its surrounding environment. The proteins in membrane make up about one-third of all human proteins, but are hard to study. Scientists at DOE's Oak Ridge National Laboratory and Vanderbilt University developed a disc-shaped artificial membrane that shows how proteins can exhibit different properties when embedded in membranes with different lipid compositions.



IN THE NEWS

NBC News: **Mysterious radioactive element einsteinium measured for the first time**
This article about how scientists have measured einsteinium for the first time quotes Rebecca Abergel from DOE's Lawrence Berkeley National Laboratory.

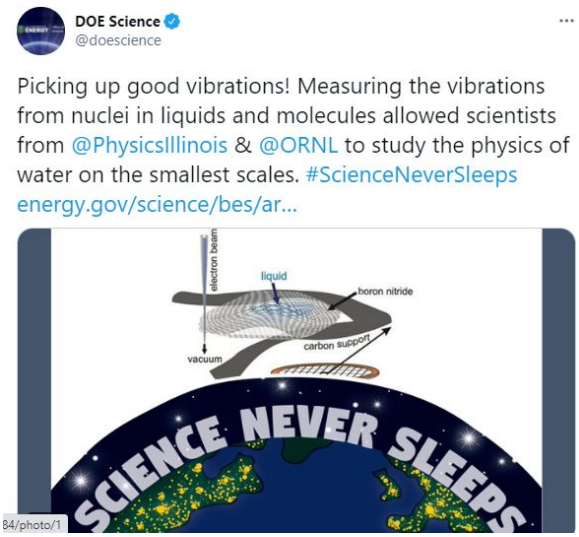
CNBC: **This 34-year-old's start-up backed by Bill Gates and Jeff Bezos aims to make nearly unlimited clean energy**

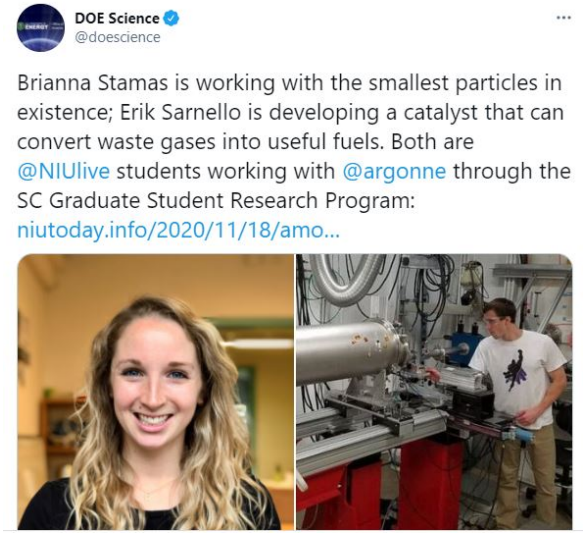
This article about the future of fusion energy quotes Egemen Kolemen, a researcher at DOE's Princeton Plasma Physics Laboratory as well as references the recent Fusion Energy Sciences Advisory Committee report supported by the Office of Science.

The New York Times: **The auto industry bets its future on batteries**
This article on the future of the car battery market and innovations in battery manufacturing quotes Venkat Srinivasan, director of DOE's Argonne National Laboratory's Collaborative Center for Energy Storage Science.

TOP TWEETS

The Office of Science sent out 90 tweets between 2/8/2021 and 2/22/2021. Here are the two most popular:





BY THE NUMBERS

Berkeley Lab 90th Anniversary

This year, DOE's Lawrence Berkeley National Laboratory is celebrating its 90th birthday. Since it was established in 1931, scientists at Berkeley Lab have invented particle accelerators, created the CRISPR-Cas9 genetic engineering technology, and discovered new states of matter. Learn about 90 Breakthroughs at the lab, attend one of seven different virtual tours, and scroll through a timeline with more than 50 historical milestones on the lab's The Next 90 website.

END NOTES

Even Bananas?

If neutrinos are your favorite fundamental particle, DOE's Fermilab has a new video series for you. On "Even Bananas," physicist Kirsty Duffy explains the history, basics, and more of neutrinos. Check out the first episode on Fermilab's YouTube channel.

Please see the Communique archive on Energy.gov for past issues.

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