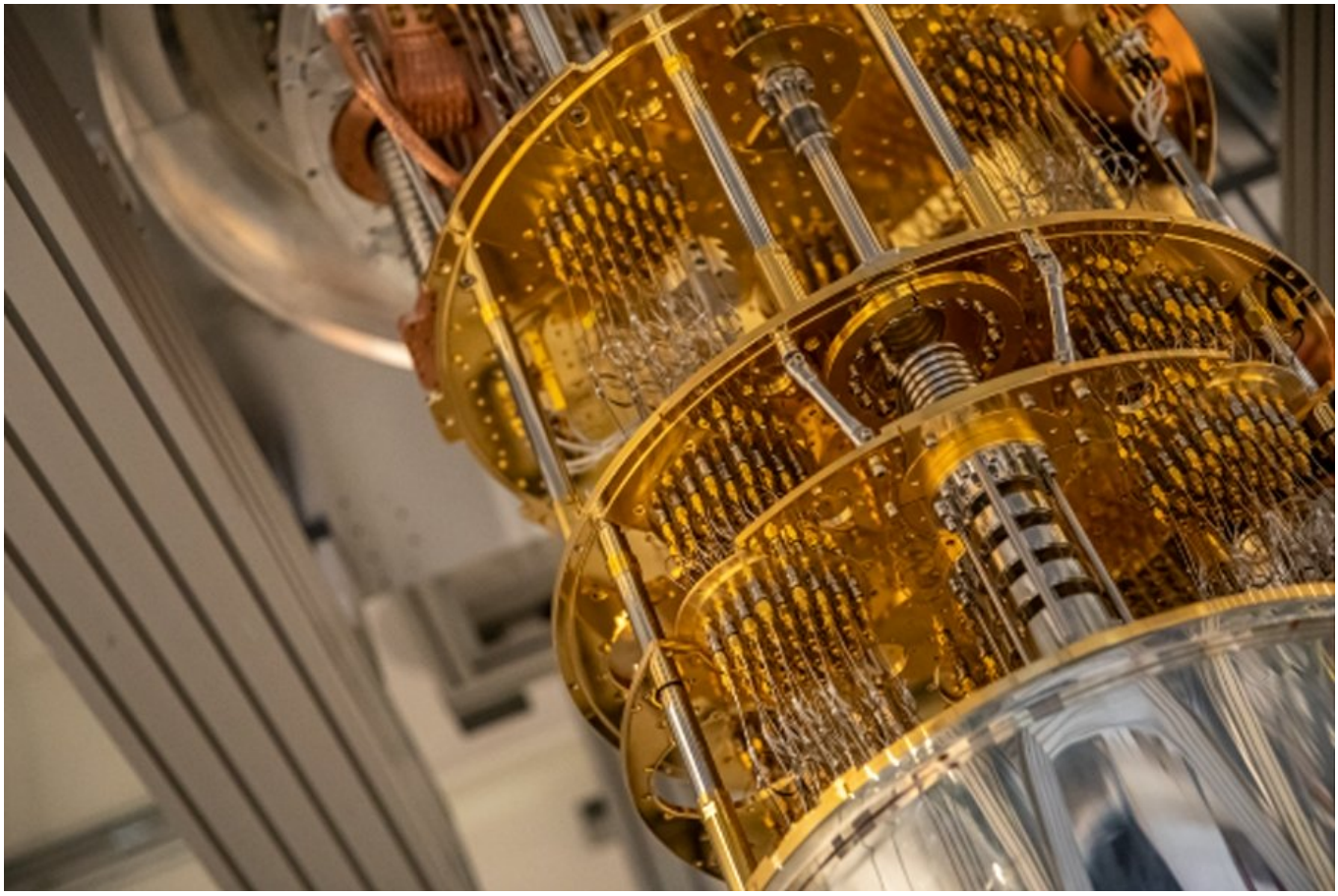
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

18 February 2020

*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.*



Creating the Heart of a Quantum Computer: Developing Qubits

Quantum computers have the potential to solve problems that conventional computers can't, but routinely using quantum computers to answer scientific questions is still a long way off. To use quantum computers on a large scale, we need to improve the technology at their heart – qubits. Qubits are the quantum version of conventional computers' most basic form of information, bits. The Office of Science is supporting research into developing the ingredients and recipes to build these challenging qubits.

Click here to read more about the Office of Science's work developing quantum computers' most basic form of information, the qubit.

NEWS CENTER

The Office of Science posted 51 news pieces between 2/3/2020 and 2/17/2020, including 26 university articles and 23 pieces from the labs and user facilities.

Inspired by natural processes in soil, researchers at SLAC National Accelerator Laboratory are using iron oxides like rust to filter out arsenic from groundwater.

Using an ammonia-salt based solvent, Rutgers University researchers have developed a new process that could make it much cheaper to produce biofuels from plant waste.

Scientists from Oak Ridge National Laboratory have found that while all regions in the United States can expect an earlier start to growing season as temperatures rise, this trend is likely to vary more from year to year in hotter regions.

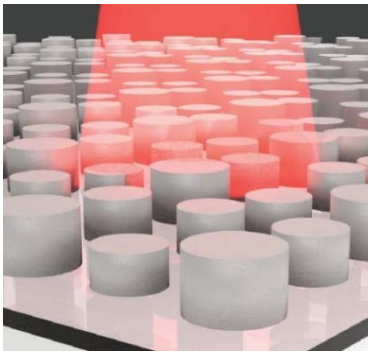
Using a neural network-driven Earth system model, UC Irvine oceanographers predict an increase in phytoplankton by the end of the 21st century, contradicting longstanding belief. Phytoplankton form the base of the aquatic food web.

Scientists from Argonne National Laboratory, working with Washington University in St. Louis, have solved a mystery in photosynthesis, determining the initial, ultrafast events through which proteins capture light and use it to initiate electron transfer reactions. This discovery could lead to improved solar-powered devices.

Marine Biological Laboratory scientists have gained insights into the formation and collapse of microbial blooms. These dynamics are important to understanding estuaries, which provide protection from coastal erosion, capture carbon from the atmosphere, and serve as a food source and breeding ground for much of the coastal biodiversity.

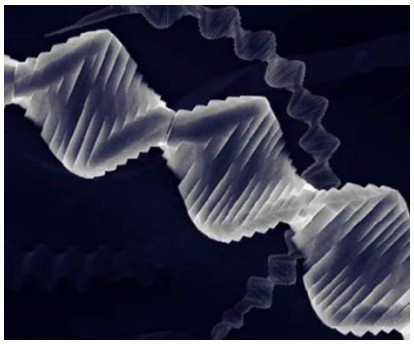
SCIENCE HIGHLIGHTS

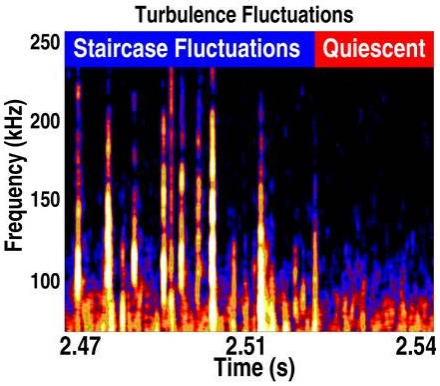
The Office of Science posted eight highlights spotlighting BES and FES between 2/3/2020 and 2/17/2020.



Researchers at Duke University used machine learning techniques to predict the ideal metamaterial for absorbing low-energy light. This approach may enable scientists to develop practical devices that create electricity from heat, rather than light.

Scientists at Berkeley Lab have created new inorganic crystals made of stacks of atomically thin sheets. These stacks unexpectedly spiral like a nanoscale card deck. Their surprising structures may yield unique optical, electronic and thermal properties.





Recent experiments at the DIII-D National Fusion Facility demonstrate that more turbulence at the edge of the plasma can result in it being hotter, contrary to previous theories. This result arises when the turbulence is sandwiched in between two insulating layers of plasma.

IN THE NEWS

BBC Future: The Modern Alchemists Racing to Create a New Element
In an article about the race to discover new superheavy elements, *BBC Future* cited the importance of Oak Ridge National Laboratory to producing the target materials necessary for the discovery experiments.

Scientific American: MICE Cold: Collaboration Demonstrates Muon Ionization Cooling
Fermilab's Vladimir Shiltsev is quoted in an article on the findings of the MICE experiement, which demonstrated muon ionization cooling.

Wall Street Journal: Fusion Startups Step In to Realize Decades-Old Clean Power Dream
Princeton Plasma Physics Laboratory is quoted in an article about fusion star-up companies.

TOP TWEETS

The Office of Science sent out 73 tweets between 2/3/2020 and 2/17/2020. Here are our two most popular from the past two weeks:

BY THE NUMBERS

Fermi Award Now Open for Nominations

The Office of Science is now accepting nominations for the 2020 Enrico Fermi Award, one of the oldest and most prestigious science and technology honors bestowed by the U.S. Government. It is given to encourage excellence in research in energy science and technology benefiting mankind; to recognize scientists, engineers, and science policymakers who have given unstintingly to advance energy science and technology; and to inspire people of all ages through the examples of Enrico Fermi, and the laureates who followed in his footsteps, to explore new scientific and technological horizons. There have been 66 Fermi Award winners since 1956, the first being John von Neuman for his contribution to fast computing machines and the most recent being Charles V. Shank and Claudio Pellegrini for the development of ultrafast lasers and of the first hard X-ray free-electron laser, respectively. In addition to recognition, awardees receive an honorarium of $100,000. The deadline for nominations is Thursday, April 9th, 2020 at 5 p.m. ET.

END NOTES

Beating the Heat in the Living Wings of Butterflies

Columbia University engineers and Harvard University biologists have discovered that butterflies have specialized behaviors and wing scales to protect the living parts of their wings. The nanostructures found in the wing scales could inspire the design of radiative-cooling materials to help manage excessive heat conditions and the sensory network in the wings could inspire the design of advanced flying machines.

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No. 29: 18 February 2020