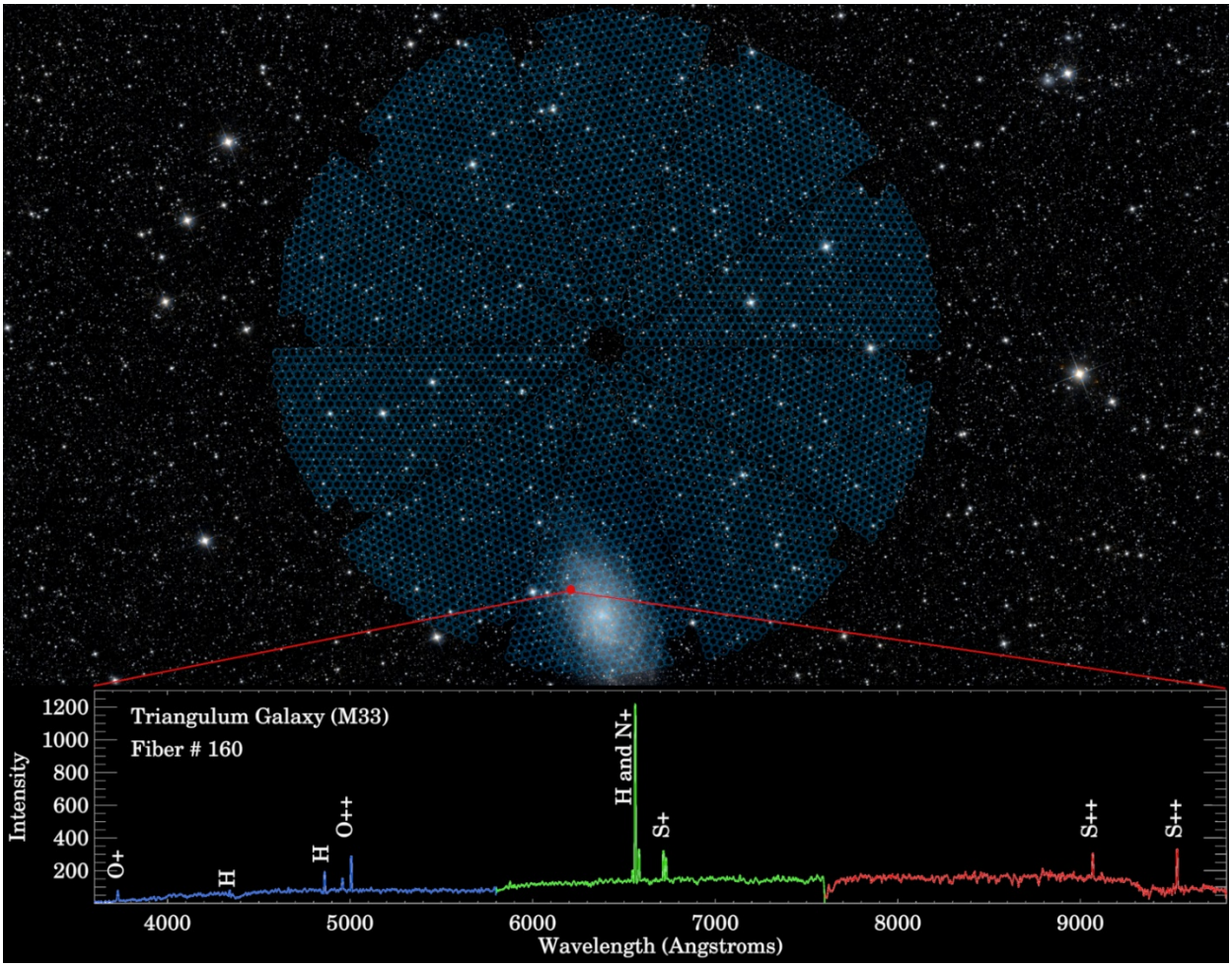
U.S. DEPARTMENT OF ENERGY

Office of Science

COMMUNIQUE

12 November 2019

*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.*



DESI Opens Its 5,000 Eyes to Capture the Colors of the Cosmos

A new instrument mounted atop a telescope in Arizona has aimed its robotic array of 5,000 fiber-optic "eyes" at the night sky to capture the first images showing its unique view of galaxy light. It was the first test of the Dark Energy Spectroscopic Instrument, known as DESI, with its nearly complete complement of components. The long-awaited instrument is designed to explore the mystery of dark energy, which makes up about 68 percent of the universe and is speeding up its expansion.

Click here to read more about this latest DESI milestone and the instrument's mission to peer into the past.

NEWS CENTER

The Office of Science posted 63 news pieces between 10/28/2019 and 11/11/2019, including 35 university articles and 27 pieces from the labs and user facilities.

In the vast frozen whiteness of the central Arctic, the Polarstern, a German research vessel, has settled into the ice for a yearlong float. Misha Krassovski, a computer scientist at Oak Ridge National Laboratory, is one of the 60 some scientific personnel who embarked on the first leg of the largest polar expedition of all time. During the yearlong expedition, the Polarstern will drift through the Arctic, frozen in ice, as around 600 experts rotate on board to study the Arctic climate system.

Researchers from Northwestern University have developed a tiny nanolaser that can function inside of living tissues without harming them. About the thickness of a single human hair, the laser can fit and function inside living tissues, with the potential to sense disease biomarkers or perhaps treat deep-brain neurological disorders, such as epilepsy.

Designing accurate flow models for use during accidents is a major challenge for traffic engineers who must adapt to unforeseen traffic scenarios in real time. A team of Berkeley Lab computer scientists are working with the California Department of Transportation to use high performance computing and machine learning to help improve Caltrans' real-time decision making when traffic incidents occur.

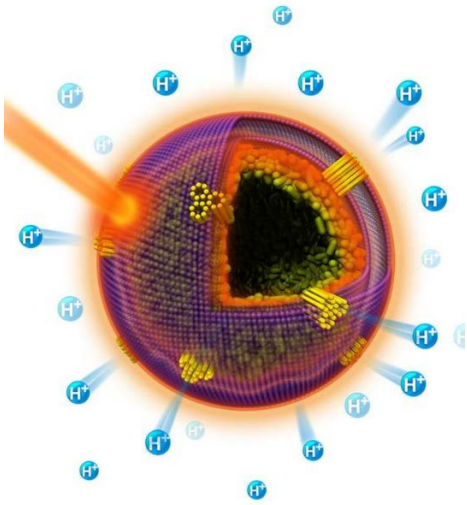
Stanford University researchers have discovered proteins that enable hardy microbes called archaea to toughen up their membranes when waters are overly warm. Finding these proteins could help scientists piece together the state of Earth's climate going back millions of years to when those archaea were cruising the ancient oceans. Figuring out how archaeal proteins handle membrane fusing may also reveal new biochemistry for applications like drug discovery and materials science.

The Army Research Laboratory recently teamed up with scientists at Argonne National Laboratory to look at the microstructure of the human skull using high-energy X-rays from the Advanced Photon Source. This imaging will provide better characterization of the structure of the skull and understanding of human tolerance of ballistic impact to inform computer models and help develop more effective helmets for soldiers.

Montana State University researchers received a grant from the Department of Energy to develop new approaches for extracting and purifying lignin, a plant compound that's one of the most abundant organic molecules on Earth, from corn stover and poplar wood. Once processed, lignin has the potential to be made into renewable, bio-based materials.

SCIENCE HIGHLIGHTS

The Office of Science posted highlights spotlighting BES between 10/28/2019 and 11/11/2019.



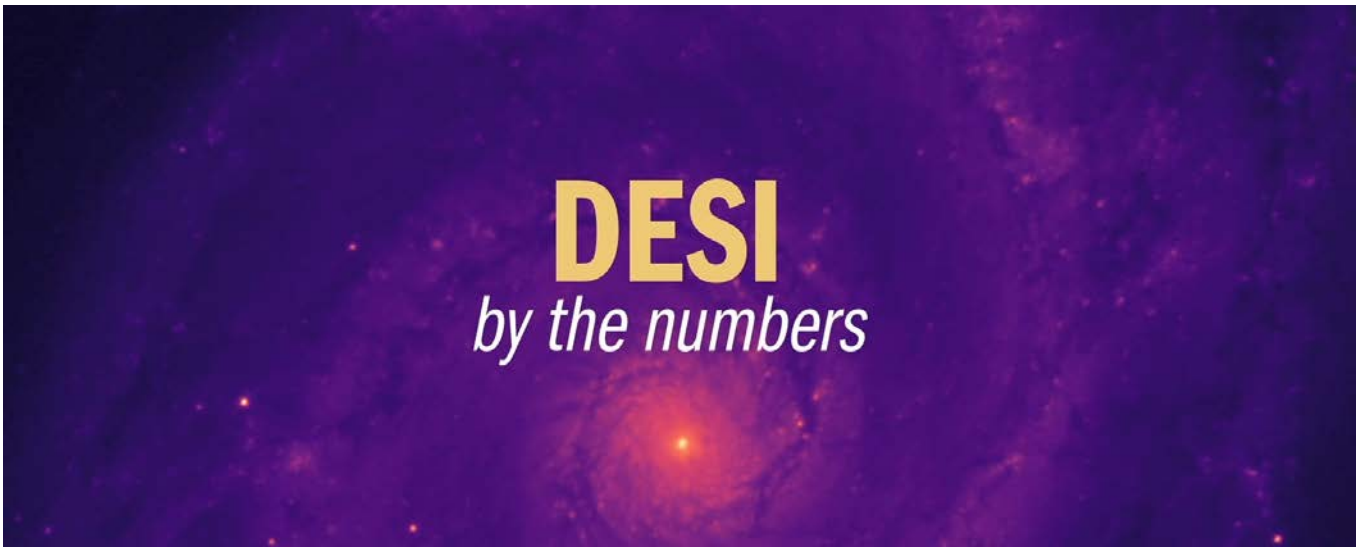
Scientists at Argonne National Laboratory designed and connected two different artificial cells to each other to produce molecules called ATP, the fundamental unit that all living things use to carry and provide energy to run processes in cells. This artificial cell design uses nanorods that respond to light, offering opportunities for developing solar-to-chemical energy conversion systems.

TOP TWEETS

The Office of Science sent out 65 tweets between 10/28/2019 and 11/11/2019. Here are our two most popular from the past two weeks:

BY THE NUMBERS

DESI by the Numbers



The Dark Energy Spectroscopic Instrument (DESI) has achieved its first test with a nearly complete complement of components. The work of 486 researchers from 75 institutions and 13 countries, DESI will map the distance to 35 million galaxies and 2.4 million quasars across one third of the area of the sky over five years. In doing so, DESI will look deeply into the universe's past and take precise measures of the universe's expansion rate.

END NOTES

Dark Matter Day Q&A with Berkeley Lab Physicist Quentin Riffard

Dark Matter Day highlights ongoing efforts to solve one of the biggest mysteries in physics: What is the makeup of dark matter? Scientists have constructed successive generations of ultrasensitive experiments to determine if dark matter is made of a certain kind of yet-undiscovered particle, a slew of different particles, or whether it may require us to rethink how gravity works. The LUX-ZEPLIN experiment that

Quentin Riffard, a project scientist, works on is designed to detect the interaction of theorized dark matter particles known as WIMPs, or weakly interacting massive particles, with atoms of liquid xenon.

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