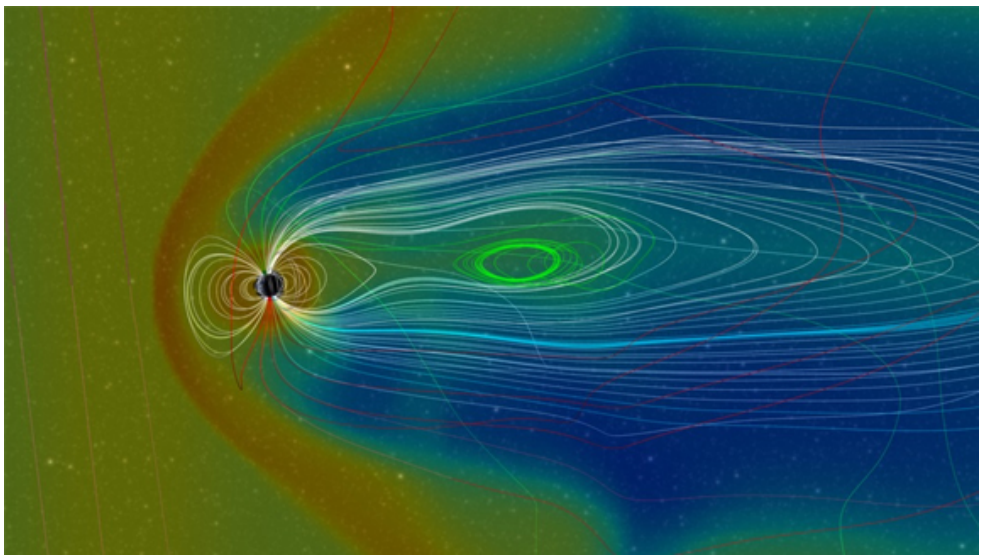
U.S. DEPARTMENT OF ENERGY

Office of Science

communique

15 October 2018

*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 work promoting the research done at universities, national labs, and user facilities throughout the country.
Please note that some links may expire after time.



Solving a Plasma Physics Mystery: Magnetic Reconnection

Magnetic reconnection is a process that occurs nearly anywhere there's plasma. The fourth state of matter, plasma, is gas made up of unbound ions and electrons. As plasma makes up the stars and 99 percent of the visible universe, magnetic reconnection is quite common. However, it is poorly understood. Scientists at universities, research institutes, the DOE Office of Science's Princeton Plasma Physics Laboratory, and NASA are coming close to mapping the process of magnetic reconnection. With the help of modeling, experimental, and observational data, they think their most recent theory may provide the definitive map to guide scientists through this fundamental phenomenon.

Click here to read more about storms in space and how they can affect fusion research down on Earth.

NEWS CENTER

The Office of Science posted 46 news pieces between 10/1/2018 and 10/12/2018, including 24 university articles and 18 pieces from the labs.

A team of researchers at SLAC National Accelerator Laboratory has used an X-Ray laser to measure, for the first time, how a plasma created by a laser blast expands in the hundreds of femtoseconds (quadrillionths of a second) after it's created. Their technique could eventually reveal tiny instabilities in the plasma that swirl like cream in a cup of coffee.

Yan-Fei Jiang, a researcher at UC Santa Barbara's Kavli Institute for Theoretical Physics, and colleagues have now developed a 3D simulation that not only shows the stages of a luminous blue variable as it becomes progressively more luminous and then erupts, but also depicts the physical forces that contribute to that behavior. Conventional models have been inadequate in explaining the special physics behind these supermassive, unstable stars.

Pacific Northwest National Laboratory researchers are determining which software architectures allow for efficient use of quantum information science (QIS) platforms, designing QIS systems for specific technologies, imagining what scientific problems can best be solved using QIS systems, and identifying materials and properties to build quantum systems. This new quantum computing chemistry project will develop tools to help solve fundamental problems in catalysis, actinide chemistry, and materials science.

You could say that Stephan Hlohowskyj is on the road to becoming a science rock star. He is the first Central Michigan University graduate student to ever have been accepted to the prestigious National School on Neutron and X-Ray Scattering. The third-year doctoral student in the Earth and ecosystem science program is using state-of-the-art techniques to explore the origins of life and the first signs of oxygen on Earth by examining trace metals in rocks.

On July 15, 2018, the Soft Inelastic X-Ray Scattering (SIX) beamline at the National Synchrotron Light Source II (NSLS-II)—a user facility at DOE's Brookhaven National Laboratory—welcomed its first visiting researchers. SIX is an experimental station designed to measure the electronic properties of solid materials using ultrabright X-Rays. The materials can be as small as a few microns—one millionth of a meter.

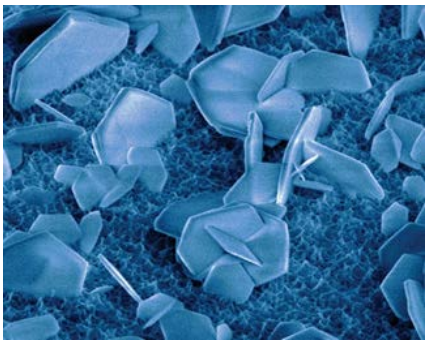
Researchers at Columbia Engineering have invented a high-performance exterior passive daytime radiative cooling polymer coating with nano-to-microscale air voids that acts as a spontaneous air cooler and can be fabricated, dyed, and applied like paint on rooftops, buildings, water tanks, vehicles, even spacecraft—anything that can be painted.

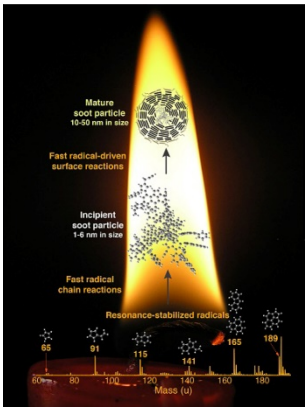
SCIENCE HIGHLIGHTS

The Office of Science posted 3 highlights between 9/15/2018 and 10/12/2018 spotlighting science from 2 programs: BES and HEP.

A fraction of a second after the Big Bang, a single unified force may have shattered. Scientists from the CDF and DZero Collaborations used data from the Fermilab Tevatron Collider to re-create the early universe conditions and understand the nature of fundamental forces.

Why study particle attachment? Water molecules line up tiny particles to attach and form minerals; understanding how these platelets form impacts energy extraction and storage along with waste disposal. A team from PNNL worked at the near atomic scale to understand water's many roles in mineral formation.

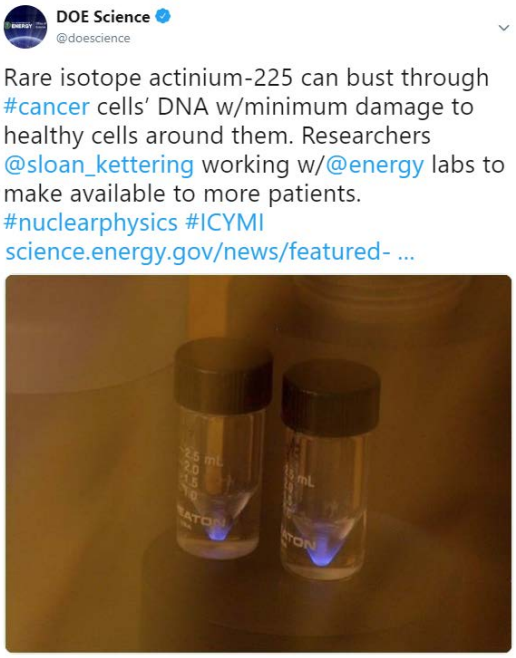


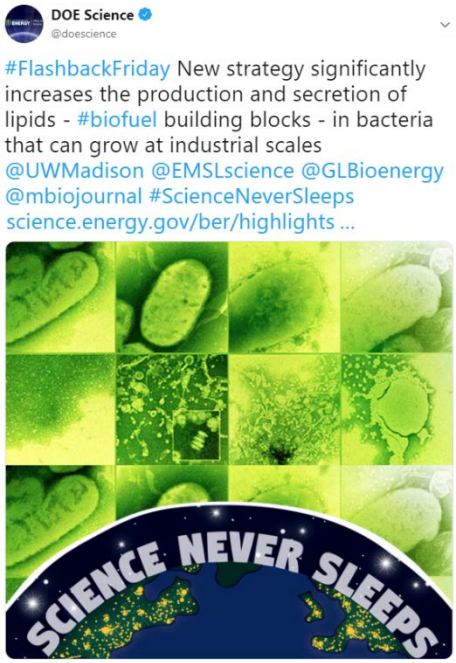


It was a mystery how gaseous hydrocarbon fuel and small precursor molecules could form into soot particles. Now, researchers from Sandia National Laboratory have identified rapid reactions that can explain how soot particles form.

TOP TWEETS

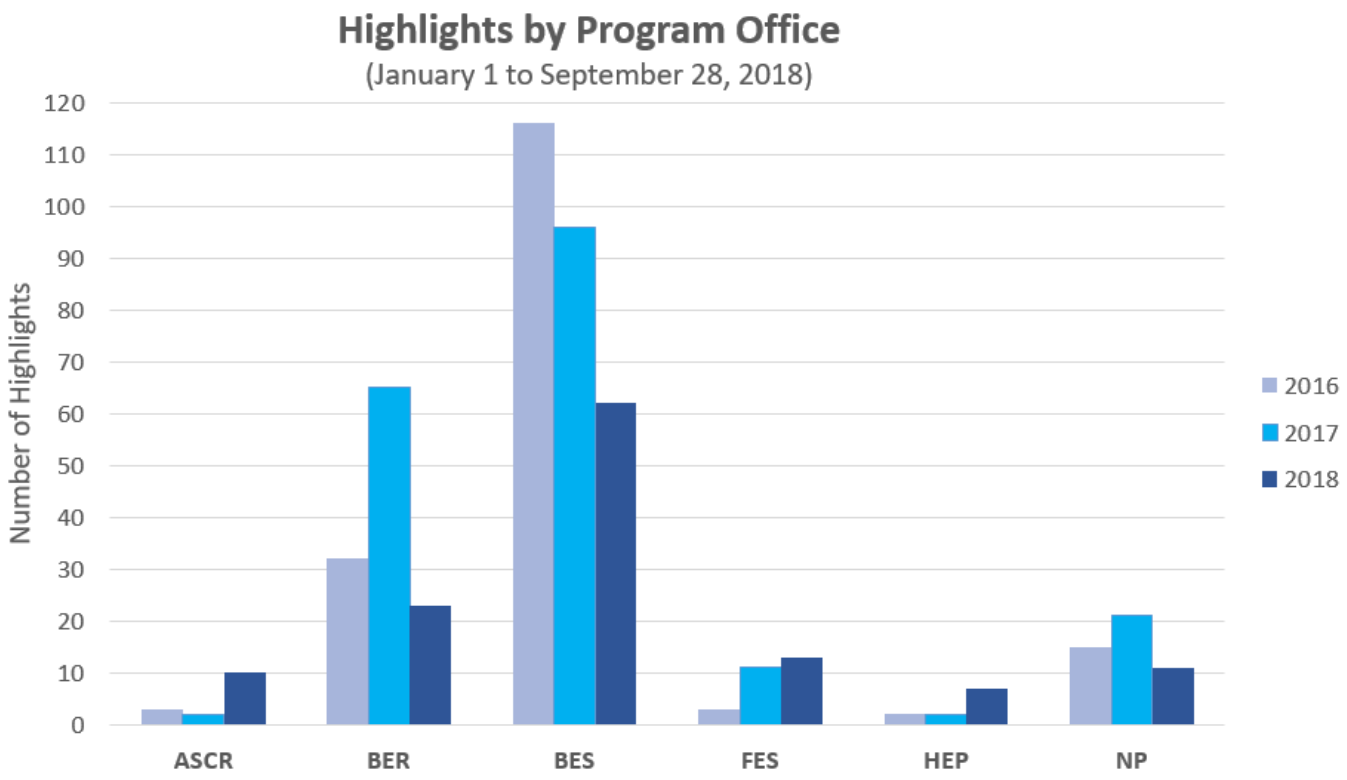
The Office of Science sent out 36 tweets between 10/1/2018 and 10/12/2018 and gained 113 followers.





STATISTICS

The Office of Science by the numbers.



In the first 9 months of 2018, 126 web highlights were published on the Office of Science's website. In 2017, 194 highlights were published and in 2016 there were 152 posted. Each highlight is sorted into the program office that submitted the content.

END NOTES

Video: SLAC from the Sky

Spread across 426 acres, SLAC National Accelerator Laboratory's campus boasts an array of distinctive and historic buildings, headlined by the 2-mile-long klystron gallery, the building that sits on top of the longest linear particle accelerator in the world. This video, shot using cameras on remotely controlled unmanned aerial vehicles, gives an overview of the lab and the science being done inside its various facilities.

These reports are archived at: https://intranet.osc.doe.gov/sites/HQ/Pages/Default.aspx

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