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Research Highlights . . .

DOE Pulse

Science and Technology Highlights from the DOE National Laboratories

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Ames Lab opens magnetoelectronics lab

A new research facility at DOE's Ames Laboratory will help scientists create and, perhaps more importantly, duplicate thin films with unprecedented control. That ability to control a number of variables will allow thin-film "recipes" to be developed and compared, resulting in a much better understanding of how thin-films work. Potential uses of thin-films include nonvolatile computer random access memory (commonly known as RAM) that would require no "boot-up" sequence and would not lose data in cases of power interruptions. The lab was funded by a $530,000 grant from the Roy J. Carver Charitable Trust.

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Fermilab researchers begin recording 'physics-quality data'

Researchers at CDF and DZero, the 5,000-ton particle detectors at DOE's Fermilab, have begun recording what they call "physics-quality data" from particle collision events in Collider Run II of the Tevatron. Says CDF cospokesperson Al Goshaw, of Duke University: "For many analyses, the data we are taking could appear in future publications." The heightened activity also emphasizes the diversity and international nature of researchers at the lab. "It is wonderful to see people on shift excited about our data-taking," he continues, "and working across language, gender and age boundaries to keep the detector running efficiently."

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Earth: More complicated than we thought

The chemical ingredients at the center of Earth are surprisingly complicated, according to high-temperature, high-pressure experiments conducted at DOE's Argonne National Laboratory. University of Chicago scientists used Argonne's Advanced Photon Source to find experimental evidence suggesting that the Earth's inner core largely consists of two exotic forms of iron, alloyed with silicon, instead of only one. The Chicago research team simulated searing subsurface temperatures of approximately 4,200 degrees Fahrenheit and crushing pressures of 840,000 atmospheres with a laser-heated diamond anvil cell. They found the atomic structure of iron changes under conditions found at 1,800 miles beneath Earth's surface.

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New material gets bigger when squeezed

Most materials get compacted or fall apart under pressure. But scientists working at DOE's Brookhaven Lab have discovered a zeolite that expands when squeezed. Structural studies at the National Synchrotron Light Source at Brookhaven reveal that it's possible to squeeze extra fluid into tiny pores in the material, thereby increasing its volume. The scientists say this material might be useful as a "molecular sponge" for soaking up chemical pollutants or even radioactive waste because, when the pressure is released and the material contracts, the fluid—potentially a pollutant—would be trapped inside. Studies will continue to see if this approach will work.

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DOE Pulse highlights work being done at the Department of Energy's national laboratories. DOE's laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. ***DOE Pulse*** (www.ornl.gov/news/pulse/) is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).