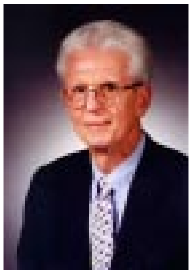

Ames' Corbett now relishes 'old man' role. Page 2

DOE Pulse

Science and Technology Highlights from the DOE National Laboratories

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Research Highlights . . .

Fermilab Sets New Schedule for Collider Run II

Scientists are augmenting their research with "hands-on" installation shifts at the massive DZero and CDF detectors, as DOE's Fermilab gears up for final preparations of Collider Run II at the Tevatron in early 2001. The world's highest-energy particle accelerator, the Tevatron was slated to get back to work colliding beams of protons and antiprotons late this year. But upgrades and additions amounting to the reinvention of the intricate systems within the 5,000-ton detectors have taken longer than anticipated. "Both of these detectors have brand-new systems that no one has ever built before," said Director Michael Witherell. "We have invented the institution of the international detector collaboration to build these multi-kiloton 'Swiss watches.'"

[Mike Perricone 630/840-5678 mikep@fnal.gov]

How cells "catch" a cold

Achoo! Scientists at DOE's Brookhaven National Laboratory have taken what could be the first step toward finding a cure for the common cold. Using X-ray crystallography at Brookhaven's National Synchrotron Light Source, the researchers deciphered the molecular mechanism by which one type of cold virus binds to human cells. Since that binding is the first step in infection, finding a way to block it could bring relief to runny noses everywhere. The finding could also lead to targeted vaccines, a better understanding of how viruses evolve, and advances in gene therapy.

[Karen McNulty, 631/344-8350, kmcnulty@bnl.gov]

On the track of wildfire pollutants

Researchers at DOE's Los Alamos National Laboratory are developing a wildfire chemistry model to track some longer-range effects of these catastrophes. The scheme to track volatile organics released into the atmosphere from wood heating and burn simulations will allow computation of gas, and smoke emissions from wildfires. These results, added to Los Alamos' wildfire model developed for fire safety applications, will allow prediction of effects on the air at a wide variety of distances.

[Kay Roybal, 505/665-0582., k_roybal@lanl.gov]

Sneak peeks leading to safer munitions handling

X-ray images tell the dentist whether or not to drill your teeth, and can also tell you whether or not it's safe to move an explosive. Researchers bombard an ordnance with X-rays on a portable turning platform and use sophisticated computer programs to assimilate thousands of pieces of data, creating two- and three-dimensional images so exact that a hairline fracture on the detonator of a bomb can be seen as easily as your cavity. New portable digital imaging technologies that can by used by police forces or the military are being developed as part of a cooperative research and education partnership between the Idaho National Engineering and Environmental Laboratory and Idaho State University.

[Deborah Hill, 208/526-4723, dahill@inel.gov]

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).

Spinning in the right direction

DOE's Thomas Jefferson National Accelerator Facility (Jefferson Lab) recently installed a second polarized electron gun designed to resolve one of a physics researchers' most important issues: uninterrupted polarized beam delivery. An electron beam where all of the electrons have their spins coherently oriented along the direction of motion is called polarized. This quality improves the quality of the nuclear physics experiments conducted at Jefferson Lab

About 50 percent of the Lab's experiments require polarized beam. The accelerator is scheduled to deliver beam to two or three halls simultaneously, so in practice, the polarized source could be run 100 percent of the time.

A key component of each electron gun is a small disc of material (gallium arsenide) that sits within each injector's ultra-high-vacuum chamber. This dime-size photocathode emits electrons when struck by laser light. Yet the wafer loses its emitting properties over time, as more electrons are delivered. Although the laser can be refocused on different sections of the photocathode, eventually the material's effectiveness decreases and the entire crystal must be replaced.

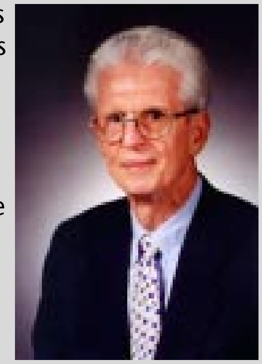
During replacement, Lab personnel open the ultra-high vacuum chamber within the injector. Although this process lasts just minutes, reestablishing the ultra-high vacuum—better than that found on the surface of the moon—can take up to 50 hours and involves enclosing the gun in an oven-like structure.

"We're staying on the cutting edge of laser technology, even inventing new technology," says John Hansknecht, Injector Group engineering coordinator. "The experimenters will always want more current and better polarization. We are constantly looking for ways of getting higher laser power and more efficient photocathodes.

The bottom line is getting better service for the tax dollar expended. Improving efficiency is a great start toward that goal.

Submitted by DOE's Thomas Jefferson National Accelerator Facility

The 'Old Man' and the 'Sea'



John Corbett chuckles as he notes that he always considered the American Chemical Society's award for Distinguished Service in the Advancement of Inorganic Chemistry to be the "old man's award."

That is, until he was chosen as the next recipient.

"Longevity has something to do with this," says Corbett, a senior chemist at DOE's Ames Laboratory since 1963. "It helps to be healthy for a long time."

But his colleagues say the award recognizes far more than longevity. They note that the 73-year-old Corbett continues to be one of the most visible, productive chemists in the inorganic community and one of the nation's foremost authorities in synthetic solid-state chemistry.

During his 47-year career, Corbett has made groundbreaking discoveries about the existence, bonding, structures and properties of many new compounds, thereby adding new depth to the sea of scientific knowledge.

"We've been extending chemistry, trying to show what's new and what's possible," Corbett says. "There are zillions of solid-state compounds left to be discovered, and you cannot predict ahead of time what you will find or what will be useful."

When Corbett's career began in 1952, the field of solid-state inorganic chemistry was virtually nonexistent. Corbett has helped it to grow through his research as well as the classroom. He holds a distinguished professorship at Iowa State University where he has trained students who have gone on to teach throughout the world.

"It's gratifying to know that I've helped nucleate a lot of solid-state chemistry in this country at academic institutions concerned with fundamental research," he says.

Corbett will receive the award at the annual ACS meeting in March 2000. And then he will return, as always, to his work.

"We're discovering lots of novel and significant things," he notes. "And if you're also having fun and you feel good, why quit?"

Submitted by DOE's Ames Laboratory