



July/August 2002

Published by the Community Involvement Office  
Building 130, P.O. Box 5000  
Upton, NY 11973  
Phone: 631 344-5658 Fax: 631 344-3654  
www.bnl.gov

## New Insight Into Origin of Superconductivity in Magnesium Diboride

- A team of scientists from the U. S. Department of Energy's Brookhaven Laboratory, the U.S. Department of Commerce's National Institute of Standards and Technology (NIST), and the University of Oslo in Norway have provided new insight into the superconductivity of magnesium diboride ( $MgB_2$ ), an unusual superconductor discovered only last year.
- Understanding the origin of superconductivity — the ability of some materials to conduct electricity without losing energy — will help scientists improve magnetic resonance imaging (MRI) and the efficiency of electric power transmission, and build smaller, more powerful electronic devices.

## Conducting-Insulating Materials Reveal Their Secrets

- Research by physicists at Brookhaven Laboratory provides new insight into why some materials made of stacks of metallic planes are conductors in the direction of the planes and are insulators in the direction perpendicular to the planes.
- Such behavior is in marked contradiction with scientists' traditional understanding of metallic conductivity, where the electrical current is carried by electrons in every direction. Understanding materials that are both conducting and insulating will help scientists gain new insight into superconductors — materials that conduct electricity with no energy loss.

## Long Island Students Recruited for Internships



Susan Pepper, Brookhaven Lab, and the four interns (from left) Sam Aro, Christopher Dalton, David Heyman, and Courtney Patterson.

- Four students from Long Island have been recruited by Brookhaven Laboratory to work for a year at the International Atomic Energy Agency (IAEA) in Vienna, Austria. They will be providing technical assistance to better verify that nuclear material placed under IAEA safeguards is not diverted for non-peaceful purposes.
- Sam Aro, Christopher Dalton, and David Heyman are recent graduates of the Chubb Institute in Westbury, a computer training school, and hold bachelor's and master's degrees. Courtney Patterson recently graduated from SUNY Old Westbury, and worked as an intern for Brookhaven and for the IAEA in Vienna last summer.

(over)

## Air Quality Study Focuses on New England

- In a multi-organization effort to identify why the Northeastern United States has some of the worst air quality in the country, scientists from Brookhaven Lab in collaboration with the National Oceanic and Atmospheric Administration (NOAA) and others will monitor air pollutants and their transport through the region this summer.
- Data will be collected from a G-1 Gulfstream research aircraft operated by the U. S. Dept. of Energy's (DOE) Pacific Northwest National Laboratory (PNNL) with instruments developed at both PNNL and DOE's Brookhaven National Laboratory, as well as from the Ronald H. Brown, the largest research vessel operated by NOAA.
- According to Peter Daum, the lead investigator from Brookhaven, "The plane has the ability to sample over a broad range of distances and can look vertically in the atmosphere so we can understand how these pollutants are distributed in space and how they relate to the sources of these pollutants."
- Understanding what's in the air that is transported to New England is essential to understanding the entire picture of air pollution in the region.



**G-1 Gulfstream research aircraft**

## Sight and Smell of Food Spikes Levels of Brain "Pleasure" Chemical

- Scientists at Brookhaven have found that the display of food – when healthy individuals are allowed to smell and see their favorite foods without actually eating them – causes a significant elevation in brain dopamine. Dopamine is a neurotransmitter associated with feelings of pleasure and reward.
- The study shows for the first time that the human dopamine system can be triggered by food even when there is no eating involved. It has also provided insight into the areas of the brain that regulate food intake. The research can give scientists new clues about what leads people to eat and to overeat.

### Events Open to the Public

*Summer Sunday Tours, Sundays – July 14 through August 25, 10 a.m. to 3:00 p.m. Free*

*Pianofest, Wednesdays July 24 and August 7, noon, Berkner Hall:* Pianists, selected by Pianofest Director Paul Schenly from this year's enrollment at Pianofest in the Hamptons, will give piano recitals on both dates. Free.

Due to heightened security, everyone 15 years of age and over entering the Laboratory must have a photo ID.