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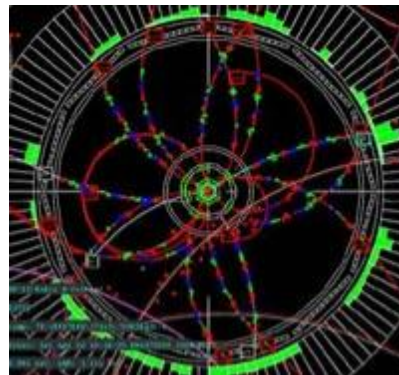
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B Factory Resumes Operations

By Matthew Early Wright

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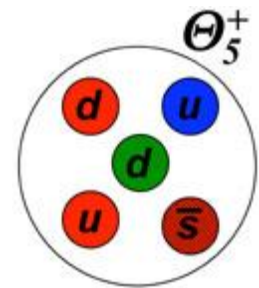
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[See whole story...](#)

Evidence Mounts Against Pentaquarks

By Heather Rock Woods

They're exotic. So exotic they may not exist. Pentaquarks are mysterious particles—whose existence is still in question—composed of four quarks and an antiquark. Quarks usually pair up to make mesons (like the B particles PEP-II produces) or flock together in triplets to make baryons like protons. Exotic baryons refer to pentaquarks, whose quantum numbers cannot be reduced down to those of regular baryons.



[See whole story...](#)

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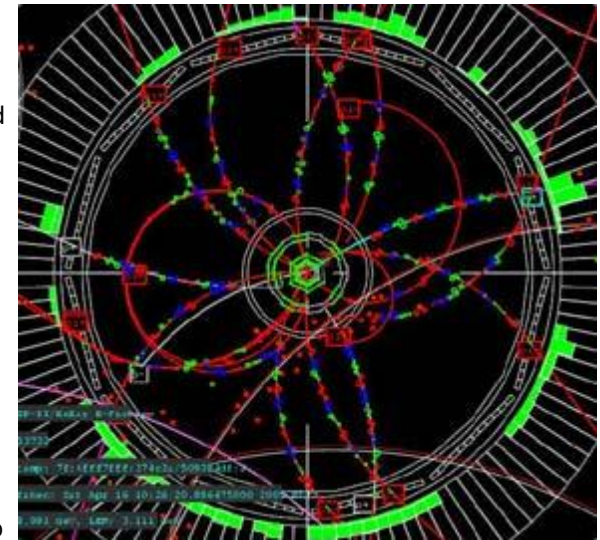
"After more than two weeks of collisions, PEP-II has over 65 percent of its former peak luminosity," said John Seeman (AD), head of the Accelerator Department. "This has been the best beam turn-on so far, and we are very pleased. The support personnel and maintenance staff have done an excellent job."

Director Jonathan Dorfan suspended operations of all accelerators at the Laboratory last October, when an electrical accident left a contract electrician seriously injured. The Lab has since been working to address safety concerns raised by the DOE's review board.

Dorfan assembled validation teams to ensure the safe restart of operations for the Lab's major accelerator facilities. SPEAR3 completed its validation in January and was operational soon thereafter. The B Factory's validation team approved the restart on Thursday, March 24. Since then, the staff has been working hard to restore operations after the lengthy shutdown.

"I don't remember the last time the accelerator complex was off for this long," said David MacFarlane, spokesman for BABAR. "Everyone involved with the B Factory is excited to resume data collection." This excitement is tempered by a renewed commitment to safety at the Lab.

According to Seeman, the B Factory staff has updated key protocols and made several hardware upgrades to enhance safety. "We are thrilled to be up and running safely, starting to provide data to the BABAR detector," he added.



Cross-sectional view of the BABAR detector, showing one of the first Run 5 examples of an e^+e^- collision producing multiple long-lived charged and neutral hadrons in the inner parts of the detector. Hits from traversing charged particles are visible in the silicon vertex tracker and drift chamber, showing curved trajectories in the solenoidal magnetic field.

(Image courtesy of David MacFarlane)

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The B Factory is addressing some of the most perplexing questions in physics. Stated broadly, the experiment hopes to answer why matter won out over antimatter in the first few milliseconds following the Big Bang.

But the B Factory is not the only experiment pursuing this goal. The Belle detector, at KEK in Japan, has been collecting data while the BABAR detector sat idle.

"We've been watching the competition collect data steadily over the last five months," MacFarlane said. "Now that the B Factory is running again, people are feeling much more upbeat."

MacFarlane said recent upgrades will eventually allow the B Factory to collect data 40 percent faster than before. At this rate, the team should be able to double the total data set by next summer.

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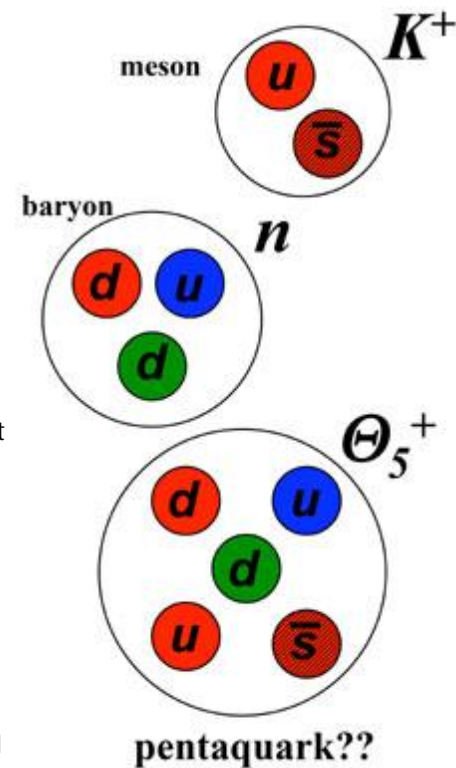
Two years ago, the first claim to see a pentaquark set the high-energy and nuclear physics communities abuzz. Twelve experiments then looked for pentaquarks in various ways and claimed to see them. To date, another 17 experiments have searched but seen nothing, including BABAR, and a Jefferson Lab experiment that announced in April it had found no signs of pentaquarks.

"It's raising very serious issues of existence for this thing," said Bill Dunwoodie (EB). "It teaches you again how important it is to do these experiments with very high statistics and very good mass resolution."

BABAR has both—very large samples (high statistics) of expected mesons and baryons and excellent mass resolution—with the ability to resolve signals from particles with small mass width. BABAR's negative results, using different search methods, have two orders of magnitude more statistics than experiments using comparable methods that claimed to observe a pentaquark signal.

"We have enough resolution to see a particle with a narrow mass range, the narrow width claimed for pentaquarks. We see nothing, lots of nothing," said Valerie Halyo (EE), co-convener of BABAR's Pentaquark Task Force.

As unconfirmed particles go, pentaquarks fall into a nebulous realm, unlike the top quark, for example, whose existence and mass were clearly predicted before discovery.



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"There's no reason for them not to exist. Theories can accommodate them, but theories don't predict them," Halyo said.

As the BABARians see it, there are shortcomings to the pro-pentaquark experiments, the biggest being small sample sizes (low statistics) and uncertain understanding of the background (events not of interest but in the same mass region). The smaller the sample, the easier it is to mistake a statistical fluctuation for a signal, or to accidentally include or exclude background events that affect the strength of the signal.

Experiments making positive claims produced only dozens of supposed pentaquarks, while BABAR produced millions of 'control particles' (which help calibrate an experiment) with a similar mass but decaying into a regular baryon and a meson.

Another concern is that the experiments were not conducted blind. Long a standard in medical trials, blind experiments in particle physics do not reveal the answers until researchers have finished their analysis. This helps prevent consciously or unconsciously fitting data to the expected or desired solution.

The recent flow of pentaquark papers illustrates that negative search results do not frequently get reported in scientific literature. Only after the first published claims generated interest did some experiments publish old data finding no pentaquark signals.

"Sometimes negative results are the most important; they can refute claims or constrain theories," said Pat Burchat (BABAR), co-convener of BABAR's Pentaquark Task Force.

BABAR searched for almost all members of the controversial pentaquark family. In a paper submitted recently to Physical Review Letters, the collaboration showed the lack of any pentaquarks in a sample of 500 million events, and said with a 95 percent confidence level that the production of pentaquarks is suppressed by a factor of four to eight relative to that of regular baryons—if they exist, they would be produced at rates an order of magnitude lower than for regular baryons of similar mass.

BABAR also used their data in an unusual way to take advantage of possible pentaquark production through electro-production. The collaboration selected the events produced when deflected electrons and positrons crash into the walls of the beam pipe (instead of each other). This technique is similar to performing a fixed target experiment, like the HERMES experiment in Germany that claimed to see pentaquarks, except the BABAR experiment yielded more data. At the recent winter conferences, BABAR presented its electro-production results.

"In effect, we did an experiment similar to theirs 200 times and put all the data together. We see there's no structure (no pentaquark signal)," said Dunwoodie.

The recently announced results from Jefferson Lab's high-statistics CLAS experiment directly refute SAPHIR, a pentaquark-claiming experiment with two orders of magnitude fewer statistics.

Dunwoodie, whose term on Jefferson Lab's physics advisory committee just ended, said the CLAS collaboration and lab management have made extensive detector calibration efforts and have emphasized the importance of

A meson (shown top) is composed of a quark and an antiquark, a regular baryon (center) consists of three quarks, and a pentaquark (bottom) is proposed to have four quarks and an antiquark.
(Image courtesy of Pat Burchat)

producing large data samples which are very well understood.

Two earlier low-statistics CLAS experiments, investigating different production mechanisms, claimed to observe pentaquarks. One of those has now gathered 10 times more statistics, and plans to announce the new findings this summer. The other proposes to collect an order of magnitude more statistics next year.

"We're anxiously awaiting those CLAS results," said Burchat. "If they still see the pentaquark, and they used techniques to minimize experimenters' bias, then we have a problem theoretically: why are they produced in some experiments and not in others? If this is confirmed, not only will pentaquarks be exotic in internal quantum numbers, but exotic in dynamics (how they are produced) in ways that will take a lot of explaining."

In the meantime, Halyo has enjoyed the search at BABAR. "We are a fun detector. We can do B physics and more," she said.

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Second GLAST Tower Installed

By Matthew Early Wright

GLAST has started to take physical shape with the installation of the second tracking tower last month. Now the team can perform the first tests ever of multiple towers in the grid array. Researchers expect to learn much about how the towers and the analysis software will cooperate to eventually produce sharp images of the gamma-ray sky.

This is the second major milestone in the instrument's construction since the first tracker arrived from Italy in late January (see *First GLAST Tracker*, TIP, February 4, 2005). Eventually, 16 such towers will constitute the main array of the instrument, known as the Large Area Telescope (LAT) grid.

"When the hardware finally comes together, that's an exciting time," said Lowell Klaisner (GLAST), LAT project manager. "It gives a whole different feeling than working through technical details."

The GLAST team celebrated the installation after the All Hands meeting on April 13.

Each tower consists of a silicon strip tracker detector, a cesium iodide calorimeter, an electronics unit and an individual power supply. The complex design of the LAT towers makes installing them a delicate task. Now that the first two have been installed successfully, team members expect that the rest will go in just as smoothly.

"The mechanical assembly went together flawlessly, with only minor issues that were easily addressed," said Elliott Bloom (EK), team manager for Integration, Testing and Calibration (I&T). "It's a big sigh of relief, a big celebration."

Though the towers function as individual units, it is also important that they work well together. Depending on the angle at which a gamma ray strikes, a single event may leave particle traces across two or more towers. In



GLAST Integration, Testing and Calibration, Quality Assurance and Tracker teams shown at the LAT GRID on April 11, shortly after its completion.

(Photo by Diana Rogers)

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this situation, it is important for the trackers to yield consistent information and for the software to reconstruct an accurate picture of the event.

As the LAT takes shape, the team will perform more involved tests to see how the LAT functions as a unit. These tests will examine not only how the towers function together, but also how well the system software can integrate data from separate towers.

The I&T team observed the first tracks through both towers last week. A graphic of the muon tracks through both towers has been posted to the Web site at (http://www-glast.slac.stanford.edu/IntegrationTest/SVAC/Instrument_Analysis/Meetings/04292005/Run-135001342/TwoTower-v4.gif).

"This is the first time we've seen a track in more than one tower – ever," Bloom said. Further analysis of these two-tower tests will let the researchers know what areas need work. "We will see if there are any differences in the individual towers, and how their geometry reacts."

The type of high-energy gamma rays that GLAST will image in space do not penetrate Earth's atmosphere, so the team has to rely on other sources to test the LAT array here on Earth. Cosmic rays can be used to test the tracker units. But the team needs a different strategy to test data processing hardware and software, since cosmic rays do not strike frequently or with enough energy to reflect the high rate of information GLAST will collect in space.

"We do simulations in the test bed to reflect the full event rate," Klaisner said. "This will show that the computers can handle the data processing."

Collaborators at Ohio State have developed software that can generate a large number of random events. This information is fed directly into the tower electronics module, producing an accurate simulation of actual gamma-ray data.

"The signals from the simulation are identical to what you'd get from a tracker," Klaisner said. "And real electronics and real software are processing the signal."

Another major milestone will come with the installation of the next two towers into the grid by the end of May. Testing four towers together can give enhanced three-dimensional resolution over that offered by only two towers. It will also present I&T team members with challenges they have not yet faced.

"Four trackers form a quadrant, which means new issues," Bloom said. "We will have to install cable trays, flight cables, and additional support structures. But from there, each quadrant is identical."

Klaisner is proud of the team and their latest accomplishment. "It's a credit to the people involved," he said. "The installation went very smoothly, and I expect it will go just as smoothly 14 more times. Then we'll be done."

For more information, see:

<http://www-glast.slac.stanford.edu>

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From summer employment to various summer school programs, SLAC provides wonderful opportunities for young people to learn about and participate in the work we do here at the Lab.

We have to remember, though, that they are young and need our help and instruction to identify and avoid safety hazards. It is not always easy to tell young people what to do. Some think they already know everything. But we cannot afford to take chances when it comes to safety.

The most important thing that you can do is teach your young employee about the Integrated Safety Management System. It is our responsibility and sometimes our challenge to get young workers to recognize that there are safety issues on the job and there are steps they have to take to prevent accidents.

We have to take the time to instruct them, show them and watch them. Teach them to go through the mental checklist of the scope of the work, identify the hazards, control the hazards, perform the work within the controls identified and then assess the work and look for and communicate improvements.

One of the most important things we can do is set a good example. There's no point in telling a teenager to perform a job a certain way—the safe way—and then cutting corners on safety ourselves. They will do what we do, not what we say. And working safely is everyone's job.

As you plan for student workers this summer, make sure to include safety instruction. Instilling safe work practices may be the most important thing young people can learn during their time here.

For more information, see:

<http://www-group.slac.stanford.edu/hr/e/2005OverviewforSummerProgram.html>



*Summer Students gain valuable experience working at the Laboratory
(Photo by Diana Rogers)*

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Success Stories from the Academic Career Counseling Center

By Linda DuShane White

Since 2003, Pauline Wethington (COM/HR) has spearheaded the Academic Career Counseling Center at SLAC as a career counselor. Employees' stories of inspiration, hard work and challenge have emanated from the Center, stories that may motivate others to follow their dreams of further education or career advancement.

The Academic Career Counseling Center is open to all SLAC employees and their families. For those interested in getting further education or changing careers, take advantage of this outstanding free program. It is important to realize, too, that SLAC employees are eligible for academic financial support, using funds from the Stanford tuition program, as well as STAP funds and money for text books.

Three stories of dreams fulfilled are spotlighted here.

Carl Blankenship

Carl Blankenship (ESD) found out about the Academic Career Counseling Center by going to the website at: <http://www2.slac.stanford.edu/career/>



He went to see Wethington to discuss finishing his bachelor's degree. "I had traveled around a lot, gone to several colleges. What Pauline did for me was get me focused. She was very helpful in helping me gather my transcripts. She helped me get organized, showed me where to get funding, and did a lot of the footwork for me."

Blankenship had to decide whether to attend traditional classes at San Jose State or accelerated classes at University of Phoenix (UOP), which he thought would be too expensive. "Then I learned what Stanford would pay." He chose UOP and now has his coveted degree.



(Photo by Diana Rogers)

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(Photo by Diana Rogers)

"The UOP accelerated program was a good fit for me, with a job and a family. Every five weeks you finish a class, you see results fast." Discouraged by past attempts to complete college, Blankenship says of Wethington: "She was very good at asking me to write questions to decide what my goal was, to extract the information she needed to help me achieve that."

"She helps the average person to find out what they want to do, and how to do it."

Gloria Azevedo

The Wall Street Journal is recreational reading for Gloria Azevedo (BSD), so naturally she is going for her A.A. in business at DeAnza.



(Photo by Topher White)

"At first I was a nervous wreck. Now I'm encouraged with my progress." Azevedo has had to learn to prioritize her many tasks at work, home and school. At Wethington's behest, she took a stress management course followed by a class in study skills. "I'm starting to enjoy it, finally."

"When I first decided to do it I was in expediting in the Purchasing Department. I put in my employment review that I was going back to college, then I had to follow through." Everyone in her department has been very supportive. After receiving her Business Certificate, she applied for a promotion and is now a Procurement Assistant.

It's been a long haul for Azevedo to reach this point. "I had tried about 12 years ago to go back [to school] on my own. I failed. There wasn't anybody to go to with my problems. Now when I have problems I go to Pauline instead of dropping out."

Lovetta Dunn

"When I went to Pauline I was seeking a return to college," shares Lovetta Dunn (ESH). Away from the academic world for many years, Dunn needed help erasing an administrative error made on her college records.



(Photo by Diana Rogers)

Because Wethington knows how to cut through academic red tape, she was able to get the error corrected, thus clearing the path for Dunn's reinstatement. "I don't know how I would have done it without her. I probably would have gotten discouraged."

Dunn is taking classes at DeAnza in the summer and at San Jose State during the school year. She expects to get her B.A. in Sociology to help her reach her heartfelt goal. Motivated by the nationwide grief following the tragedy of September 11, she wants to be a grief counselor. She says of the Center, "It's the best thing that ever happened. I'm really excited."

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Supercomputing (SC|05) Science Education Program for Teachers

By Cathie Dager

The annual International Conference for High Performance Computing, Networking and Storage (SC|05) is being held November 12-15 in Seattle. Under the theme 'Gateway to Discovery', SC|05 will showcase how high performance computing, networking, storage and analysis lead to advances in research, education and commerce. The SC|05 Education Program is one of the most innovative and exciting opportunities available to faculty, undergraduate students and K-12 instructors.

The application deadline for the SC|05 Education Program has been extended to May 23.

For more on SC|05 Education Program, see the Purdue site:

<http://wwwdev.itap.purdue.edu/newsroom/sc05/newletter3.htm>

For more information on SC|05, see:

<http://sc05.supercomp.org/>

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Youth Opportunity Program Has Slots Available For Your Jobs

Do you need student support this summer? Is your budget tight? Hire a Youth Opportunity Student and pay only half the hourly rate for the support you need.

Employment Services has received a record number of applicants for this program, many are over 18 years old and there is funding for more slots than in previous years. The Youth Opportunity Program is a 10-week program running from June 22 to August 31 for students between the ages of 16 – 22. This program, funded in part by Affirmative Action, is designed primarily to provide supplementary income to families in financial need, and to give entry-level students exposure to the work place while allowing them the opportunity to enhance their job skills in full time positions.

Contact Diedre Webb at: Ext. 4744, dee@slac.stanford.edu

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MILESTONES

Service Awards

5 Years

Eriksson, Thomas (ESRD), 5/8
 Focke, Warren (EK), 5/15
 Gordon, Geovanni (MFD), 5/1
 Graf, Norman (SLD), 5/1
 Nguyen, Tieudao (MD), 5/1
 Rogers, Jasmine (BIS), 5/1
 Sundaita, Nizam (PUR), 5/1
 Wright, Dennis (SCS), 5/1

10 Years

Fry, Jack (ESH), 5/1
 Li, Zenghai (ACD), 5/15
 Russ, Ray (RP), 5/1

15 Years

Anderson, Scott (MM), 5/9
 Conrad, Alan (PC), 5/1
 Locke, Gibson (REG), 5/4
 Shewchuck, Lori (ESRD), 5/7
 Simpson, James (BSD), 5/7

20 Years

Bologoff, Gregory (PUR), 5/6
 Church, Teri (SCS), 5/1
 Dormiani, Mohammad (AD), 5/11
 Moss, Thomas (MFD), 5/6
 Winston, Alan (ASD), 5/1

25 Years

Cordova-Grimaldi, Boni (ESD), 5/6

35 Years

Clay, Percy (CEF), 5/4

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40 Years
Parish, Sunnie (RD), 5/11

Deceased
Changnon, Harry, formerly with BSD, age 85, on April 10, 2005
Seymour, Angie, formerly with ARDB, age 68, on March 31, 2005

To submit a Milestone, see: <http://www.slac.stanford.edu/pubs/tip/milestoneindex.html>

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See Awards and Honors at: <http://www.slac.stanford.edu/slac/award/>

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SLAC Hosts International HEP Technical Safety Forum

By Jack Hahn

SLAC hosted the 5th International High Energy Physics Technical Safety Forum April 11-15. Safety professionals from 15 institutions including laboratories in Europe, China and the U.S.

This Conference is held approximately every 18 months, and has presentations on a wide range of technical and programmatic safety issues associated with such topics as Electrical, Personnel Protection, Large Experimental Equipment, Construction, Photon Science and Subcontracting. Participants also made a visit to the U.S. Geological Survey in Menlo Park to assess some of the emerging issues surrounding earthquake and Tsunami research done at this facility. The next Safety Forum will be hosted by the Rutherford Appleton Laboratory in England in the fall of 2006.

Presentations from the Forum can be found at:

<http://www-conf.slac.stanford.edu/itsf05/presentations.htm>



*Participants at the safety forum.
(Photo by Diana Rogers)*

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Trees That Climb The Sky

Oaks of the Stanford Linear Accelerator Center

Photography & Poetry by Lenore W. Horowitz

May 5 to June 15, Research Office Building 48



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Giants vs. Athletics

Reserve your tickets now for SLAC @ S.B.C.

Sunday, May 22, 5:05 p.m.

There will be buses from SLAC to the SBC Park.

Tickets are \$24. For more information, see:

<http://www-group.slac.stanford.edu/hr/er/SLACATPAC/giants.html>

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16th Annual Juneteenth Celebration

Friday, June 17

3 - 6 pm, Cafeteria Picnic Area

Please mark your calendar and come join the party!

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Kids Day is Coming!

Wednesday, August 10

Registration begins July 12

Be sure and schedule this into your summer plans!
This year, there will be some new workshops in Optics, Electric Motors and more!

For more information, contact Teresa Troxel, Ext. 3135

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Corrective Actions For Safety Violations

SLAC Human Resources is supplying this information to keep the Lab informed of the actions taken to ensure adherence to our safety requirements. HR will provide this data on a quarterly basis.

During the fourth quarter of 2004 and the first quarter of 2005, SLAC implemented the corrective action process for employees and, in two cases, their supervisors in seven different incidents. The incidents were: working without a JHAM; impairment due to alcohol; failure to use Personal Protective Equipment; two instances of failure to follow procedures; two instances of the smell of alcohol on breath and two instances in which supervisors were not diligent in carrying out their supervisory duties. The corrective actions included counseling, verbal warnings, written warnings, a final written warning and a two-week suspension.

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Important Security Issue: Running File Sharing Software at SLAC

By Bob Cowles

On June 28, 2004, a memo entitled 'Use of SLAC Computing Capability to Illegally Download Material' was addressed to all SLAC Staff and Visitors (see <http://www-group.slac.stanford.edu/hr/Important/2004-06-28.html>).

The memo describes SLAC policy and quotes Stanford University policy on downloading copyrighted or pornographic material from the Internet. Here are some important quotes from that memo.

Stanford University Policy (*applies to the entire SLAC community*).

Stanford is committed to facilitating access to information through its computer networks as part of its mission to pursue research and create knowledge. However, the university's research and teaching mission also depends on respect for the rights of intellectual property and the university will not facilitate the pirating of intellectual property through its computer networks. ... Sharing music, videos, software, and other copyrighted material in violation of copyright laws can expose you and others to legal sanctions, as well as sanctions under Stanford's policies. Please do not put yourself, your friends, or your colleagues in that serious and difficult position.

SLAC Policy

We want to remind you not to engage in illegal downloading of copyrighted material such as music and films or the downloading of pornography from the internet. We also remind you of SLAC's obligation to follow up, report to the DOE Inspector General, and discipline any individual on site who does engage in such activity. Because SLAC is government funded, SLAC has an additional prohibition on misuse of government property.

Early Detection of Infected Computers

SLAC Computing Services (SCS) uses an analysis program that looks for patterns of network use typical of malicious software. This provides for early detection of computers on site that might be infected. While SCS has detected some infected machines, the more common results have been detection of machines running peer-to-peer file sharing software like Gnutella, Kazaa, Limewire, eMule, eDonkey. Due to the strong association of these programs with illegal file sharing, once the software is detected, SLAC is obliged to ensure that no copyright or other laws are being violated. As a result, computer security staff reports the use of file sharing software to Lab management for follow-up investigation.

From a computer security point of view, use of any of this software can be very dangerous—both to SLAC and to

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your own personal computing.

The peer-to-peer file sharing networks have been a major vector for distributing software or files that are 'wrapped' with adware, spyware, viruses and trojans in addition to the program you think you're getting. Also, even after you close the window, the file sharing software keeps running in the background and is exposing files on your hard drive to the Internet—including files you may not want to be visible.

SCS is asking you not to run peer-to-peer file sharing software on the SLAC networks (including the visitor network), or on a machine that you use to connect to SLAC via VPN or dialup.

Thanks for your understanding and cooperation.

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Order Traveler's Checks Early

Stanford has made some changes to their administrative procedures for handling traveler's checks. As a result, SLAC will no longer have a stock of traveler's checks on-site but will need to order them from campus as needed.

Effectively immediately, traveler's checks will need to be ordered at least one week in advance in order to pick them up from the Petty Cash Office. Traveler's check orders will be placed on Friday and will be available the following Friday for pick up. If a traveler cannot wait until the following Friday to pick up the checks, the requestor will need to go to campus to pick up the checks.

Please let me know if you have questions. The procedures for obtaining traveler's checks can be found at: <http://www-group.slac.stanford.edu/travel/>

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