



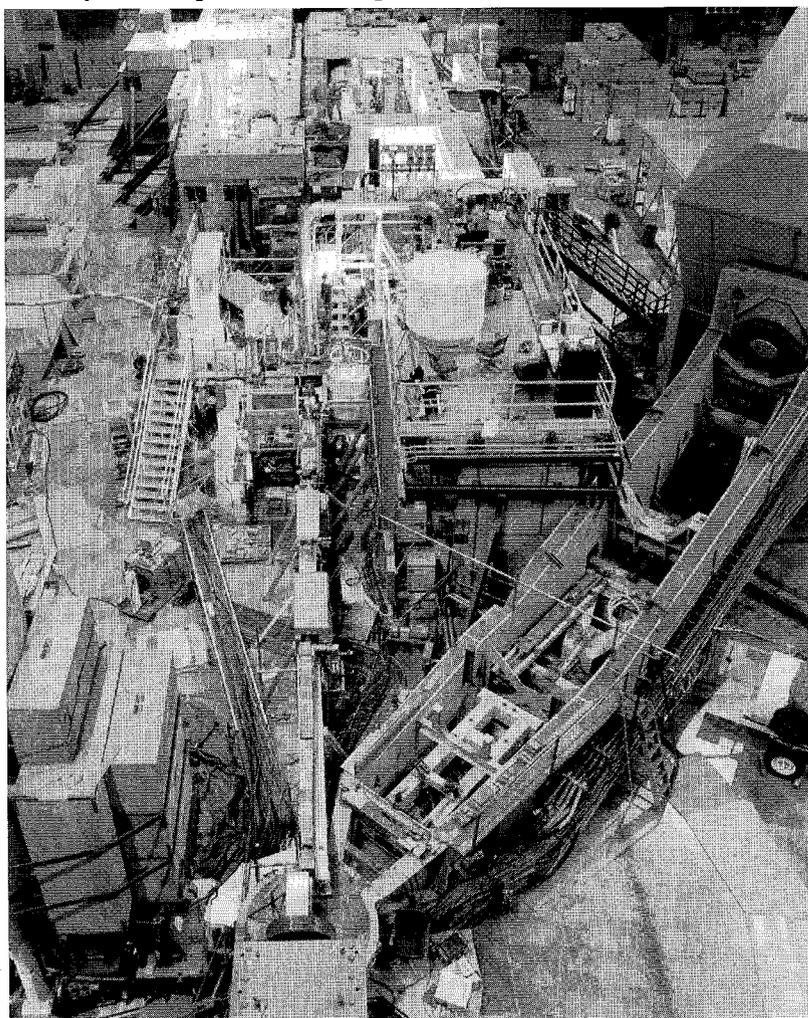
E-155: Closing in on Parton Spin

NINE MONTHS BEFORE THE run was to start, 85 +/- 3 physicists in experiment E-155 were confronted with a daunting challenge. The collaboration consisting of SLAC and 15 universities in the US and Europe faced the task of building a completely new spectrometer in End Station A on a shoestring, making extensive changes to the two existing spectrometers, and carrying out R&D on a new target material. The collective E-155 team spirit overcame "Murphy," and achieved all of these goals while also collecting the data from a three-month proposal in only two months.

E-155 scattered polarized electrons off polarized protons and deuterons to study how the spins of the quarks and gluons combine to produce the well-known spin properties of protons and neutrons. The polarized electrons scatter primarily from quarks with spins in the opposite direction. By

reversing the spin of the electron beam and measuring the difference in the number of times the electrons were scattered, E-155 measured the net contribution of the quark spins to the overall spin of the protons and neutrons. Measurements of these differences have shown that the quarks do not carry as much of the total spin of the nucleon as expected. If the proton and neutron spins do not come wholly from the quarks, where does the nucleon spin come from? The gluons hold the key. In addition to measuring the spin carried by the quarks, the experiment also shed light on the spin carried by the gluons. A third spectrometer was built at a larger angle to the beam to collect information on collisions in which the electrons transferred a larger amount of momentum to the quarks. These collisions probe more deeply into the swarm of gluons and pairs of quarks and antiquarks in the protons and neutrons and almost double the experiment's ability to see the indirect contribution of the gluons.

(continued on Page 4, Column 2)



Bird's-eye view of End Station A, showing E-155 target in middle foreground, and 5.5°, 2.75°, and 10.5° spectrometers in the background. The remains of the 8 GeV spectrometer can be seen to the right.

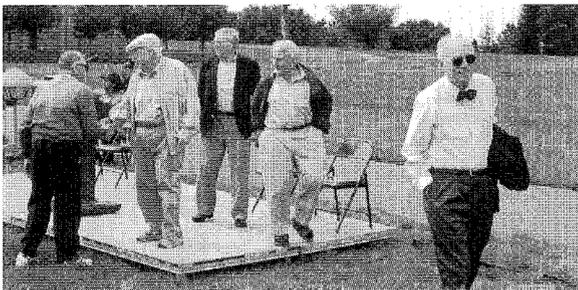
SPEAR- 25 Years



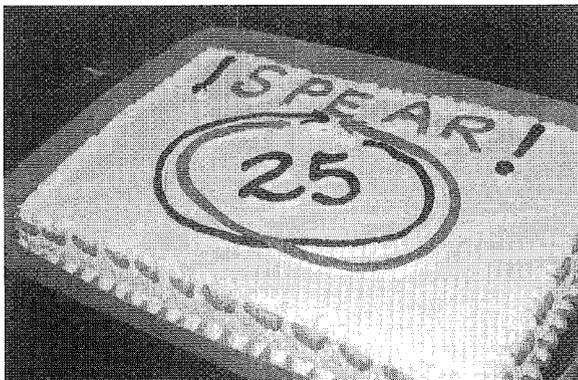
SLAC Director Burton Richter welcomes SLAC staff with some stories about the early days of SPEAR and its garden shed beginnings.



Since it wasn't raining, Palo Alto Fire Chief McDonald waved his umbrella to the music, to the delight of his audience.



(L to R) John Rees congratulates Burton Richter, while Arthur Bienenstock, Seb Doniach and Martin Perl move on.



There has to be cake to mark a birthday, so here's to SPEAR at 25!

ON APRIL 28TH THE SLAC Community honored three events, in particular the SPEAR Milestone Celebration held on The Green. Not only was it the 25th anniversary of colliding beams at SPEAR; it was also the 40th anniversary of the original proposal to build the linac. In line with this was the 100 year anniversary of the discovery of the electron.

Speakers at the event were: Burton Richter, SLAC Director; Martin Perl, SLAC Faculty Chairman; Arthur Bienenstock, SSRL Division Associate Director; and Sebastian Doniach, SSRL Faculty Chairman.

25 years ago, on April 28, 1972, the Stanford Positron Electron Asymmetric Ring first collided a beam of high energy electrons with a beam of positrons. The SPEAR facility began its career in high energy physics and found a reincarnation as a national user facility for synchrotron radiation research.

(Photos courtesy of P.A. Moore)



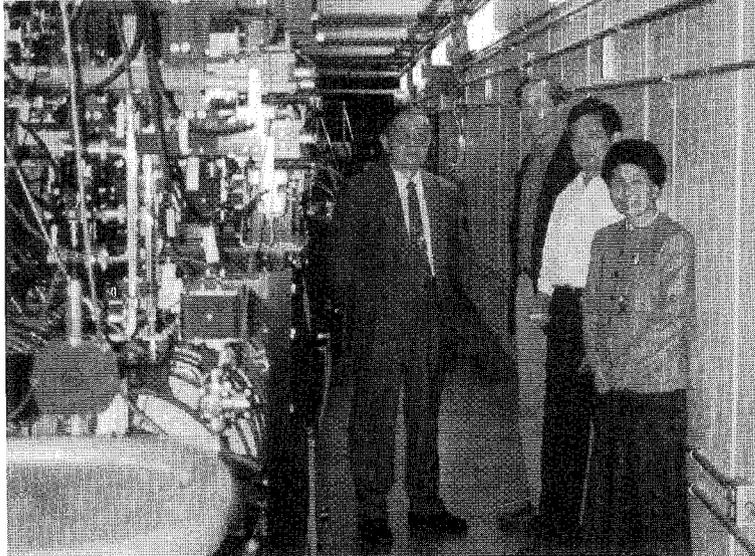
SLAC Archivist Jean Deken displays several variations on the SPEAR proposal.

B.A.S.E. Contributes to McKean Family Fund

THE BLACK ASSOCIATION OF SLAC Employees (B.A.S.E) would like to thank those in the SLAC community who contributed over \$1000 to the McKean family fund. The McKeans lost nine family members in early May, in the worst fire in East Palo Alto's history. Anyone wishing to contribute can send a check to the McKean Family c/o Wells Fargo Bank, 1071 El Camino Real, Redwood City, CA 94063. If you go to a local Wells Fargo Bank, the account number is McKean Family, #022441528.

--J. Hubbard

Chinese Academy President Visits



P.A. Moore

Pictured here (l to r) are President Zhou of the Chinese Academy of Sciences, David Burke and Juwen Wang of the NLCTA, and Madame Zhou during a recent visit by Chinese dignitaries.

U.S. Department of Energy
**FRAUD, WASTE, AND
ABUSE HOTLINE**
1-800-541-1625

Jazz Concert

As the song says, "Summertime and the livin' is easy..."
and music
floated over the trees during a jazz concert by Jamie
Davis and Friends.



"Cool Blues" - The Stanford Jazz, featuring Lee Alexander-Bass, Wayne Banks-Drums, Joe Hienemann-Piano, Joan Minor-Vocals, Jamie Davis-Vocals, and Robert Mayer-Guitar.

(Photos courtesy of P.A. Moore)

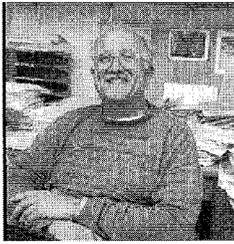


Members of the Fabrication Shop.



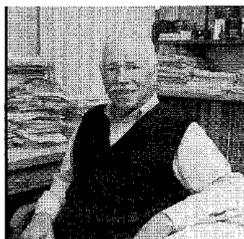
Technicians and sound crew mixing and mingling.

Faculty Milestones



PROFESSOR ROGER H. MILLER will become Emeritus Faculty as of June 1, 1997 after 37 years at SLAC. Professor Miller received his B.A. from Princeton University and his Ph.D. from Stanford University. He was appointed as a Research Assistant in the Microwave Laboratory at Stanford University from 1959-1961. Professor Miller started at SLAC in 1960 as a Senior Research Associate, and in 1974 was promoted to Adjunct Professor. Since 1983 he has been a Professor of SLAC and his main research interests have been wakefield suppression in accelerator structure, injection; positron sources, rf sources for the Next Linear Collider (NLC), and NLC test accelerator.

Professor Miller will continue at SLAC on a 50% basis to work on R&D for the Next Linear Collider.



PROFESSOR PERRY B. WILSON will become Emeritus Faculty as of September 1, 1997 at 50% appointment. Professor Wilson received his B.S. and M.S. from Washington State University, and his Ph.D. from Stanford University in 1958. From 1958-1959 he worked as Staff Physicist at Linfield Research Institute, McMinnville, Oregon. In 1959 he returned to Stanford as a Research Associate in the High-Energy Physics Laboratory. In 1964 he was promoted to Associate Director of Operations of the High-Energy Physics Laboratory, and to Senior Research Associate in 1966. He moved to SLAC in 1969 and was promoted to Adjunct Professor of SLAC in 1974. He has been Professor at SLAC since 1983.

Professor Wilson's research interests have been in the theory and design of rf systems for electron storage rings and microwave linear accelerators, and on the development of high power rf sources for next-generation linear colliders. He will continue at SLAC on a 50% basis to work on R&D for high energy linear colliders.

A REMINDER...
SLAC'S AREA CODE
WILL CHANGE ON AUGUST 1, 1997
FROM 415 TO 650

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"It's just work."

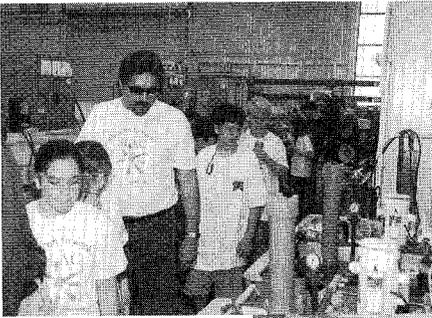
To achieve the desired goals, the experimenters had to work harder, smarter, and safer. Construction of the third spectrometer involved contributions from SLAC's Experimental Facilities Department (EFD) and Group A, American University, Caltech, Old Dominion University, Smith College, University of Massachusetts, University of Virginia, and the College of William and Mary. Upgrades to the overall system were handled primarily by EFD and resident collaborators from other institutions. These modifications included adding shielding around the various detectors, upgrading the data acquisition system, and even rewriting the testing procedures for the manufacturer of some of the electronics! Guidance of the experiment and getting the data onto the tape was handled by these groups along with the University of Basel, CEBAF, Clermont-Ferrand, Kent State University, Saclay, Stanford University, University of Michigan, and the University of Wisconsin. The University of Virginia, with technical support from EFD, was responsible for finding a way to use lithium deuteride (LiD) as the deuteron target material. This target material has almost twice as many deuterons as the deuterated ammonia used previously, which decreases the running time correspondingly. Intensive studies were required to make the material work in the relatively "warm" environment of the target, one degree above absolute zero. This represents the first time that LiD has been used in a high intensity production experiment.

"But does it work?"

As the experiment began, the Accelerator Department, building on a development started for the previous experiment, produced a pulse that was at least three times longer than the customary 120 ns SLED pulse, thereby allowing higher beam currents and hence higher data acquisition rates. To achieve these stretched pulses, the maintenance crews had to keep almost every klystron in the system humming perfectly. The efforts of the maintenance and operations people resulted in remarkable overall beam performance with hardware availability at 90% and mean time to repair at 1.2 hours. A tour de force, indeed!

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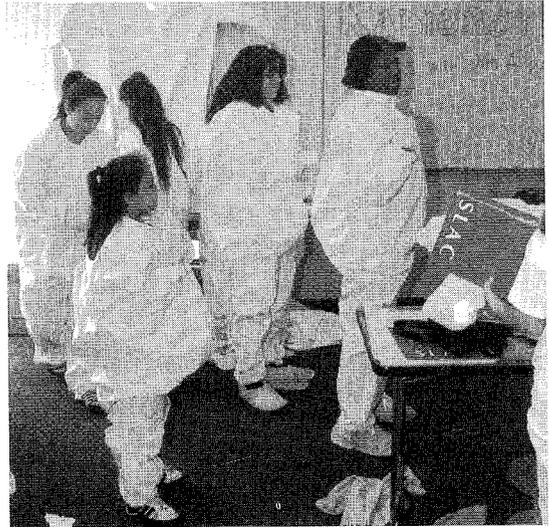
TAKE OUR CHILDREN TO WORK DAY



Ali Farvid's gold-plated dimes.



Reggie Rogers, CNC, machines a shark key chain "...right before their eyes!"



Jim Allan's Radioactive Bananas!

SET FREE TO DISCOVER what their folks do here, over 105 eager kids flooded SLAC on April 24, for what one described as, "The BEST ever!" Take Our Children To Work Day event.

Enthusiasm reigned supreme, from the morning hands-on experimental science exhibits, to the many excellent department Open Houses in the afternoon. Clad in commemorative T-shirts and canary-yellow radiation worker suits, the young people had fun trampling the site, searching for knowledge and insight about themselves, their parents, and the wonderful world of SCIENCE!

Post-event evaluation forms will be sent out to survey the participants' and sponsors' reactions to this year's organization and to solicit constructive recommendations for any future events. Special thanks to all the volunteers who worked at making this year's event such a success. We can't do it without you!

Photographs will be available for viewing shortly. An announcement will be made concerning the purchase of group and/or individual pictures. Check out the Website for more information on this event:

<http://www.slac.stanford.edu/grp/bsd/toctw-97.html>

Here are a few candid shots of the next century's Nobel prize winners!

--Jan Crehore



*Exploring Teamwork & Communication
Dear Liza: What's in that bucket?*

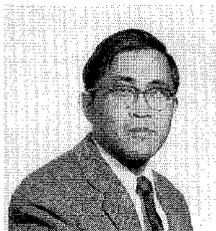


*The SLAC Home Page
draws rapt attention.*



*Cyberspace is fun for Peggy William's
daughter, Cynta.*

Min Liu Remembered



FOOK FAH (MIN) LIU, a postdoctoral research associate at SLAC during its first years of operation, died of liver cancer on March 28. Min Liu was a member of the streamer chamber group at SLAC from 1968 through 1970;

he then became a professor at California State University, San Bernardino. During the first few years at San Bernardino, he continued his research with the streamer chamber group, spending summers at SLAC.

Min was born in Calcutta in 1934, and graduated from the University of Calcutta in 1957. He got his first Ph.D. at Purdue and then came to Stanford in 1962 as a research associate at the High Energy Physics Laboratory, studying pion photo-production using the polarized photon beam. In 1966 he left to take an assistant professorship at Case Institute, before returning to Stanford in 1968. While at SLAC, Min took charge of the scanning and measuring of film from the streamer chamber, as well as participating in data analysis.

He started a program in Computer Science at San Bernardino when he found that university lacked one. He persuaded the University to offer a course in Fortran programming, which he taught. In his later years at San Bernardino, he devoted most of his effort to Computer Science.

A memorial scholarship in Dr. Liu's name has been established at the University. Contributions can be sent to:

Department of Computer Science
California State University, San Bernardino
5500 University Parkway
San Bernardino, CA 92407-2397

--Robert Mozley

WELCOME GUESTS AND NEW EMPLOYEES

The following people joined SLAC through mid-May: **Ian Adam**, Experimental Group B; **Chiquita Askew**, MFD; **Tomeka Askew**, MFD; **Lovetta Dunn**, ES&H; **Zev Kvitky**, AD; **Dinesh Loomba**, Experimental Group E; **Richard Mount**, SCS; **Christopher O'Grady**, BaBar; **Clemens Wermelskirchen**, SSRL; **Jingchen Zhou**, CD.

E-155 (continued from Page 4)

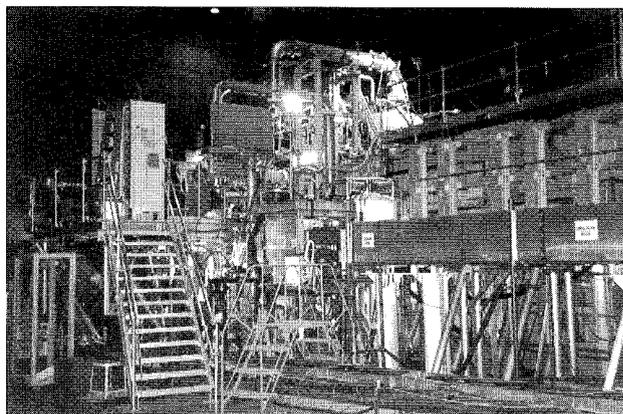
The experiment also demonstrated that the LiD target material was about six times as resistant to radiation damage as deuterated ammonia. This allowed the experiment to run at the higher currents without the need to replace the material as often. In fact, it was found that the material was a significant improvement over previous materials and it is likely that future spin experiments will build on the research done by the E-155 target group.

When the run concluded at the end of April, the experiment had collected in two months almost all of the data it had originally proposed to collect in three months. Without the 110% effort given by so many of the people involved, this would not have been possible. The E-155 collaboration would like to thank everyone who helped make the run a success!

"What's Next?"

Has the potential for world class physics in End Station A finally been exhausted? Of course not! A natural follow-on is the proposed E-156 experiment, which would make a more direct measurement of the contribution of the gluons to the nucleon spin by measuring asymmetries in the production of charm quarks. The combination of high energy and high intensity of the SLAC polarized beam would make it possible to measure the gluon spin more precisely than any other lab in the world in a relatively short time. Also waiting in the wings is a proposal to make a precision measurement of the electroweak mixing angle using Moeller scattering in a new kinematic region.

--Lee Sorrell



E-155 Target

Soaring to New Heights...



MIKE PALRANG GOT INTERESTED in miniature planes about four years ago when he helped his youngest daughter, then in kindergarten, make paper airplanes. Once

aware of the challenge of keeping small planes aloft, Mike turned to a more sophisticated method of making miniature planes, and then went on to enter competitions.

To make a plane, Mike starts out with Saran Wrap that is 35 micro-inches thick, about 1/10th as thick as your normal wrap. This is carefully crafted into the wings and tail, and is framed in balsa wood that is 1/6th as heavy as the usual wood. Ultra thin balsa wood also is used for the propellers. To give you an idea of how light the finished product is, an airplane with an 18 inch wing span, complete with rubber band for rudder control, weighs about a gram - the same as a dollar bill. Mike says this is a cheap hobby in which to participate. Considering that the balsa he uses for the propellers costs \$900 an ounce, you may wonder. But the wood is thinner than tissue paper, so a little goes a long way.

The next step in a hobby is sharing it with other enthusiasts. To that end, record trials are held to better national records. Such a competition was held at the Cow Palace on March 9th, with Mike entering a plane with an 18" wingspan. Mike smashed the previously held record of 22 minutes, 6 seconds that day. His plane remained aloft for 25 minutes, 44 seconds. The contest director verifies the class description of the entries.

Mike will now defend his time at the national competition, which is held each August in Moscow, Idaho.

Work Safe, Work Smart

Since the last workers' compensation claim of 4/14/97 involving days away from work was filed, there have been four more claims involving days away from work. The incidents occurred on 4/24/97, two on 5/8/97, and 5/12/97. The number of calendar days between claims was 20 days, 10 days, and 4 days, respectively. The record number of calendar days between claims remains at 67 days.

Adopt a Colleague

WOULD YOU LIKE TO make a new friend? Add a little to your vacation fund?

The SLAC Housing Office is experiencing increasing challenges in the face of the present housing crisis. We would like to assure our esteemed visitors and colleagues that they are truly welcome to SLAC and to California. But, we are coming up short. We are running out of places to house our visitors. If you live close to SLAC and have a spare room, you might consider renting to a SLAC visitor for a short time. This could be an opportunity to get to know some of our visitors and add some extra cash to your household budget.

Give the Housing Office a call for further details.

Ute Hayes	4132
Toni Campos	4133
Heidi Berndt	4130

Meet the Hazardous Waste Management Group



SLACHAS A STRONG commitment to preserving our environment and making sure that our research activities are in compliance with laws and regulations. To do that, one of SLAC's groups is concerned with Hazardous Waste Management. They are primarily responsible for identifying and characterizing waste, and arranging for pick up, storing and packaging. Waste is sent to various treatment, storage and disposal areas, and regulations require that the waste is tracked from the point of generation to the disposal location. Members of the group include (l to r) Ardie Jacobs, Joe Christy, Yolanda Pilastro, Karen Holtemann (seated), Ron Sanchez (seated) and Clair Stevens. Not pictured: Brian Lalor, Hillary Russak, Michael Scharfenstein, and James Smith.

Meet Sharon Jensen



THE THEORETICAL PHYSICS Group on the third floor of the Central Lab runs smoothly due to the expert administration of Sharon Jensen, the Theory Group administrator. Sharon has been at SLAC since January 1966. She started working in the Typing Pool and after six months moved to

the Theory Group -- and never left.

"I like the variety and the interesting people," she said. Sharon has constant responsibility working with the seminar, colloquia, and Guest Lecture Programs. She handles all of the paperwork associated with the theory group, including the summer visitor program and long-term visitor requests, assigning office space, and helping visitors with their needs.

"Working with TeX and the World Wide Web are areas that I particularly enjoy. Things constantly change and improve," she added. E-mail is another improvement that makes the life good at SLAC. Sharon has become very involved in bulletin board submittal and preparation for conference papers. She has mastered the skills needed to edit and submit papers to the various bulletin boards in addition to preparing them for the SLAC Web server and SLAC-PUBS. This includes: TeX files, slide preparation, postscript files, uuencoded and compressed files and archived files.

Working with the large numbers of theorists from all over is a pleasure, because Sharon can say "I knew them before they were famous." Sharon has seen SLAC post docs go on to faculty and research positions at major laboratories and universities around the world. Most theorists pass through SLAC again and again, so she gets a chance to see old friends regularly.

You are Invited to a Juneteenth Celebration

ALL SLAC EMPLOYEES ARE welcome to attend SLAC's eighth annual Juneteenth celebration which will be held June 20, 1997, 3:30 to 6:00 pm in the cafeteria picnic area. The event includes entertainment, an art and display show, door prizes, and a guest speaker. The theme this year is: **BASEBALL - "50 Years After Jackie Robinson."** There will be a barbecue at a cost of \$10 (\$5 for children) featuring ribs, chicken, hot links as well as other goodies. Look for the flyers posted around SLAC to get more information on this event, including purchasing tickets for the barbecue or ordering t-shirts.

Factinos

Brookhaven Lessons

Brookhaven's environmental issues are a lesson to us all that safety and science must be equal partners. Secretary of Energy Peña has emphasized the need to maintain the public trust in federal labs. All labs, including SLAC, will be increasing efforts in the areas of safety and community outreach.

Changing Stripes

If your parking place is gone, or has been restriped, it is all part of the Traffic Plan designed by us, the people of SLAC, who put traffic issues near the top of safety concerns two years in a row. Is parking at SLAC an occupational hazard or, as Pogo says, "We have met the enemy, and it is us!?"

Beam Success

If you still don't know, beam was achieved in the High Energy Ring of PEP-II for the first time last month. Congratulations to all involved!

Budget Progress

The Chair of the House Science Committee, James Sensenbrenner, is reported as making progress on issues regarding US contributions to the Large Hadron Collider to be built at CERN. Perhaps when the LHC issue is resolved, SLAC's budget will be settled as well.

Forward Looking SLUO Meeting

The SLAC Users were treated to a view of the future of High Energy Physics during the recent SLUO meeting, with talks on future linear colliders and networking needs into the next century. Congratulations to Uriel Nauenberg and his team for a well-attended meeting with excellent presentations.

Third Class Mail

By the end of June, Mail Services won't deliver third class mail unless it has a SLAC mail stop in the address. Make sure that you have submitted any necessary address changes if you wish to continue receiving a particular publication.

Sticker Shock?

Citations are being given to cars which do not have SLAC stickers. Reminder to get a sticker from Security, Bldg. 205, or get stuck with a ticket.