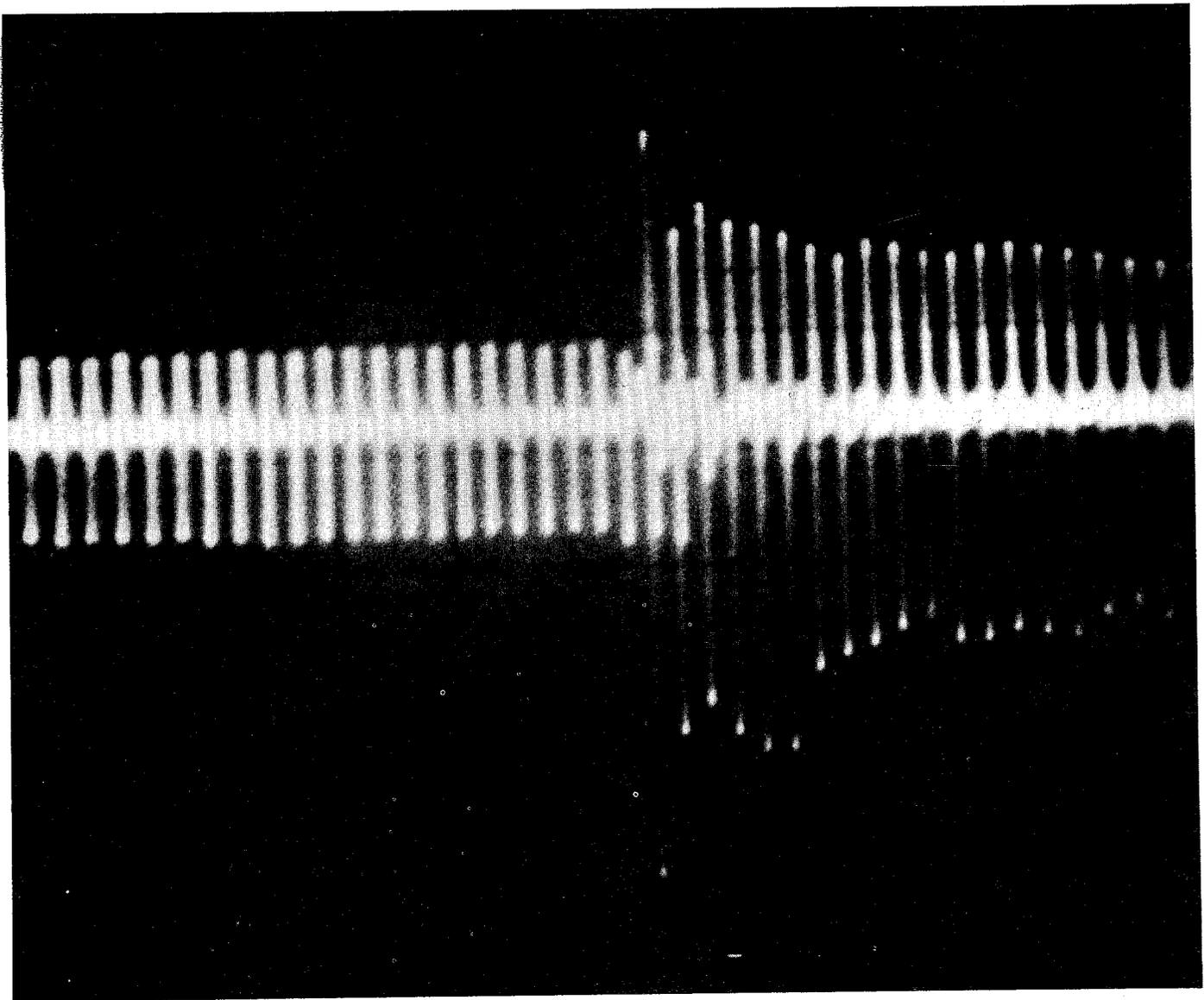


SLAC BEAM LINE

*One of the tragedies of life is the murder of
a beautiful theory by a brutal gang of facts.*
--La Rochefoucauld

Volume 14, Number 3

March 1983



SLC DAMPING RING STORES FIRST BEAM

Very early Sunday morning, February 27, a picket fence pattern on a very fast oscilloscope signaled the successful storing of beam in the SLC damping ring. The circulating electron bunch produced a pulse every time it passed a monitor at one point in the ring, making the series of pips on the left side of the photograph. At the center of the trace a new electron bunch was injected into the ring from the linac. The change in height of the following pulses is a result of the normal variations in the position of the beam which are damped out in the ring.

DAMPING RING STORES BEAM

Progress on the SLC damping ring has been rapid and regular; this is its third *Beam Line* cover in a row. On December 12 the beam was brought through the tortuous beamline linking the linac and the ring. On February 6 the beam was successfully injected into the ring, taking a few turns around. One or two good turns may deserve another, but this machine needs about one hundred thousand to do its job. Injecting the beam was just the beginning.

In one second the electron bunch travels a total distance of about 186,000 miles. There are several things which can cut the trip short. The magnets which bend and focus the beam must be properly aligned and their currents adjusted. Small errors in location or strength will eventually accumulate and the beam will wander into the wall of the vacuum pipe. Even with a perfect ring, or "lattice", the beam will soon spiral into the beam pipe as it loses energy by radiating x-rays. The lost energy must be made up at each turn by high-frequency voltage applied through rf cavities.

This was all well done, and the beam was stored. Although this ring is made to store a beam only for about one-hundredth of a second before giving it back to the linac and starting over, the half-life of the stored beam in these tests was over three minutes.

The next steps are to study the efficiency of the injection and how well the ring performs its job of damping down the oscillations of the stored beams.

THE DAMPING RING TEAM

The four happy physicists pictured at right celebrate the successful storage of electrons in the SLC damping rings. This team illustrates the cooperation going into the project: Roger Miller, standing at left, is in Accelerator Physics; Ted Fieguth, seated, is in the Experimental Facilities Department; Lenny Rivkin is a graduate student from Caltech; and Gerry Fischer is a member of the SLC project staff.

In addition to these four gentlemen, the experimenters who gave long weekends for the past month to bringing up the damping ring include Matt Allen, Terry Martin, John Rees, Burt Richter, Jack Truher, Jim Weaver, Steve Williams, and Mark Woodley.

Helmut Wiedemann was responsible for the conception and design of the rings, and Bill Davies-White was the chief engineer.

Most welcome and notable assistance was received from the Accelerator Operations Group, and over 150 SLAC staff members in every division and department.

NEW MACHINE FOR DESY

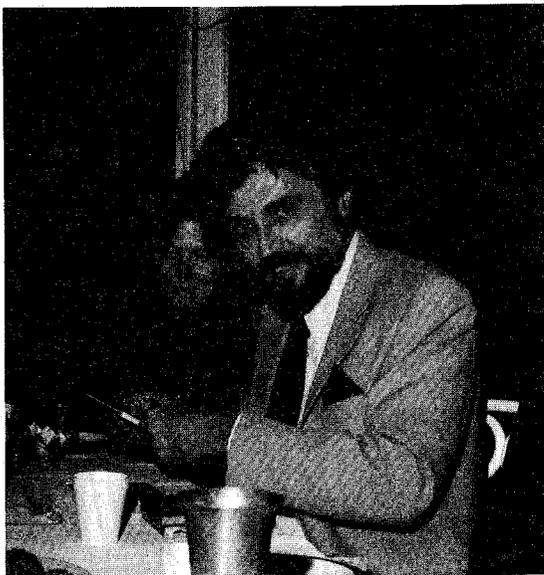
The German high-energy laboratory DESY has taken an important step toward approval of a new machine. The facility, called HERA, would collide 800 GeV protons with 30 GeV electrons.

In a telegram to SLAC Director W.K.H. Panofsky, DESY's Director Volker Soergel noted "The Federal Minister for Sciences and Technology, Dr. Heinz Riesenhuber, has taken a decision 'in principle' for the construction of HERA in connection with the 1984 budget planning."

All existing colliding-beam machines collide particles of the same class: electrons with positrons, protons with protons, and protons with anti-protons. The separation is a consequence of the very different characteristics of accelerators for electrons and the more massive protons. Overcoming this technical barrier will open up new areas of physics, including the detailed structure of the proton.

Protons are known to have a structure, generally described as a combination of three fundamental quarks. Electrons, on the other hand, appear to be simple charged particles. Electron-proton collisions are a clean way of exploring the proton structure. Most of what we now know about that structure, in fact, came from experiments in which electrons were scattered on protons in a hydrogen targets. With HERA that understanding can reach much deeper into that structure than possible with fixed-target experiments.





BILL LOCKWOOD LEAVES SLAC

Bill Lockwood resigned from SLAC on St. Valentine's day, 1983. After 15 years of SLAC budgets, he left to "go into the forest, to emerge only for an occasional TV fix or Big Mac break". Known in the Budget Office as the Maharaja of Metaphor, Bill will be missed for his expertise in budget management and for his warm heart and special sense of humor. Bill, who was recruited for SLAC in 1967, in the waning days of a stint in the U.S. Army, recalls that an early assignment was to "...work with some mad scientist in Group C who wanted to make particle beams collide. It was another three years before this crackpot scheme was actually launched, to emerge as SPEAR, probably the single most innovative and productive physics device ever invented. The SPEAR detector, which discovered the psi particle in 1974, was put together almost as an afterthought; it was budgeted in the *miscellaneous* category along with cable, shielding blocks and oscilloscopes".

Bill spent the next four years writing environmental impact statements when not otherwise occupied. The fruit of this effort includes the Environmental Impact Statement for PEP and for the original SLAC site (retroactively, of course, since SLAC had been constructed before environmental concerns had achieved legislative status), as well as the more recent (and highly successful) environmental assessment for the Linear Collider.

One of Bill's more difficult assignments was to impose order on the funding of the initial complement of PEP detectors. There were eight separate detectors to design and fabricate for PEP. The detector projects involved groups from several different Universities or laboratories, some of which were outside the United States.

-(Please see LOCKWOOD page 8)

CONTROVERSY AT SSRL

A recently announced proposal by three nuclear weapons laboratories (Livermore, Sandia, and Los Alamos) to do research at the Stanford Synchrotron Radiation Lab (SSRL) has become a controversial issue at SLAC. A group of SLAC scientists have spoken out in opposition to the acceptance of this proposal. A petition opposing the nuclear weapons related work has been circulated and over 280 SLAC staff members have signed it.

The nuclear weapons labs group wishes to construct an x-ray beam line which would be used to calibrate and improve x-ray detectors. The x-ray detectors are to be used to measure the radiation from exploding nuclear weapons. The research information gathered from the SSRL tests would not be classified and presumably would be available to the technical community. Also, the new beam line would be available to other researchers.

SSRL, which is not managed through SLAC but rather from the university, accepts proposals from researchers everywhere. Most of SSRL's work is applied materials research in which scientists use the particular qualities of the SSRL x-ray beams to investigate materials and processes for application in electronics and other high technologies. In fact, high technology companies are prominent among the sponsors of research at SSRL.

SLAC, on the other hand, only does research to discover more about the basic nature of matter. The very essence of SLAC's basic research and the necessity to communicate its results openly make SLAC scientists worry about the secretive style of weapons research and the compromising effect it might have.

Also there is an image problem for SLAC scientists. In the understanding of many Americans, atom smashers (e.g. SLAC) and nuclear reactors are not that dissimilar. It has been a main point of SLAC public relations to emphasize that we are not involved in reactor and weapons research.

How this issue will be resolved is not clear at this time. Proposals are normally accepted or rejected by the SSRL Director with the advice of a proposal review panel. The controversy and sensitivity surrounding the nuclear weapons labs' proposal suggests that perhaps the University will want to become involved in the decision.

-RCG

Basic research is what I am doing when I don't know what I am doing.

-Werner von Braun

Mike Acheff
 Louise Addis
 Ken Bailey
 Joe Ballam
 John Barreiro
 Wilson Becker
 Bill Beeger
 Mary Beth Beerbohm
 Dick Bierce
 Hardy Bowden
 Kurt Breymayer
 Karl Brown
 Bob Byers
 Rich Callin
 Merrill Card
 Al Carlson
 Vic Carty
 Joe Cobb
 Olen Cochran
 Janet Crew
 Ken Crook
 Urban Cummings
 Rod Curry
 Dave Downing
 Sid Drell
 Dorothy Edminster
 Paul Edwards
 Jim Ewing
 Dave Farkas



MARY BETH BEERBOHM has been Pief's right hand since 1965 but her affiliation with Stanford began at Hansen Labs in 1957.



GENE RICKANSRUD serves SLAC as Associate Director, Business Services. A man of many "hats", Gene's expertise extends also into technical fields.

Joe Faust
 Joe Fish
 Randy Fowkes
 Emmett Freitas
 Dick Fuendeling
 Manville Gan
 Ed Garwin
 Bob Gex
 Harry Greenhill
 Charlie Griffin
 Al Guidi
 Fred Hall
 Ralph Hashagen
 Dennis Healey
 Dick Helm
 Bill Herrmannsfeldt
 Sam Howry
 Earl Hoyt
 Glenn Hughes
 Jack Humphries
 Bill Jacopi
 Ted Jenkins
 Ken Johnson
 Ray Jones
 Joe Jurow
 Al Keicher

20 Year

A celebration honoring 20 years labor at SLAC was held at the SLAC Club on Wednesday, March 23, 1983. Awards were presented to all of the 104 members of the club. Our photographer, John Pief, captured many of the moments on film.



AL GUIDI was one of the original Systems Engineers in the SLAC Group. He has recently completed the damping ring design.



DONN ROBBINS has been successfully keeping the SLAC Beam Line running for Plant E.

wards

who have survived 20 the Stanford Faculty 9th. Pief passed out who were present and aptured some of those



original members of the nstallation Dept. Piping responsible for aspects of



at many years at SLACool as Chief Mechanical g.



Pief congratulates **ADA SCHWARTZ** for her contributions to SLAC which began in the Project M Reports Dept.

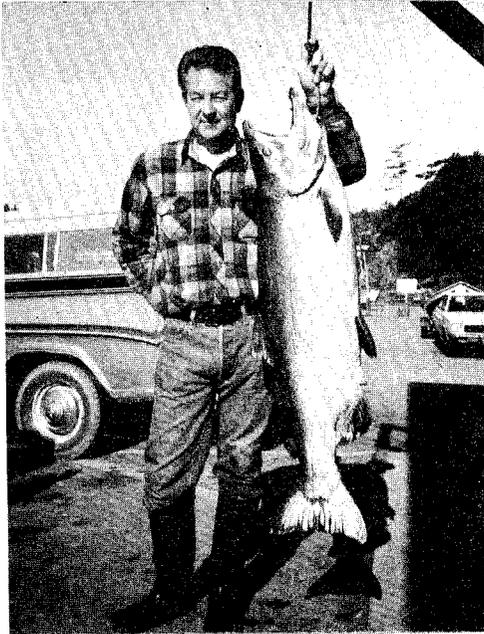


RAY YNEGAS, the fellow on the right, has been most recently working at PEP, installing and maintaining beam lines. Adele Panofsky hands Pief a pen for autographing a souvenir program.



A career Navy man before joining SLAC, **BILL LADEN** is now serving as the head of the Instrument Repair and Standards Lab Group.

- Ed Keyser
- John Kieffer
- Larry Kral
- Charlie Kruse
- Chuck Lacy
- Bill Laden
- Ray Larsen
- Rudy Larsen
- Bob Laurie
- Martin Lee
- Al Lisin
- Greg Loew
- Bill Lusebrink
- Roger McConnell
- John McKee
- Walt Messing
- Roger Miller
- Gerry Nelson
- Jack Nicol
- Frank Norton
- Pierre Noyes
- Lou Nunes
- Al Odian
- George Owens
- Jim Pardoe
- Dan Porat
- Vern Price
- Gordon Ratliff
- Gerry Renner
- Gene Rickansrud
- Donn Robbins
- Des Rogers
- Gus Sandoval
- Bill Savage
- Ada Schwartz
- Ron Seefred
- Knut Skarpaas
- Dave Soule
- Dick Taylor
- Glenn Tenney
- Paul Tsai
- Cornelius Van Egmond
- Frank Veldhuizen
- Maria Wallace
- John Wehner
- Alan Wilmunder
- Armin Wolff
- Ed Wong
- Ray Ynegas



THE PRIZE CATCH OF BOB BYERS

This is a true fish story. Bob Byers and his friend Tom Martinez belong to the San Jose Flycasters Club. For the last six years they have been travelling to Northern California and Southern Oregon for the fall steelhead and salmon runs.

Last November Tom drove up to Oregon without Bob and caught a 45 pound Chinook "King" Salmon on the Chetco River. It was believed to be the largest Chinook caught on a fly rod with a 10 pound leader in 1982. He called Bob in Cupertino to tell him about it. Bob drove right up and managed to hook and land a 53 pound Chinook. He did it using a borrowed fly rod with an 8 pound leader, which may qualify for a world record, incidentally pre-empting Tom's bid for fame. Tom was philosophical, his reaction was "that's the way the cookie crumbles."

Every fisherman should have a friend like Tom Martinez.

-HAW

MOPED TIP

If your moped won't run after sitting out in cold, wet weather, it may be due to water in the gas. Draining the carburetor might help. There is a drain screw at the bottom of the float bowl on the forward end. It can easily be reached with a screwdriver. Back the screw off two turns and let the fuel drain for a few seconds. The gas is highly flammable, of course, so keep away from flames and sparks.

CALLING FOR HELP

Most of us know that the SLAC extension to call in case of fire or other emergency is X2313. What many people don't know is that this puts them in communication with a dispatcher at the North County Emergency Communications Center in Palo Alto. From there, the dispatchers can contact fire and paramedic services, and customer service for utilities.

While the caller is speaking, the dispatcher relays information to emergency services using dual headphones with a foot-switch operated microphone. Usually more than one operator is on duty. Thus while one dispatcher is taking down the information, another is already routing the responding services to your location. The dispatchers track emergency service equipment and keep the information current.

What you tell the dispatcher is, of course, very important: the exact location of the emergency is essential; a phone number where the rescuers can call for more information is most important; and, of course, a concise description of the problem is most important of all. Of course, you can also get help in an emergency by using a fire alarm pull box.

Away from SLAC, dial the emergency number for your area (911 in Palo Alto) to reach an emergency center.

The Safety Office has bright red 2313 stickers for your telephone. We also have detailed safety procedures for emergencies. To get a copy call X2221.

-Fred Perego, Safety Office

DISCOUNTS ON IBM PERSONAL COMPUTERS

Substantial discounts are available to Stanford employees on personal computers. The IBM Personal Computer discount rate is now 25% or 30%, depending on the configuration selected, and the entire system or individual components may be ordered by SLAC employees directly through Ron Lynch at x2763.

HEARTFELT THANKS

Many thanks to all the people who donated blood at the last SLAC Bloodmobile visit. Seventy one people signed in, sixty six donated blood. Notice of future visits will be posted throughout the year.

-Nina Adelman

LOW COST BLOWER CAPTURES ATTIC HEAT

(The following article describing a clever innovation of SLAC employee Gordon Ratliff is excerpted from the January issue of the newsletter, *PGE Progress*.)

Attics heat up on sunny days, even in winter. Aware of this fact, Gordon Ratliff decided to tap that source of heat for the comfort of his family.

"I installed a small blower and thermostat on one end of some sheet metal duct and set it all up in the attics so it blows the warm air through a diffuser into the hallway," says Ratliff, who works at the Stanford Linear Accelerator Center.

He installed the equipment in October 1981 for about \$80. It qualified for a 55% tax credit and took only two months to pay for itself in energy savings.

He expects to save more than \$200 this winter compared with the 1980-81 season.

"It's easy to install," says Ratliff. "I'd suggest that people hire an electrician to put in the wiring and switch." They also should check with local building departments to be sure the installation complies with local codes and ordinances.

The blower costs about 15 cents per day to operate.



The current SERA Board of Directors: Joan Gardner, Norb Heinen (President) and Dave Hutchinson.

A HISTORY OF SERA

The SLAC Emergency Relief Association, SERA, is SLAC's home-grown charity; most of its supporters are SLAC employees. Its beneficiaries are the people for whom SLAC workers might "pass the hat."

SERA was conceived in tragedy. In March, 1967, Chris Schmierer of Drafting—a working mother of four—was involved in an automobile accident that left her paralyzed and unable to work. Not only was a large hat needed, but it would have to be passed again and again. Thus, the idea of an enduring charitable organization was born.

To be charitable, philanthropate; to be tax-exempt incorporate. So after considerable legal shuffling and delay, SERA was incorporated in 1968.

Since then SERA has continued to serve those in the SLAC community who find themselves in need of emergency financial assistance. Unlike most assistance groups, SERA's operating expenses are less than one percent. This is possible because the entire effort is volunteer. The current Board of Directors are Norb Heinen (President), Joan Gardner, and Dave Hutchinson. Dorothy Edminster is Secretary and Charlie Hoard serves as Treasurer.

SERA's funds come primarily from the payroll deductions of its members. Only fifty cents per month will make you a full voting member. You may also make a lump sum payment to SERA, or authorize a larger monthly deduction. In any case, we hope to have you join us in this worthwhile (and tax deductible) enterprise—SERA stands ready for SLACers who need a helping hand, but SERA needs your support in order to continue this effort. Contact one of the Directors or this writer.

—Charlie Hoard



On Friday, December 10 at the end of their scheduled run, the E-137 Axion Search experimenters threw a party to celebrate and to express their appreciation for the support they received. The photo above, taken in the main control room in MCC, shows some of the principals and some of the operators who delivered the beam. Left to right: Luke Mo, spokesman, Gerry Nelson, Finn Halbo, Patrick Smith (seated) Clive Church, Stan Ecklund, Wayne Linebarger, and Dave Tsang (seated).

NEWS & EVENTS...

SUNDAY FLICKS

- o Mem Aud at 7:00 and 9:30pm. \$1.50
- o Mar.13 The Paper Chase
- o Apr. 3 Raiders of the Lost Ark
- o Apr.10 Tron

ALMA TRIO

- o Fri., Mar.11, Works by Brahms, Schubert, Schumann, and Debussy, Dinkelspiel Aud, 8:00pm, \$4.00

TRAVEL MOVIES

- o Mem Aud at 7:45pm, Monday, \$4.00
- o Mar.21 New Zealand
- o Apr. 4 Belgium

VARSITY BASKETBALL

- o Maples Pavilion at 8:00pm \$5.00 or \$6.00
- o Mar.10, Thurs Oregon
- o Mar.12, Sat Oregon State



A VICTIM OF THE STORM

This mighty oak, which helped guard SLAC's front, fell during one of our recent storms. A passing look at the the amount of load-bearing wood remaining is enough to make one wary of using an old oak as a refuge from the storms that don't seem to ever end.

-(LOCKWOOD, continued from page 3)

Pier Oddone, a physicist from LBL was asked to conduct the liaison among the participants in this enterprise, and Bill Lockwood was assigned to keep Pier fiscally sound. No SLAC funds were to be commingled with funds otherwise allocated, etc., but the resulting detectors were supposed to be operational devices, capable of doing exciting physics, notwithstanding the parochial fiscal interest of the organizations involved. It is fitting tribute to Bill's capacity for diplomacy and tact that the first round of PEP detectors was completed, and that most of the participants in the endeavor remained on speaking terms. It is a talent we will surely miss here in the Budget Office.

We thank Bill for his 15 years of dedication to SLAC, and we wish him the best in his new adventures. Adios, Bill.

-Wayne Bennett



Jim Wright retired from Occupational Health Physics where he was an electronics technician specialist.

LIQUID HYDROGEN TARGET FAILURE

At 11:00am on February 16, Experiment E-136 came to an abrupt stop when the liquid hydrogen target flask ruptured. The hydrogen dumped into the vacuum tank which contained it until it was blown out the vent line. No hydrogen was detected in the experimental area.

This 65-cm long target was the longest ever used in the electron beam at SLAC. The mylar walls had been weakened by scattered radiation from the thin target windows and the hydrogen following a month of energy deposition rates up to 233 watts.

When E-136 resumes operation it will use a new all-aluminum target. Work on this target has been interrupted for the moment by work on another target for an interesting new experiment which is just being proposed.

-John Mark

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