

The Beam Line

VOLUME 5, NO. 1 **Stanford Linear Accelerator Center** MAY 1, 1974

High Energy Accelerators: The 1974 Frontiers

In future issues of the Beam Line we will include articles on interesting projects at other high energy physics laboratories in the world. The illustration lists all the world's high energy accelerators (electron or proton) with primary energy greater than one billion electron volts. (GeV)

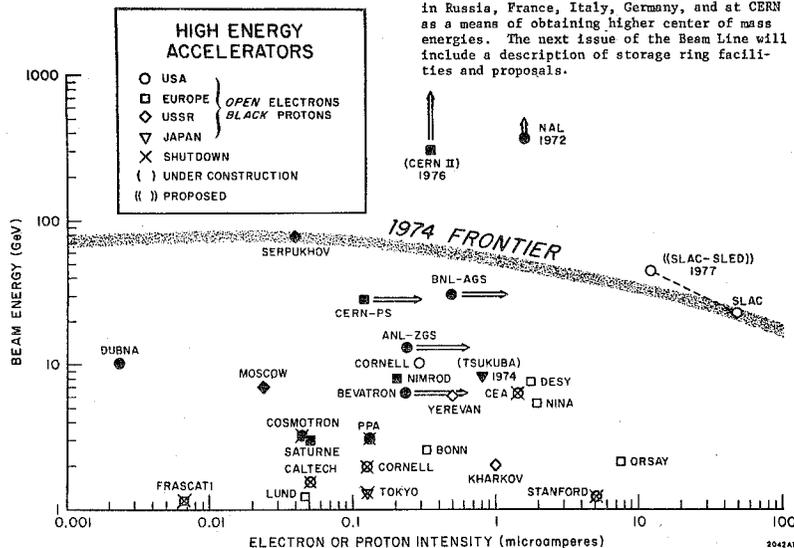
For example, the world's largest operating proton accelerator is located at the National Accelerator Laboratory in Batavia, Illinois. Protons are injected into the main accelerator and are accelerated to full energy in a nearly circular ring about four miles in circumference. At present the protons reach an energy of some 400 GeV (denoted by the arrow in the illustration). Although such large dimensions are nothing new around SLAC, the enormous size of NAL can be compared to the 480 acre SLAC site when one considers that the prairie land inside the circle comprising the NAL main accelerator occupies some 650 acres alone.

Potentially greater energies may be achieved at CERN Laboratory II scheduled, at present, to deliver 400 GeV proton beams by the

end of 1976. A super proton synchrotron (SPS) is currently being built in an underground tunnel about 1.36 miles in diameter spanning the French and Swiss frontiers and near to the Rhone River and the Jura mountains. Protons will be injected at an energy of 10 GeV by the existing proton synchrotron in CERN Laboratory I.

All by itself on the chart, is SLAC, illustrated as the world's most powerful electron accelerator at 21 GeV. The proposed SLED (SLAC Energy Doubler) concept would bring the SLAC beam energy to the higher level illustrated. This device consists of storing the microwave energy from each klystron in a set of cavities for a short time and then "dumping" this stored energy, together with the continuing power of the klystrons, into the accelerator. The result is a higher energy beam lasting for a shorter time. Feasibility studies for this new idea are currently in process.

Upon the completion of CERN II no further construction of these big machines is contemplated. At the same time, a new technique, the storage ring, is already being exploited in Russia, France, Italy, Germany, and at CERN as a means of obtaining higher center of mass energies. The next issue of the Beam Line will include a description of storage ring facilities and proposals.



Brookhaven Challenge Race

by Ken Moore

The long awaited challenge race between SLAC and Brookhaven National Laboratory is now in the planning stage. We expect to hold this event sometime in early May on a Saturday morning.

Runners, joggers and bicyclists are encouraged to prepare for this event.

The race will be run on the circular loop around the Administration - Central Lab Complex. The road is approximately 4300 feet long so it will be twelve laps for the runners and twenty-four laps for the bicyclists to complete ten miles and twenty miles respectively.

We intend this to be a fun event; so it is not important how fast you run or bicycle, just as long as you can finish the course.

Two representatives from Brookhaven will be coming to SLAC for detailed talks on this race and we hope to have complete information in the next issue of the Beamline.

Two of SLAC's younger runners, Bill Divita, a contract employee, and Gerald Putalaz from Bubble Chamber Operations competed in the marathon in Burlington on February 9th. For those who are not familiar with a marathon race the

distance is 26 miles, 385 yards. Bill turned in a fine two hours, fifty-seven minutes and Gerard did a commendable three hours, thirteen minutes. Anyone completing this sort of a race is to be congratulated.

Brookhaven-SLAC Trial

An enthusiastic crowd of competitors enjoyed the Brookhaven-SLAC trial long distance run and bicycle race at SLAC on April 7th.

In the long distance event Dave Guthill Theoretical Physics Group scored an upset over second place John Ferguson of Stanford who was expected to win.

The winning time for the 8.1 mile course was 47 minutes 35 seconds. In the bicycle race, Dave Uggles, Experimental Research Group E, edged out Don Burwell, Data Analysis Department, by only 5 seconds and won the 16.2 mile race in 51 minutes 52 seconds. If you are interested in joining in the bicycle events, contact Don Burwell at Ext. 2283.

We would like to thank the security guards for their cooperation in traffic control while the races were in progress.

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SLAC Hosts Physics Conference

On Thursday morning, May 2, SLAC Director, W. Panofsky will deliver a welcoming address in the auditorium to members of the international scientific community. Over three hundred delegates, the majority from outside the U. S. and Canada will be visiting SLAC through Tuesday, May 7 to exchange technical information on major activities and projects in particle physics research.

Larger delegations of scientists from Germany, Switzerland, France, Japan, England, Italy and Russia will gather with scientists from Denmark, Finland, Greece, Netherlands, Norway, Sweden, Austria, and East Germany to make this a truly international gathering. The People's Republic of China, which sent a scientific delegation to SLAC in December, 1972, declined an invitation to attend this conference.

The conference is sponsored by the International Union of Pure and Applied Physics and is held approximately every two years. The 1969 conference host was the Yerevan Physics Institute in Russia, and the last such conference was held in 1971 at CERN. SLAC will be hosting the present conference on behalf of the American physics community.

Pep on Target

The proposed Positron-Electron-Proton (PEP) storage ring project first announced about two years ago is moving ahead on schedule. A joint LBL-SLAC study group was formally established in January of this year to prepare a joint submission to the AEC later this year. Both the Regents of the University of California and the Board of Trustees of Stanford have approved this joint venture—the latter authorizing a 13 acre expansion of SLAC to accommodate construction at their April meeting.

The long range timetable following the submission of the official proposal to the AEC asking for authorization for construction of the machine is wholly dependent on funding, estimated at approximately \$55 million, if operation of such a facility will become a reality by the 1980's.

SLAC Happenings

Physicist, Bill Hermannfeldt of Accelerator Physics and a member of the PEP Task Force has received an appointment to the Staff of the Atomic Energy Commission's High Energy Physics Program, Division of Physical Research. He will relocate this summer to AEC headquarters in Washington, D.C. for duration of the two-year appointment.

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Jerry Friedman, head of the SLAC Computation Group has been invited to the 1974 CERN School of Computing to offer a course on the topic of Data Presentation. He will travel to Norway to address high energy physicists and Computer Scientists working in the twelve participating European Countries of CERN.

Joining the CERN staff later this year will be Gerhard Fischer a Physicist in Experimental Group C. For the past several years he has worked on SPEAR--SLAC's colliding beam project and will spend the next year at DESY in Hamburg and, later, with the Intersecting Storage Rings group at CERN.

SLAC Retirements Corbin Fairfield retired in March from the Plant Maintenance and Utilities Department where he was a Maintenance Electrician. Corbin has been with Stanford since 1959

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Chimp Facility Opens

After lengthy delays caused in part by the protracted rainy season, the Primate Research Facility received their first tenants recently. The new \$400,000 facility for chimpanzees is located adjacent to SLAC on the South side of the Klystron Gallery.

The first five chimps arrived from the Stanford Research Institute and more are expected soon from Los Angeles. For all of these animals the new one and one-half acre enclosures are the most spacious they have ever experienced and most are getting accustomed to the outdoors for the first time in their lives. The facility is both a teaching center for human biology students and an experimental center for the Medical School.

Dr. Pat McGinnis, director of the new center, has promised to organize tours especially for SLAC Staff commencing in late June. Meanwhile, he would greatly appreciate everyone's cooperation by staying away from the facility and the perimeter walls until they are settled in and the animals have become totally adjusted to their new environment.

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Brookhaven Challenge Race David Cuthiell, Man in Motion

The Theoretical Physics Group is a major source of running talent at SLAC. The winner of last year's long distance race, Dave Cuthiell, comes from this esteemed group, which is tucked away on the third floor of Central Lab.

Dave is twenty-five years old and hails from Edmonton, Canada.

He obtained a B.S. Degree at the University of Alberta in 1969 and began graduate study in physics at Cornell University in 1969.

He came to SLAC August, 1973 with his academic advisor, Professor T. M. Yan and will be returning to Cornell to complete his Ph.D in late spring this year.

Dave did no organized running until 1971 and relates that he was generally one of the poorer runners in high school.



Dave Cuthiell, left, and Ikaros Bigi, both from Theoretical Physics at SLAC's Thanksgiving Jog

His best time for the mile prior to 1971 was something over seven minutes, which he would sooner forget about.

It was during his time at Ithaca, New York, that he became interested in running as a means of getting into good physical condition. There was a fairly broad based running community there which included all levels of talent to encourage the beginner.

After six months of limited training, he managed to cut his mile time to five minutes, twenty seconds and had completed a twelve mile run. His friends encouraged him to enter the Boston Marathon and he started training for this event, averaging thirty to forty miles a week.

Dave's first marathon was a complete disaster. He discovered what so many runners already knew--that a marathon of twenty-six point two miles is a lot different from the maximum of twenty miles that he had done before the race.

Dave walked and stumbled the last six miles and finally crossed the finish line in something more than four hours, thirty minutes, long after the officials and most of the spec-

Book Collection



The picture above includes a sample of the books and magazines that are available in the SLAC Library's Minorities and Women's Collection. The books are available for two-week loans; the journal issues are to be read in the library. This collection, which was selected by the Minorities and Women's Committee, is intended for the use of all SLAC employees and hopefully will further the understanding which is needed in the struggle for equality. The SLAC Library is located on the second floor of the Central Laboratory Building.

SLAC employees interested in other activities of the Minority and Women's Committee can contact John Valverde, Plant Maintenance and Utilities, Chairman, or any member of the Committee: Viola Belton, Travel; John Brown, Data Analysis; Tiana Hunter, Publications; Dick Jeong, Mechanical Engineering; Marie LaBelle, Data Analysis; Frankie McLaughlin, SFG; Paul Regalado, SPEAR; Joe Sodga, Accelerator Operations; Marion Smalls, Accelerator Physics; Kenneth Stewart, Experimental Group B; Anthony Tilghman, Electronic Instrumentation, Lucy Wilson, Data Analysis.

tators had left.

Dave has come a long way since those days when he was finding out what competitive running is all about.

He now runs the mile in something better than four minutes, forty seconds, and his best marathon time is two hours, fifty-two minutes, thirty-three seconds. He is continually improving and if his plans work out, he will return to Boston and "Defeat that course." He hopes to do it in under two hours, thirty-seven minutes, a six minute per mile pace.

Dave finds running a pleasant contrast to his academic work and feels that it helps balance his day to day life and has a valuable influence on a person's mental as well as physical well-being.

Coming from Canada, Dave has a natural interest in ice hockey and finds this sport to be a tremendously exciting one to watch or participate in. Whenever he gets the opportunity, you will find him on the ice rink, chasing the puck.

SLAC will be sorry to lose you to Cornell, Dave, but wish you the best of luck in your future athletic and academic careers.

1974 SLAC Affirmative Action Program

Copies of the SLAC Affirmative Action Program for calendar year 1974 have been sent out to all Directors and Group Leaders according to Jim Ketcher, SLAC Affirmative Action Officer. Additional copies are available to all interested SLAC employees and may be obtained from Jim Ketcher, Ext. 2352.

Compiled by Jim Ketcher from comments and suggestions supplied by SLAC management, the SLAC program is designed to implement existing University and AEC regulations, policies and procedures that deal specifically with equal opportunity and Affirmative Action. Policies and other matters bearing on Affirmative Action were developed at SLAC before similar policies

SLAC Staff Member Exhibits Paintings

Widely acclaimed artist, Walter Zawojski was recently invited to exhibit his collection of paintings entitled "Forms of Imagination" at February Convention of American Association for the advancement of science in San Francisco. Some 4000 members and guests of the Convention viewed his work in the lobby of the Hilton Hotel. This same collection is currently being exhibited at the Monterey Peninsula Museum of Art and received critical acclaim from art critic, Irene Lagorio, of the Peninsula Herald: "Although involved with scientific theories, acoustical vibrations and spectral color, Zawojski's paintings transcend their technoscientific foundation and show what artists are doing with physics". In short, his art is a perfect marriage between science and aesthetics."

Such comment is particularly satisfying to SLAC's graphic artist, Walter Zawojski who has endeavored through his monochromatic airbrush paintings to form images derived from actual mathematical models modeled by the Pythagorean conception of the musical harmony of the world and nature. His collection of eighteen "Cosmic Music" paintings, two photographs, and one experimental painting of acrylic on vinyl are exhibited in the darkened main gallery to create a soft focus atmosphere that parallels the diffused forms in the canvases. Each painting is then spotlighted so that it appears to "lean forth in the gallery's darkened space like a mysterious celestial being" according to Ms. Lagorio. His experimental work, entitled "Singing Spheres" drew particular praise for its multi-dimensional effect of separating three painted vinyl sheets with an inch of space from each other. This painting was printed in one dimension in the June 20, 1972 issue of the Beam Line.

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SLAC Happenings

and at SLAC since 1969. Walter Bassinger retired from SLAC at the beginning of the year and has been working for Hansen Laboratory on a short term basis. Walt has been a Mechanical Engineer for MED since 1964. James Walker retired in January due to disability with thirteen years of service. During most of this period he was responsible for the operation of SLAC's off-site warehouse.

AEC Robert Thorne, Manager of the San Francisco Operations Office was named as Deputy General Manager of the AEC. Mr. Thorne had been Manager of the SAN office for the past two years and in his new position will assist the General Manager, John Erlesvine, in supervising the non-regulatory functions of the AEC.

CREF Values			
1973			
January	50.36	February	47.11
March	46.44	April	43.69
May	42.06	June	41.40
July	44.80	August	44.06
September	46.63	October	47.06
November	41.30	December	42.61
1974			
January	40.75	February	40.83
March		March	39.32

were developed by the University, and well before any agency of the U.S. Government became active in the field. The 1974 program is designed to continue this initiative in establishing procedures which exceed in some cases guidelines imposed by the University and consistent with the terms of SLAC's contract with the AEC.

The program covers the goals of the SLAC program for 1974 as well as specific procedural activities in areas such as internal recruitment, selection and hiring, training, and procurement. The importance of supervisory and management personnel in implementing the Affirmative Action Program at SLAC is emphasized in the section on Program Administration.

The SLAC Affirmative Action program will be reviewed and modified as appropriate at the beginning of each fiscal year. All members of the SLAC community, especially women and minorities, are encouraged to direct their comments and suggestions to Jim Ketcher before July.