BROOKHAVEN BULLETIN
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BROOKHAVEN NATIONAL LABORATORY

BNL Physicists Play Major Role in D-Zero

Detectors for high energy physics experiments are typically huge, complex affairs and are often given fanciful names. But other detectors, equally grand in stature and scope, get by with more generic appellations.

For instance, the UA1 detector at CERN's Super Proton Synchrotron (SPS) Collider (see box) is simply named for the Underground Area in which it is situated. Nonetheless, it detected the Nobel Prize-winning discoveries of the W and Z particles in 1983.

Almost 100 physicists from 14 universities and laboratories are betting that D0 can have a similarly successful career. Pronounced D-zero, this detector is named for its future location in the ring at the Tevatron I collider (see box) at the Fermi National Accelerator Laboratory (Fermilab).

Ten physicists from BNL are working on the D0 project, which is headed by Physicist Paul Grannis of SUNY at Stony Brook. Other collaborating universities include Brown, Columbia, Florida State, Maryland, Michigan State, Northwestern, Pennsylvania, Rochester and Virginia Polytechnic Institute. Also involved are Fermilab, Lawrence Berkeley Laboratory and CEN Saclay in France.

The detector is slated for operation in 1989. While it is being built, about $7 million of its estimated $45 million total cost is expected to be spent by BNL. The project is primarily supported by the U.S. Department of Energy, with additional funding from the National Science Foundation and France.

When completed, the D0 detector will take advantage of the high luminosity expected from the Tevatron. With this feature, D0 collaborators hope to produce more W's and Z's per year of running time than is now possible at CERN. This will allow the particles to be studied in depth.

When the Tevatron's beams collide, the energy at the center of mass will be two trillion electron volts (2 TeV). At such high energies, theorists predict the observation of streams of secondary particles, resulting from quark interactions. These "jets" are also high on the list of phenomena the researchers want to explore.

"Our notion of the physics that we're going to concentrate on has evolved over the entire period of designing this experiment," said BNL Physicist Sam Aronson, "and it's going to continue to evolve as hints of new phenomena come in from the existing experiments at CERN. But our main focus has not been on a particular physics process, because those things may change in time. Rather, our basic philosophy in designing the detector has been to center on the basic measurements we want to make. This will give us the best chance to be able to do the physics that's available when we get to run."

Howard Gordon, who heads the Omega Group in the Physics Department, is eager to see what that physics is. "As far as I'm concerned, the most optimistic and exciting thing this detector has is the new energy region, which will be the highest in the world for many, many years. So the possibility of discovering some new phenomenon is strong. If there are particles that exist there, they just wouldn't be produced in any other way."

In looking for these particles, D0 will be both in competition and in partnership with the second experiment being built for the Tevatron by another large collaboration. Called the Colliding Detector at Fermilab (CDF), the experiment has been in the works several years longer than D0 and is expected to be at least partially complete for testing of the collider in September 1985. Originally, CDF was the only experiment approved for the Tevatron, but it became obvious that, in order to confirm any findings at one detector, there needed to be another. In the sense that D0 and CDF will be the only detectors operating at those energies, they will be partners, confirming each other's data.

But there will be a healthy competition; each collaboration, of course, would like to be the first to find any new phenomena. Gordon thinks that D0 may have the edge here. "CDF was designed many years before the CERN collider went into operation," he explained, "so they didn't have the benefit of knowing what the physics might be. We think we've learned something from what happened at CERN, and we took that into account when we were designing this experiment."

The detector is designed in three parts. After leaving the collision region at the Tevatron's D0 intersection, the particles will first be "seen" by a tracking detector. Then the particles' energies will be absorbed and counted in a 600-ton calorimeter, made of uranium and copper plates. From the non-magnetic calorimeter, the particles will enter a 3,000-ton, magnetized iron box where muons — the only particles that should be remaining by then — will be deflected and identified. In all, the apparatus will be 40 feet high and weigh in at 4,700 tons.

Most of BNL's efforts will go into calorimetry. "From a physics point of view, this is the most crucial piece of equipment in the detector," said Aronson, and Brookhaven is responsible for a large portion of its design and construction. Gordon is in charge of all calorimetry for the experiment, while Aronson heads the work being done at Brookhaven. A number of physicists and engineers at the Lab are already at work building prototypes and finishing the design.

BNL began testing the uranium calorimeter at Fermilab in May and will continue into the summer. "This type of calorimeter is becoming a standard towards which people are striving in doing high quality calorimetry," said Aronson, "and there are a number of other experiments around the world that may build liquid argon uranium calorimeters. So good measurements at high energies, which we should be able to do this spring and summer, will be valuable not only for us, but also for lots of other people."

BNL is also heavily involved with data acquisition for the experiment, for which Bruce Gibbard is overseer, and with off-line software for analysis of the experiment, an activity being coordinated by Serban Protopopescu. This is no simple matter. While collisions at the D0 intersection will produce about 50,000 new particles each second, Aronson said, "Maybe one or two will be of interest to us. The hard part of the analysis will be to weed out the rest of them."

Other Lab people involved in all

(Continued on page 2)

Roger Stoutenburgh

Sam Aronson (left) and Howard Gordon discuss calorimetry for the DO detector. A schematic of the calorimeter covers the blackboard behind them.

Accelerators Around the World
CERN and Fermilab

Brookhaven's particle accelerators are only part of a global network of equipment that researchers rely on in the quest to understand the universe. With this article, the Bulletin begins a series of occasional pieces designed to acquaint BNL employees with particle accelerators associated with other institutions around the world. Because the SPS Collider and the Tevatron are important to the discussion of the D0 detector in the accompanying story, they are the subject of the first article in the series.

With the advent of the electroweak theory in the early 1970's, high energy experimentalists set out to create tools that would allow them to look closely enough at the particle world to prove or disprove the theory. On both sides of the Atlantic, this challenge has been met with different machines.

At CERN, the European Organization for Nuclear Research located in Geneva, Switzerland, the answer was the Super Proton Synchrotron (SPS) Collider, also known as the $S\bar{p}pS$ Collider.

The SPS Collider story began in 1959 when CERN's Proton Synchrotron (PS), a machine very similar to the AGS, began operating, reaching energies of 7.2 billion electron volts (GeV) in the center of mass (E_{cm}), during the collision of the proton beam with a stationary target.

In 1971, a second CERN machine, the Intersecting Storage Rings, or ISR, was commissioned. The ISR was the world's first hadron collider, an accelerator in which two beams of protons, going in opposite directions, collided at different intersections in the ring for an E_{cm} up to 63 GeV. Thus, the ISR showed that colliders could allow much higher energy regions to be reached with relatively small accelerators.

The SPS began operating in 1976, as a scaled up version of the PS, capable of an E_{cm} of 27.4 GeV. At almost the same time, however, plans were being made to change the machine from a fixed target accelerator to a collider, in which a beam of protons would collide with a beam of antiprotons for an E_{cm} of 540 GeV. The PS would be used to inject protons and antiprotons into the SPS and into the ISR.

By mid-1981, the new SPS Collider was operational. Shortly thereafter, experiments UA1 and UA2 were collecting data. The rest is Nobel Prize-winning history. In 1983, the W and Z particles were discovered by UA1, offering important confirmation of aspects of the electroweak theory. Since its 1984 upgrade, the SPS Collider has an E_{cm} of 630 GeV, allowing for the collection of more data and the possibility of further discoveries.

CERN's experiences have also been valuable for those working on the Tevatron at Fermilab, the Fermi National Accelerator Laboratory (FNAL) in Batavia, Illinois. Fermilab began operating a proton synchrotron with a beam energy of 400 GeV in 1972. The FNAL accelerator, with a circumference of four miles, was originally capable of an E_{cm} of about 27.4 GeV, but was later upgraded to an E_{cm} of 30.6 GeV.

In 1979, Fermilab began looking beyond the FNAL accelerator. They started to design the Tevatron, so called because it would accelerate particles to one trillion electron volts (1 TeV).

The Tevatron design evolved into two phases. First, a ring made of superconducting magnets was to be built under the existing accelerator, in the same tunnel, to create a proton synchrotron that would save energy while reaching higher energies. This Doubler/Energy Saver project was dubbed Tevatron II, and the new ring was to contain two beam lines, so it could also function as a collider. For the second phase, called Tevatron I, protons were to circulate through one beam line, while antiprotons were to be accelerated in the opposite direction in the other beam line. The old FNAL accelerator would be used in the production of antiprotons.

TeV II, which began operating in 1983 with an E_{cm} from 31 to 36.2 GeV, was upgraded in 1984 to its present E_{cm} of 38.7 GeV. With a beam energy of 800 GeV, TeV II is closing in on its goal of 1 TeV (1000 GeV). Slated for completion in 1986 or 1987, TeV I will combine the 1 TeV energy available in each beam for a collision E_{cm} of 2 TeV.

Blanche & BERA

Question: Who and what do aerobic dancers, basketball players, campers, fly tyers, ham radio operators, rifle & pistol shooters and swimmers at the Lab have in common?

Answer: Blanche Laskee and the Brookhaven Employees' Recreation Association (BERA).

BERA sponsors 44 activities in which Lab employees participate, and Laskee is the liaison between it and the Lab. BERA's 37th fiscal year began on May 1. In addition to dues and program charges established by each activity, the Laboratory provides a significant amount of financial support for BERA.

Laskee has worked at the Lab for 27 years, spending her first 10 years at the Brookhaven Graphite Research Reactor as division receptionist and then as reactor operations secretary. In 1968, Laskee made a career change by moving into Personnel's Recreation Office, which until 1971 was located in the gym where the exercise rooms are now. When she was appointed recreation supervisor, she became the first woman to hold the position.

The idea for a Laboratory-sponsored, employee recreation association that would promote athletic competition, social activities and cultural exchange was born in March 1948. BERA's first constitution was adopted that June, and the first BERA board of trustees was elected the following year.

The first activities sponsored by BERA were eight: a bridge club, camera club, choral group, dance & party committee, film society, rental library, tennis club and theater group. The number of clubs grew to 28 during the 1950's and since then has progressively expanded to its present 44. Of the original clubs, only four remain: the camera club, choral group, tennis club and theater group.

—Roger Stoutenburgh

Recreation Supervisor Blanche Laskee at BERA's newest recreation facility, the Parcourse Fitness Circuit. In the background, BERA member Vincent Polywoda is hot on the trail of physical fitness.

BERA members are active and retired employees of BNL, AUI and the Brookhaven Area Office of DOE and their immediate family members. Also included are BNL or AUI guests and visitors, non-laboratory employees on site and their immediate family members.

The six trustees of the BERA board are Vice President John Connelly (Pl.Eng.), Corresponding Secretary Mickey Haller (C&P), Lois Marascia (DNE), Bernie Silverstein (S&EP), President Ken Sutter (DAS) and Ed Taylor (AMD). They meet on the second Thursday of each month to take care of the affairs of the Association. Two new board members are elected each March, and each serves a three-year term. The BERA board has appointed Donna Dowling (Pers.) as Recording Secretary, and Richard Eggert (AUI) serves as Treasurer.

About 550 BERA members take part in the Softball League, thus making softball the most popular BERA activity. "The birth and growth of BERA clubs reflect the changing times," explains Laskee. "For example, as running became more popular in America, so did the Runners' Club, and after aerobic dancing was created as a way to work out, the Aerobic Dance Club was founded.

"Since my two loves are music and cooking, I have particular interest in the Concert Series of chamber music and the Cooking Exchange," says Laskee. "I would like to see the Choral Group as a year round activity, instead of just at Christmas, and I would also support an organized instrumental group of some sort — how about a Brookhaven National Laboratory Marching Band?"

Laskee supervises the day-to-day operation of the swimming pool, gymnasium, recreation building in the apartment area, Recreation Park, six tennis courts, the Parcourse fitness trail and the Astronomy Observatory.

Laskee is assisted by Recreation Representative Guy Mastrion and Recreation Assistant Richard Parsons, who coordinate BERA activities held after work hours. Additional BERA employees include two attendants who mind the gym and its equipment after hours, recreation building attendants and lifeguards.

BERA also operates a Sales and Service office in Berkner Hall, which offers film processing, sells camera supplies and entertainment tickets, and is the official redemption center for BERA participation awards.

— Marsha Belford

Speaking Out

Maurice A. DuBois, Reporter
Roger Stoutenburgh, Photographer

We queried BERA members to find out which activities they participate in.

Dick Hildenbrand (AGS) — I'm in the Golf League and the Motorcycle Club. I like competing in BERA golf tournaments. I got into motorcycling when the gas crunch hit, but now motorcycling is more fun than economy.

Adrienne Usher (P.R.) — I participate in volleyball because we have a very good team, and I love to win. I also play softball to socialize. I'm in the Cooking Exchange because I like to cook — and I like to eat.

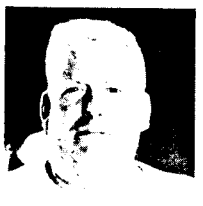
Pat Carr (Med.) — I play volleyball and softball, and I occasionally take the aerobics class. Taking part in BERA activities is convenient, and I've enjoyed the sports and meeting people. It's been a positive experience.

Steve Perlstein (AGS) — I've been at the Lab for a little over a year, but I haven't joined a BERA club yet — though I've thought about it. I would like to participate in the R/C Model Aircraft Club and the Rifle & Pistol Club. I like BERA's concerts, and I love swimming at the pool — I wish they would finish repairing it soon.

Mary Durham (Pl. Eng.) — I belong to the Afro-American Culture Club because it brings cultural awareness to its members and the general community. Since we have a Commodore 64 computer at home and my kids want to use it, I am a part of the Commodore Users Club. I don't know much about the computer, so the knowledgable members of the club are helping me. I used to play softball, but my son is now in Little League, so I attend his games instead.

Jean Ramirez (DNE) — I enjoy volleyball and softball. The sports are fun and I like the people. I've met a lot of people who I would never have met at the Lab if they hadn't been on my team or in my league.

Yin-Nan Lee (DAS) — I play badminton and table tennis — for fun and to keep in shape. I am also a member of the Commodore Users Club. I appreciate BERA's supplying sports facilities, and I think BERA provides the opportunity for employess with the same interests to meet, which probably would not happen otherwise.



Ken Andersen (Pl. Eng.) — I like camping, and I enjoy the Camping Club. We've been doing it for 20 years. We like the wilderness, the travel and the people we meet.

Stockroom Closing

Building T-158 will be closed for inventory on May 23 and May 24. Please make all necessary withdrawals of stock prior to 3 p.m. Wednesday, May 22. This will give Supply & Materiel Division sufficient time to prepare for the inventory. Emergency requirements should be processed through John Scharpeger, Ext. 2974.

Reports Available

The following reports are now available to the Laboratory staff and to affiliates of the DOE, AUI and NRC. Others may purchase the reports from the National Technical Information Service, U.S. Dept. of Commerce, 5285 Port Royal Rd., Springfield, VA 22161. Staff members should call Ext. 5068.

NUREG/CR-2331
BNL-NUREG-51454
Vol. 4 #2
Safety Research Programs Sponsored by Office of Nuclear Regulatory Research. Quarterly Progress Report April 1 - June 30, 1984. Compiled by A.J. Weiss

NUREG/CR-3026
BNL-NUREG-51609
Feasibility Study on the Acquisition of Licensee Event Data. W.Y. Kato, et al.

BNL-51731
Hydronic Distribution Systems for Use with Condensing Boilers. R.F. Krajewski, J.W. Andrews

BNL-51808
Study on the Application of Coal-Water Slurry Fuels to Marine Transportation Vehicles. C.R. Krishna

NUREG/CR-3943
BNL-NUREG-51812
The BWR Plant Analyzer. Final Report. W. Wulff, et al.

BNL-51825
Brookhaven Highlights. April 1983 - Sept. 1984

BNL-51831
Vols. I, II
Study of Space Utilization and Technical Approaches to Heating in Buildings with Irregular Occupancy. Final Report. Prepared by Gard, Inc.

NSLS Users Convene

The fourth annual NSLS General Users Meeting will be held Thursday, May 23, and Friday, May 24, at Berkner Hall. After Deputy Director Martin Blume welcomes the Light Source users, the recently appointed chairman of the National Synchrotron Light Source, Michael Knotek, will give an overview of NSLS operations. Other speakers will review the status of the VUV and x-ray rings and their respective beam lines, discuss Phase II expansion and a 6 GeV ring, and report on experiments performed at the NSLS. About 250 Light Source users from BNL and other institutions are expected at this meeting. To sign up and for further information, please call Eileen Pinkston, Ext. 4194, before 5 p.m. this afternoon.

D-Zero

(Continued)

aspects of D0 include Physicists Wlodek Guryn, Stephen Kahn, Melvin Month, Michael Murtagh, Iuliu Stumer and Peter Yamin, as well as Engineers Walter Gubler, John Koehler, Peter Kroon and Monty Montag. "Mainly," said Gordon, "Brookhaven is providing leadership, including scientific leadership. In return, we'll not only get to do some important and interesting physics, but we'll also be gaining some expertise for major detectors for future accelerators, like the proposed Superconducting Super Collider and the Relativistic Heavy Ion Collider. Our calorimeter, for example, might serve as a very important model for future calorimeters."

— Anita Cohen

Coming Up

Geoffrey Hind, senior biochemist, Biology Department, will give the 215th Brookhaven Lecture on Wednesday, May 29, at 4:30 p.m. in Berkner Hall. His topic will be "Photosynthetic Cycles and Plant Productivity."

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BERNICE PETERSEN, Editor
MONA S. ROWE, Associate Editor
ANITA COHEN, Reporter
MARSHA BELFORD, Reporter

35 BROOKHAVEN AVE., UPTON, N.Y. 11973
Telephone (516)282-2345

NYC Train Trip

The Hospitality Committee is planning a group railroad trip to New York City on Wednesday, May 29. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is $5.00; children under five years ride free.

Reserve a ticket by sending your fare through the U.S. mail to BNL, P.O. Box 322, Upton, New York 11973. Please do not send cash. Checks or money orders, payable to BNL, must be received by Friday, May 24. Put the date of the trip, your BNL life number and your phone number on the back of your check or money order. Your tickets will be given to you at the railroad station on the day of the trip.

Arrivals & Departures

Arrivals

Roger A. Katz ..... AGS

Departures

Michael G. Hauptmann ..... S&EP

Cooking Exchange

Wednesday, May 22, will be the final Cooking Exchange meeting of the 1984-85 program. The theme is Foods of the 23rd Olympiad, which will be a catch-all for anyone who still wishes to demonstrate her recipes before the International Dinner.

The annual International Dinner, which is the highlight of the Cooking Exchange year, will be held on Friday, May 31. Only those members who have given recipe demonstrations at least once during the past season will be invited to attend.

The Cooking Exchange is open to employees and their immediate family members. Meetings are held in the Recreation Building from 12:30 to 2:30 p.m. For the $1.00 donation those present receive copies of the recipes prepared, along with a sampling of each dish. Coffee and tea are also served. Babysitting is provided at 50¢ for each child.

For more information concerning the activities of the Cooking Exchange, contact Dee Polychronakos at 744-3578.

Astronomical Society

Observation night this month will be Friday, May 17, beginning about 8 p.m., with the following Friday as the rain date. Those planning to attend should call Bob Mills, Ext. 5043, or Rick Jackimowicz, Ext. 3803, during the late afternoon in question. There will be an informal meeting immediately preceding the observation session, starting at 7 p.m. in the Center.

Runners' Corner

Today at noon in Room B of Berkner Hall, the BNL Roadrunners will show a video tape of the first place finish by one of the three 3-person BNL teams at the Dix Hills 10 Kilometer Race held Sunday, April 28. The winning team was made up by Terry Sullivan (DNE), Peter Boni (Physics) and Ed Gallagher (MIS). Individually, out of about 1,000 runners, Sullivan won the race in 31:51, Boni finished third overall, and Gallagher placed 32nd.

A team of ten BNLers finished tenth out of over 100 teams from the New York metropolitan area in the New York Xerox Corporate Marathon Relay on Saturday, April 13. Each of the ten members ran a 2.6 mile loop and handed off a baton to a teammate; when all were done, the team completed a full 26.2 mile marathon.

The team included Diane Hatton (NSLS), Sharon Zuhoski (DAS), Joe Bauerfeind (AGS), Skip Medeiros (DAS), Lou Addessi (AGS), Don MacKenzie (DNE), Bob Liegel (Physics), Peter Boni (Physics), Terry Sullivan (DNE) and Trevor Sears (Chemistry). Gus Prince (DNE) coached BNL's team. The fastest BNL male runner was Sullivan, with a time of 13:08, and Hatton, who had a time of 17:28, was the fastest BNL woman.

On Saturday, May 11, Peter Boni (Physics) placed first in the Mount Sinai Harbor Five Miler with a time of 25:48.

Reminder:

The BNL Roadrunners Club is sponsoring a free running clinic on Saturday, May 18, at 6:30 p.m. in Berkner Hall. The speaker will be Bill Squires, former coach of such world-class runners as Bill Rodgers, Alberto Salazar and Grete Waitz. He also coached the late Ted Landry, a former BNLer and Roadrunners president who was killed last July while bicycling. Squires will talk about "How to Put Speed Into Your Running the Easy Way."

The clinic is offered in conjunction with Ted's Twosome Five-Mile Race, a race held in memory of Landry on Sunday, May 19 at 10 a.m. Entry fees are $7 for singles, $10 for couples, and anyone who registers by today will receive a long-sleeved commemorative T-shirt. Registration the day of the race will be held at the gym. For information, contact Bill Thomlinson, Ext. 3937.

Camera Club

Would you like to expand your photographic knowledge to include darkroom procedures? Are you interested in learning how to print or enlarge your pictures? Attend the next Camera Club meeting, Thursday, May 23, at 5:30 p.m. in the Recreation Building. Members and non-members are welcome at all meetings.

Softball

Games for week of May 6

League III

Survivors 12 - No Names 6
TNT won - Nads (forfeit)
Farm Team - (Bye)

League IV

Who Cares 7 - Kidz-R-Us 5
Mole-Esters 25 - September 10
Turkeys vs. Farm Busters
(game postponed)

League V

No Feedback 10 - Underalls 7
Foul Ups 10 - Simply Awesome 2
Mudville Sluggers 24 - Space Kadets 16

Volleyball Champs

DINKERS (Mixed League — Div. A): From left, Dennis Weygand, Sandee Litcher, Don Litcher, Adrienne Usher, Bob Meier, John Usher. Absent when photo was taken — Annette Meier.
—photos by Rosen

TNT (Mixed League — Div. B): Tirre Farmer, Denise Miesell and Allen Jones. Absent when photo was taken — Kathy Norden, Marty Leach, Bob Brown, Marg Desmond and Linda Farmer.

CAPTAIN MIDNIGHT (Mixed League — Div. C): Kneeling, from left, Ani Aprahamian, Dan Benz, Ann Mutschler. Standing, Vanessa Samuels, Lisandro Cardoso, Ron Nawrocky, Jim Wicksted, Marta Nawrocky. Absent when photo was taken — Bernie Benz.

PHOENIX (Open League): Foreground, John Usher and Greg Matthews. Standing, Dennis Weygand, Sandee Litcher, Don Litcher, Adrienne Usher and Bob Casey.

Cafeteria Menu

Week Ending May 24

Monday, May 20

Old fashioned Dutch green bean soup	(cup)	.65
	(bowl)	.85
Broiled flank steak w/ buttered noodles		2.35
Turkey chow mein on rice		2.15
Hot Deli: Baked ham	(bread)	2.00
	(roll)	2.20

Tuesday, May 21

Turkey noodle soup	(cup)	.65
	(bowl)	.85
Fish'n chips		2.10
Veal patty scallopini & 1 veg.		2.20
Hot Deli: Italian sausage hero		2.20

Wednesday, May 22

Cream of tomato soup	(cup)	.65
	(bowl)	.85
chicken breast Parmesan & 1 veg.		2.35
or w/ spaghetti		2.55
Pot roast of beef & 1 veg.		2.25
Hot Deli: Corned beef	(bread)	2.00
	(roll)	2.20

Thursday, May 23

Navy bean soup	(cup)	.65
	(bowl)	.85
Beef Burgundy over noodles		2.20
Fried chicken finger basket		2.35
Hot Deli: Turkey breast	(bread)	2.05
	(roll)	2.25

Friday, May 24

Manhattan clam chowder	(cup)	.65
	(bowl)	.85
Fettucini carbonara & 1 veg.		2.15
Baked meatloaf & 1 veg.		2.15
Hot Deli: Hot Italian beef	(bread)	2.05
	(roll)	2.25

Handball

The BERA Handball Club plays on site daily at lunch time, weather permitting. Two courts, player rotation and short games of doubles assure maximum participation for all. Call Bill Dieffenbach, Ext. 2434, or Gerry Bennett, Ext. 7590.

Classified Advertisements

Placement Notices

The Laboratory's placement policy is to select the best-qualified candidate for an available position, with consideration given to candidates in the following order of priority: (1) present employees within the department, with preference to those within the immediate work group; (2) present employees within the Laboratory as a whole; and (3) outside applicants. In keeping with the Affirmative Action plan, selection decisions are made without regard to age, race, color, religion, national origin, sex, handicap or veteran status.

Each week, the Personnel Office lists new personnel placement requisitions. The purpose of these listings is, first, to provide open placement information on all non-scientific staff positions; second, to give employees an opportunity to request consideration for themselves through Personnel; and, finally, for general recruiting purposes. Because of the priority preference policy stated above, each listing does not necessarily represent an opportunity for all candidates. As a guide to readers, the listings are grouped according to the anticipated area of recruitment.

Except when operational needs require otherwise, positions will remain open for one week following publication date.

For further information regarding a placement listing, contact the Employment Manager, Ext. 2882.

OPEN RECRUITMENT - Opportunities for Laboratory employees and outside applicants.

2247. RESEARCH ENGINEER - Requires BS (MS preferred) in mechanical or electrical engineering and a minimum of five years' experience in the nuclear power industry. Must have knowledge of commercial nuclear power plant design and operational problems, plant systems and equipment test and maintenance. Duties include research and technical assistance on equipment aging, manufacturing, etc. Department of Nuclear Energy.

2248. PAINTER A - Under minimum supervision, performs wide variety of interior and exterior skilled painting operations on buildings, furniture, and Laboratory equipment. Must know use and application of paints, synthetics, bleaching materials, stains and similar products. Plant Engineering Division.

2249. P&GA SPECIALIST - Requires an AAS degree in art or three to five years' equivalent experience. Skills to include LeRoy lettering, isometrics, layout, paste-up and mechanicals. Must be able to take job from beginning to end with minimum supervision. Experience with computer graphics for creating slides and viewgraphs can be helpful. (Illustration Section). Photography and Graphic Arts Division.

2250. NUCLEAR REACTOR OPERATOR TRAINEE - Requires AAS in a technical field or equivalent experience. Prior reactor background and experience in maintaining and operating electrical and mechanical equipment very desirable. Must be able to work rotating shifts, obtain "Q" clearance and maintain reactor qualifications. Will operate and maintain HFBR and auxiliary equipment. Reactor Division.

2251. TECHNICIAN - Requires AAS degree or equivalent experience in electronic technology, including experience in printed circuit board layout with REDAC design automation system. Under general supervision, will perform technical functions involved with electronic fabrication with particular emphasis on complex printed circuit board layout using out RACAL REDAC design automation faciltiy. Instrumentation Division.

Autos & Auto Supplies

78 CHEVY MONTE CARLO - p/s, p/b, p/w, a/c, runs excel., needs minor cosmetics, asking $2,150. 473-1454 or 744-3284 eves.

54 ARIEL SQUARE FOUR - needs completion, 80% there, excel. running motor, $1,500 firm. 665-9333.

POP-UP CAMPER - Sears trailer, good tent, needs minor repair, usable tires, excel., asking $300. Ron, Ext. 3238.

84 PLYMOUTH TURISMO - 2.2 litre engine, hatch, reclining seats, custom, warranty, like new, $5,800; 78 Chevy van, heavy duty, low mi., am/fm, $4,000. 563-2847.

80 CITATION - excel. cond., gas saver, standard, one owner, garage kept, $3,200. Lou, 281-5532.

77 PLYMOUTH GRAND FURY - wagon, 4 dr., p/s, p/b, a/c, am/fm, original owner, $1,500. 286-2525 or 286-8552 after 6 p.m.

76 MONTE CARLO - excel. cond., a/t, p/b, p/s, a/c, p/w, treated with TLC. George, 581-4318 eves. or 665-3000 day.

75 FIAT 128 - 4 spd., good eng. (2) new tires, needs work, $300. Ext. 3714, or 3208 after 7 p.m.

77 OLDS OMEGA - good cond., reliable, $1,750. 588-5287 after 6 p.m.

77 PLYMOUTH VOLARY - 6 cyl., a/c, $400. 589-0578.

71 KARMEN GHIA - runs well. 286-0570 after 4 p.m.

CAR TOP CARRIER - Sears, orig. $89, now $58. Ext. 4395.

BLAZER REAR SEAT - $75; 15" Chevy rims, 5 hole, $5 ea. Bill, Ext. 2807 or 281-0557.

75 MUSTANG - am/fm, 302 V8, a/t, excel. cond., $1,400. Jon, 744-7242.

83 TOYOTA COROLLA - SR5, blue, 5 spd., 28k mi., $6,500. Ext. 3870 or 981-3309 after 5 p.m.

75 MGB - conv., am/fm, new top, 84k mi., good cond., $2,600. John, Ext. 7671.

78 CHEVY TEC - motor home, 19k, sleeps 8, like new, must see, $12,000 or best offer. 736-0383 after 5 p.m.

65 NOVA - 4 dr., for parts, 6 cyl. eng., needs work, make offer. Ron, Ext. 4082 or 289-1003.

72 TOYOTA CELICA - 4 dr., 5 spd. good on gas, must see. Tom, 281-6745.

TIRE - 155R13 Goodyear Viva radial, like new, $25. Ed, Ext. 3466.

71 VOLVO 164 - 4 dr., 6 cyl., a/t, a/c, p/s, p/b, am/fm. 878-2233 after 6 p.m.

70 FIAT SPIDER - rebuilt eng., new clutch, body needs work. $500 or best offer. Al, Ext. 2075.

GOODYEAR VECTOR TIRES - (4) size 205/75R-14", $160. Glenn, 281-7873 eves.

77 FORD GRANADA - a/c, p/w, am/fm, new breaks, a/t, body and eng. need some work, $700. Tony, 281-0350.

72 OLDS DELTA 88 - 2 dr., runs well, $700. 941-4328.

72 VOLKSWAGEN BUG - restored, rebuilt motor, everything new, $1,100. Ed Bihn, Ext. 3840.

81 VIKING CAMPER - pop-up, sleeps 6, fully equipped, excel. cond. Skora, Ext. 5046 or 744-9677.

71 TOYOTA CORONA - 4 dr., a/t, runs, good for parts or station car, best offer. 281-7230.

77 DODGE ASPEN - wagon, runs well, 3 spd., 6 cyl., radio, $1,350. Paul, Ext. 2264 or 941-9055.

75 THUNDERBIRD - 50k mi., good cond., loaded, new rubber, $1,795; 77 T-Bird, 100k mi., good cond., a/c, a/t, am/fm, new rubber, $1,875; wheels, 74 Merc SW, body poor, runs like an old clock, $450. Ext. 2549.

COSMIC MAGS - W185-60X13, Firestone S660's, new, nuts, caps, fit Datsun, Toyota, Austin, $425. Dave, 475-2626.

85 Mercedes - 500SEL, loaded, metallic brown, all leather interior. 941-4999.

PICKUP BED - 8', fits 68-72 Chevy, fair cond., $50. John, Ext. 2172 or 744-4386.

79 MAZDA GLC - 4 spd., orig. owner, excel cond., good mi., ideal second car. 924-3066.

74 PONTIAC FIREBIRD - V8, p/s, p/b, very good cond. 744-9476 eves.

82 THUNDERBIRD - custom made, low mi., gray velour interior, moon roof, spoke wheels, loaded. 878-0487 eves.

73 OLDS - dependable transp., just inspected, $700. Ext. 2058.

77 COBRA II - 302, p/s, p/b, 4 spd., very good in & out, 89k mi. Tony, Ext. 7543 or 757-5362 after 6 p.m.

81 OLDS DELTA 88 - diesel, a/c, p/s, $3,700. Jim, Ext. 3372.

74 CHEVY - wagon, V8, a/t, p/s, p/b, clean, good cond., $950. Katsumi, Ext. 3406.

84 DODGE RAMCHARGER - p/s, p/b, a/t, cruise, a/c, tilt, power d/1, windows, excel. cond., $12,500. 281-4124 after 5 p.m.

72 OLDS DELTA 88 - 8 cyl., 350 eng. front disc brakes, p/s, a/c, radio, heater, 76k, $950. 289-1605.

RIMS - (4) hub caps, chrome nuts, 5 hole, fits Jeep, GM, 8" x15", white spoke, $125. Bob Kiss, 467-4222.

83 NISSON PICKUP - 6k mi., king cab, $5,500. Ed, Ext. 2362 or 3925.

FORD F250 TRUCK - hit in nose, good, 360 motor, 4 spd., door, 8' bed etc. Dick, Ext. 3499 or 589-9103.

81 DATSUN - station wagon, a/c, stereo, a/t, luggage rack, 40k mi., mint cond., $5,000. 286-9485.

74 CHRYSLER - Newport, high mi., 4 dr., asking $300 or best offer. 727-5912.

76 KAWASAKI 400 - $650; 76 Kawasaki 100KD, $225; father/son combo, $800 takes both. 744-3284 eves.

Boats & Marine Supplies

MOORING ANCHOR - chain, buoy and PU buoy, 150 lb., $200. 289-8988 after 5 p.m.

CHART KIT - Canada to Block Island region 2, latest ed. Pete, Ext. 3043.

27' BRISTOL - fully equipped, fath. radio, year old, 10 HP, 4 sails, good cond., asking $14,500. Bill, Ext. 2108.

18' BOAT - without engine, must remove from yard, best offer over $100. 286-0372.

17' SPORTCRAFT BOAT - motor, trailer, extras. 289-5248 after 6 p.m.

20' FRIENDSHIP SLOOP - new deck, new sail, jib, sleeps 2. Ext. 7225 or 929-6748.

15' SLOOP - "Surprise" class, fiberglass, about 1975, center board, sails well, $600. 286-0384.

23' AUX KETCH - CB, shallow draft, 6 HP, outboard, sleeps 2, galley, dinette, excel. cond., $2,500. 286-1169.

23' FIBERGLASS SLOOP - European crafted, sleeps 4, dinette, HO & galley, draws 4', 3 sails, many extras, in water, must sell immed. Ext, 4605 or 938-8353.

31' RICHARDSON - twin grays, planked cedar hull, solid teak decks, all in good cond., extras, $6,000. Ken, Ext. 3897 or 588-4641.

25' CHRIS CRAFT - Cavalier, plywood hull, 305 Chevy, rebuilt, new interior. 758-6588.

24' CHRYSLER - w/115 HP Envinrude, power trim & tilt, cabin, sleeps 2, good cond. $2,300, Jim, Ext. 7772.

23' CHRYSLER - 1968, fiberglass, twin Volvo engines, sleeps 3, extras, $3,900. 399-3381.

26' PACEMAKER - 1968, sp 318 cu Chrysler, f/w cooled, sleeps 4, stand up head, stove, 110v/12 REF, VHF, DF recorder, exc. cond. Don, Ext. 5329 or 878-2215 eves.

21' GALAXY - 1983, cuddy cabin, 125 HP Volvo, 30 hrs., port-a-potty, am/fm cassette, compass, depth, full swim platform, full canvas, extras, like new, $8,000. Ext. 3589 or 281-3635.

Miscellaneous

TENNIS RACKET - Davis classic, gut strings, press $30; Sears "graduate" portable typewriter $100. Georgia, Ext. 2342.

BIKE - w/training wheels, great cond., $55; typewriter, $30; 4 drawer file cabinet, $65; single mattress/box spring, practically new, $65. Ext. 4395.

TRACTOR - 10 HP, Bolens Husky, 38" cutter, 22" rototiller, 36" snow blower, $1,000. Ext. 4676 or 286-9721 eves.

SANSUI STEREO - cassette deck, full logic control, 4-band tuner, $150. Rajiv, Ext. 5161 or 924-1460 eves.

CORAL SHELLS - rings, necklaces and shell craft. Whitey, Ext. 2913, Illustration 197B or 928-3088.

FREEZER CHEST - 9 cu. ft., $100; acetylene "B" tank, $45. Jack, 286-1268 after 6 p.m.

12 HP TRACTOR - 42" mower, rear tiller, extras, $1,400. Joe, Ext. 4255 or 475-6580.

77 YAMAHA - GT/MXC dirt bike, good cond., $350. 878-0480.

DISK DRIVES - IBM compatible 2S2D, 360k, half height, new, never used, $120. Ed, Ext. 4768.

FLUTE - Artley Symphony model. solid silver head joint, closed hold, C-foot, good cond., $125. M. Hardy, Ext. 3389.

SAND FILTER - for large pool, multiport backwash, $50. Al, Ext. 2075 or 281-6617 after 5 p.m.

TRUMPET - Holton, nickel plated, (2) mouth pieces, mutes, beginner books and music stand, $200. Gavin, 286-3679 after 6 p.m.

COMPUTERS - TRS-80 model 3 and model 4P, w/steel office desk, $25. Skora, Ext. 5046 or 744-9677.

PROM GOWNS - Maise, size 8-10, peach, size 8-10, worn once, $50, ea. Lucy, 698-0576 mornings or eves.

PROPANE CAMPING STOVE - Coleman, 2 burner, never used, in original carton, $25. Sam, Ext. 4749.

MOWERS - Sears, rear bagger, $50; electric mower, $25. 588-5287 after 6 p.m.

SIAMESE KITTENS - beautiful, males, lilac w/blue eyes. Whitey, Ext. 2913 or Ramona, 928-3088.

ANSWERING MACHINE - message minder, excel. cond. Tony, Ext. 7772.

DRUMS - Rogers & Slingerland, blue sparkle, many drums and accessories, $1,200 takes all. 363-6417 after 6 p.m.

MOWER - Snapper, ride on, 8 HP, electric start, like new. Ext, 3392 or 475-8330 after 5:30 p.m.

DINETTE SET - wrought iron base, formica top, 4 wrought iron chairs, $125. 669-0549.

DINETTE TABLE - (4) chairs, (1) leaf, hardwood table, pad, $50. 744-5871.

FENDER TWIN REVERB - pre CBS, celetions, wheels, cover, mint, $375; Ampeg Reverborocket w/extras, $150. Dave, Ext. 4256.

AUDIO SYSTEM - Fisher, complete w/cabinet, model MC708, 3 mo. old, mint, asking, $225. Vinnie, 399-1559.

WIDE ANGLE LENS - unused, 35 mm, F/2.8, for Olympus single lens reflex camera, $50. Peter, Ext. 4094.

TYPEWRITER - Smith Corona, electric, portable w/case, correcting, new, best offer. 363-6121 after 6 p.m.

CANOPY BED - $100; trumpet w/case, $100. Jim, Ext. 3372.

LAWNMOWER - B&D, electric, like new, $60. Steve, Ext. 5163.

OUTSIDE DOOR & FRAME - w/6 panel glass, $25; storm door, white alum., w/interchangeable top & bottom glass & screen, $35. Ext. 3293 or 751-0345.

MARQUIS DIAMOND RING - beautiful, brillance rating high, 1 carat, appraised, $3,125, price $1,500 firm. Maryann, 286-2435.

RACING BIKE - Patterson BMX, Araya rims, Calif. light, asking $400, additional options extra. Steve, 744-8087.

TREES - locally grown, evergreens, maples, dogwood, you dig, reasonable. 924-6582.

FILE CABINET - (4) drawer, letter size, like new, $75. Jane, 929-4910 after 6 p.m.

MAPLE SYRUP - from my family's Vermont farm, $7 per qt., $12 per ½ gal. P. Wanderer, Ext. 7687.

MICROWAVE OVEN - Sears, large capacity, all digital, probe, shelf, defrost cycle, full power settings, $500 list, $280, no tax, under warrenty. Bob, Ext. 4656.

STEREO RADIO - GM Delco, am/fm, excel cond., $30. Suresh, Ext. 4459 or 751-2095.

SOUND MOVIE SET - complete, only used twice. Pete, Ext. 3328 or 751-1401.

KEROSENE HEATER - Corona, 22,000 BTU, $75. Ext. 7720.

QUILTED BEDSPREAD - red/white/blue, for twin size bed, like new, $15. Les, Ext. 2920.

WOMAN'S SHOES - (20) pair, 8-½ to 9, $1/pr. 281-2002.

SWIMMING POOL - 16 x 4-½', round, new liner, slide, (2) filters, all accessories, 5 yrs. old, will deliver, $500. 475-1469.

AMF RIDING MOWER - 6 HP, 4 spd., many new parts, needs carburetor work, $150. 929-4850 after 5 p.m.

Free

SHEPHERD/DOBERMAN PUPS - (8), good homes w/TLC, available July 1. Kim or Bill, 473-5830 after 6 p.m.

BENJI TYPE PUPPIES - mix, medium size, (5) males, (1) female, 6-7 weeks old, ready now. Miriam, 473-5060.

DOUBLE BED - mattress & box spring set. Ext. 7225 or 929-6748 eves.

FIREWOOD - (2) 40' hardwood, you cut/pick up, Setauket. Ext. 3293 or 751-0345 eves.

FREEZER - yours for the taking. Les, Ext. 5180.

Garage Sale

CONTENTS OF HOME - May 18th and 19th, Mastic, something for everyone. 281-2002.

Real Estate

Real Estate advertised for sale or rent is available without regard for the race, color, creed or national origin of the applicant.

For Rent

SAYVILLE - cottage, furnished, close to beach and town, available July 15, $425 + elec. and 1 month security. 563-2847.

MYRTLE BEACH, SC - oceanfront condo., 2 bdrms., 2 full baths, sleeps 6, balcony view of ocean, pools, sauna, exercise room, $550/wk. Ext. 4675.

BROOKHAVEN HAMLET - new 2 bdrm. chalet, new appliances, f/p, decks, 2 baths, on quiet street, available June 15, $850 mo. plus security. Ext. 4331 or 286-0204.

CORAM - (1) bdrm., modern complex apt., spacious and sunny, clubhouse w/pool, summer sublet or take over lease, $540 mo. include heat, neg. Ext. 3856.

WADING RIVER - (1) bdrm. cottage, 10 min. to Lab, 10 min. walk to beach, next to Wildwood State Park, $650 mo., 1 mo. advan. + sec. Ext. 2008 or 929-8588 late p.m.

For Sale

PORT JEFFERSON VILLAGE - cul de sac, lovely ranch on ¼ acre of park-like grounds, new 30'x20' deck, dining rm. w/French drs., oak floors, low taxes, 3 Village SD. 744-2274 or 744-3729.

RIDGE TOWNHOUSE - 3 bdrms., 1-½ baths, wood/coal stove, central a/c, w/all appliances $78,900. Ext. 3541 or 924-4070.

YAPHANK - 2 bdrms., 1-½ baths, condo., full basmt., interior new, oil heat/hot water, pools, tennis courts, club house, 2 mi. from Lab., $82,990. Henry, Ext. 4547 or 924-6688.

Wanted

CAMPBELLS SOUP LABELS - send to F. Chandler, Bldg. T89, for St. Mary School, E. Islip.

CEMENT MIXER - 2-½ cu. ft., Sears type, motor driven. 286-8886 eves.

SITTING - light housekeeping, days, summer, own trans. pref., Brookhaven Village. 286-1234 eves.

COMPUTER EXPERT - capable of digital conversion of medical data. Bradley, 694-2222.

GARDEN TRACTOR - w/mower, in usable or repairable cond. Ext. 7590.

PHIL COLINS TICKETS - Radio City Music Hall. Ext. 3565.

HOUSE TO SIT - experienced, caring, responsible, any period May 23 to Sept. 15, free. Jack Allentuck, Ext. 2412.

MAZDA ENGINE - Ext. 4395.

TRAINS - Lionel, American Flyer, accessories, any cond. brings good price. Carole, Ext. 3362 or 924-4097.

HOUSE TO SIT - Suffolk and Nassau areas. Ext. 3671 or 736-2131 eves.

GARDEN TRACTOR - in used or repairable cond. w/mower deck. Ext. 7590 or 878-1790.

HOUSEMATE - share large house, 4 bdrms., 3 baths, 20 min. from Lab., wash/dryer, sundeck, $233/mo. +1/3 util. Ext. 5038 or 928-8579 eves.

TIRES - H78-15. Cheryl, Ext. 3586.

MAGAZINES - for various clinics and hospitals, you bundle up and I will pick up. Joe, Ext. 3464 or 281-7683.

SOFTWARE - for Apple IIc, Tak. Ext. 2823 or 3187.

BARNYARD PIGEONS - to buy/rent, for training my bird dog, birds not harmed. Ext. 4098.

CAR STEREO - am/fm cassette, w/speakers, to fit 1973 Pontiac Grand Am, reasonable, for student. Fred, Ext. 3259.

OUTBOARDS - or outdrives, 1970 & up, running or not, for cash. Jim or Bill, 567-3417 or 281-6498.

METAL DETECTOR - to borrow to find lost ring in backyard. Janet, Ext. 2345 or 929-8152.

HOUSE TO RENT - rural area, min. 3 bdrm., 2 yr. lease, Aug. occup. 473-3364.

Ads left out of this issue due to lack of space need not be re-submitted to appear in the next issue.

Classified Ad Policy Deadline is 4:30 p.m. Friday for publication Friday of the next week.