

Hyperons: The Strange Nucleons

Exotic but elementary, quasi-stable yet strange - these diverse descriptions all apply to nuclear particles called hyperons.

Hyperons are exotic because they help create nuclei that do not normally exist in nature - hypernuclei. They are elementary because they are fundamental nuclear particles, like the protons or neutrons into which they eventually decay. They are quasi-stable since they live for a long time, relative to the nuclear time scale. They are strange because they contain a non-zero quantum number of strangeness - in contrast to the zero strangeness of neutrons and protons. They exist long enough to partake of nuclear motions and excitations just like ordinary nucleons. But they are not ordinary, and they decay only slowly because strangeness must be preserved in strong interactions.

Like protons and neutrons, hyperons are baryons - elementary particles composed of a combination of three quarks. Theory holds that quarks are the basic building blocks of nature and that they combine in threesomes to form elementary particles. Because the force that holds quarks together is so strong, they have yet to be separated long enough for a free quark to actually be detected. In lieu of studying quarks themselves, the Hypernuclear Spectrometer at the AGS is helping physicists use high energy particles as probes of nuclear structure. The ultimate goal of these experiments is to see how the differing forces among baryons of various quark makeups are manifested in differences in the structure of nuclei containing the strange baryons.

In operation since 1978, the spectrometer is the primary tool of the so-called Medium Energy Group of the Physics Department. The group is headed by Robert Chrien, whose core

team includes physicists Michael LeVine, Daniela Maurizio, Morgan May and Phil Pile; technicians Bill Espensen and Al Minn; and engineers Vito Manzella and Ed Meier. Resident collaborators Henryk Piekarczyk of the University of Houston, Jadwiga Piekarczyk of MIT, Robert Stearns of Vassar, and Ying-Ting Xu of the Institute of High Energy Physics, Peking, are aided by graduate students Steve Bart and Robert Hackenburg of Houston. In addition, other collaborators represent Carnegie-Mellon University and the University of Torino.

Essentially, the spectrometer consists of two dipole magnets, one located on each side of a target area. Aimed at the atoms that constitute the target is a negative kaon beam (K^-). Kaons, and their siblings, pions (π), are members of the meson family. These particles are composed of quark-antiquark pairs.

In the spectrometer, the bombarding kaons react with the quarks in the nuclei of the target atoms. When the reaction is completed, there are two new kinds of "nuclear things" in existence. Replacing the kaon is a departing pion, and a hyperon replaces a nucleon in one of the target atoms, changing the nucleus of that atom to a hypernucleus.

The spectrometer verifies that this kind of reaction has taken place by making sure there is a correlation between a kaon and a pion, then determining the energy difference between those two mesons. Did the resulting pion have a positive or negative charge? The answer to this question determines what kind of hyperon was also created in the reaction.

So far, the group has succeeded in creating two kinds of hyperons. The lambda-zero (Λ_0), the lighter of these, has no charge and eventually decays



The Hypernuclear Spectrometer serves as a backdrop for members of the Medium Energy Group: (seated, front to back) Daniela Maurizio and Ed Meier; (standing, from left) Phil Pile, Mike LeVine, Robert Stearns, Robert Chrien, Ying-Ting Xu, Vito Manzella, Morgan May, Bill Espensen and Al Minn.

into a neutron. This baryon is the result of a (K^-, π^-) reaction, where the K^- reacts with a neutron in the nucleus. The neutron changes to a Λ_0 hyperon and a negative pion comes out of the spectrometer.

In some ways the heavier sigma (Σ) hyperons are more interesting because they have charge and, therefore, come in more varieties. The hypernuclei created in a (K^-, π^-) reaction are more exotic than those formed when a neutron becomes a lambda-zero, because they contain a negatively-charged Σ in place of a positively-charged proton. "That's dramatic," said Chrien, "you're changing the nucleus by two charge units and the nucleus now contains negative nucleons as well as positive and neutral ones."

Hypernuclear experiments are not new. The hyperons were all basically identified in emulsion and bubble chamber experiments. In fact, the Omega Minus particle, the heaviest stable hyperon and the one with the greatest strangeness number, -3, was discovered at BNL in 1965 by a group led by Nicholas Samios, now acting director of the Laboratory. Until recently however, little was known about the nuclear excitations these strange baryons produce. That research is relatively new, with the most ambitious programs at CERN and Brookhaven. BNL's Hypernuclear Spectrometer is more sophisticated than its competition. It features a more intense beam and can pivot to do angular distribution studies to determine the angular momentum quantum numbers of hypernuclear states. "In order to create hyperons rather than chaos, the incoming momentum must be just right," Chrien said, "We just want to tickle the nucleus. We don't want to blow it apart. Once we know the incoming and outgoing particle momenta, the experiments give us the nuclear excitation."

For the future, the group is not only looking at creating hyperons and hypernuclei, but it is also attempting to measure electro-magnetic transitions between these states. By looking at the gamma rays emitted, the group

(Continued on page 2)

Tanking Up On ALF

On the dawn of January 6, a flatbed truck carrying a sixty-thousand gallon steel tank rumbled on site. The tank, the biggest that can be prefabricated for delivery by truck, will be used to hold surplus or recycled light feedstock fuels.

These fuels - mostly alcohols, mineral spirits, solvents and substandard distillate fuels - are called alternate liquid fuels, or ALF. ALF is about half the cost of No. 6 fuel oil.

Since 1977, thanks to a system developed by Joe Rose, manager of the

Engineering Division in Plant Engineering, BNL's Central Steam Facility has been using a blend of ALF and No. 6 oil, but never more than 50% ALF in the mix. ALF has a viscosity like kerosene, while No. 6 oil resembles road tar. The existing equipment in the steam plant, designed to handle thicker No. 6 oil, would malfunction if too much ALF was added, making the mixture too thin.

But realizing the significant savings if even more ALF were used, Joe Rose and Robert Terwilliger, the Lab's

Energy Conservation Coordinator, two years ago proposed retrofitting the steam plant so up to 100% ALF could be burned. Funds were approved by DOE's Office of Construction and Facilities Management, and the \$1.5 million retrofit project began last year. (See Bulletin story, February 27, 1981.)

Two major changes were needed. The burners and controls of the existing boilers had to be modified so they could handle the less viscous ALF alone, without it being blended with No. 6 oil. Also, a separate storage and supply system for ALF was needed, including the sixty-thousand gallon tank. Currently, a twenty-thousand gallon tank is used for blending ALF and No. 6 oil before the mixture is pumped to the boilers.

With the new tank on site, work is under way to complete the light fuel system. As explained by project engineer Ed Murphy, five ten-thousand gallon tanks, recycled Army railroad tank cars, were procured earlier and are already in place. These small tanks will be used to hold individual deliveries of light fuels so they can be checked for quality before being piped into the large tank.

When the retrofit project is finished some time this summer, the Lab will have complete flexibility to buy as much ALF as the tanks can hold. Since BNL's fuel oil consumption is about 6.5 million gallons a year, the savings from using ALF instead of No. 6 oil would be substantial. Says Murphy, the project could be paid back with just one winter season on ALF. (See "Heavy Duty" page 2.)



Sixty-thousand gallon tank for ALF delivered to Lab on a 100-foot flat bed truck.

A Costly Kindness

Plant Engineering reports that because of the severe winter weather we have had recently, they have been plagued with frozen pipes and radiators. The problem is occurring with the plumbing and heating lines underneath buildings that have crawl spaces.

Apparently, doorways to these crawl spaces are being opened by well-meaning animal lovers who are trying to provide shelter from the cold for the stray cats and other furry creatures that live on site. People should keep in mind that these animals who live in the wild grow winter coats in the fall to protect them through the winter.

So keep those crawl spaces closed and the cold out. The Lab has already spent about \$5,000 in repairing frozen and split pipes. That's money none of us can afford.



Music From Marlboro

Music From Marlboro will be on stage at Berkner Hall, Tuesday, February 16, at 8:30 p.m. Here is a chance to hear three exciting pieces which are seldom performed because of the unusual combinations of instruments required.

On the program are Claude Debussy's "En Blanc et Noir," for two pianos; Robert Schumann's Andante and Variations in B Flat Major for Two mont. Pianos, Two Cellos and Horn; and Bela Bartok's Sonata for Two Pianos and Percussion.

Music From Marlboro concerts are an outgrowth of the Marlboro Music Festival held each summer in Ver-

mont. The festival brings together world famous artists and outstanding young musicians to exchange ideas and explore the vast repertoire of chamber music.

Presenting the concert at Brookhaven will be pianist Bruno Canino, pianist Thomas Lorango, cellist Kari-Lise Ravnan, cellist Jonathan Spitz, horn player David Jolley, percussionist John Grimes and percussionist Neil Grover.

Tickets for the performance will be available at the door. Adults are \$7; students and senior citizens, \$4; and those under 18, \$3.

Gospel And Opera At Berkner

The nationally acclaimed Institutional Radio Choir of Brooklyn will be the featured group tomorrow night in a **Gospel Extravaganza** — the first of five exciting performances by black artists being presented by the BNL Afro-American Culture Club during Black History Month.

Appearing with the choir will be four gospel groups from Long Island: the Joseph Brown Choraleers of First Baptist Church, Riverhead; the Mighty Arch Angels of Eastern Long Island; the Channel of Blessings, Freeport; and the Loving Brothers of the Seven Churches of God in Christ, Amityville.

Saturday's celebration will begin at 7 p.m. in Berkner Hall. Tickets, at \$5 each, will be available at the door.

The second event of the series will take place next Thursday, February 11, when **mezzo-soprano Elvira Green** performs operatic works by Black female composers. Ms. Green served in the company of the New York Metropolitan Opera for nine years, and has had engagements with the Opera Company of Philadelphia's Opera in the Parks, the Birmingham Symphony Orchestra, and the St. Louis Symphony. She will appear in



Mezzo-soprano Elvira Green

Berkner Hall at 8 p.m. Tickets are \$3 each and will be sold at the door.

Tickets to all five February events are available at a special rate of \$20 from Berthel Becton, Ext. 4432; Mary Durham, Ext. 7981; Renee Flack, 3316; Michele Henderson, Ext. 4303, and Deidre Seymore, Ext. 5037.

Tips on Brown Tips

On many houseplants, brown tips are usually a sign that the plant needs more humid air than it is normally exposed to. One treatment suggested by the Cooperative Extension Association of Suffolk County is to stand the pot in a shallow tray which has a two-inch-deep layer of pebbles or gravel, covered with water. Make sure they do not dry out.

Brown tips may also be caused by a build-up of fertilizer salts or fluoride in the soil. Fluoride toxicity is particularly rough on dragon trees, corn plants, spider plants, Ti plants, lilies and prayer plants. The fluoride may come from water, perlite or peat in the soil, or superphosphate fertilizers. To avoid fluoride problems, use distilled water or rain water. Leach excess fertilizer salts from the soil occasionally to prevent their build-up to damaging levels.

Hyperons

(Cont'd)

hopes to obtain even more detailed information about the binding forces and the structure of wave functions. "If we detect these gamma rays, we will be the first to see them as a direct transition between two identified levels in a hypernucleus," Chrien said.

Despite the sophistication of the Hypernuclear Spectrometer, detecting gamma rays will not be easy. "We can't prepare large numbers of these things," Chrien explained. "They're very rare, so we're always dealing with small numbers of events. It's a tough business." — Anita Cohen

Heavy Duty



Doug Humphrey

When the new tank for ALF was delivered early this month, the outside contractor was supposed to unload it and set it in place. But at the last moment, that commitment was broken. So on short notice, BNL riggers went into operation, using the Lab's new 65-ton capacity hydraulic crane. Working in very tight quarters, the riggers maneuvered the 26-ton, 70-foot long tank into place. Supervisor Ben Belligan says it's the heaviest load this crew has lifted and set using the new crane. Besides Belligan, other Plant Engineering personnel involved in the lift were Site Division manager Jack Hennessy, general supervisor Roy Barone, rigger group leader Ben Lattanzio, and riggers Larry Johnson, Charles Spillet, John Sterzenbach, Fred Traxel and Kenneth Wenger.

Last Crafts Call

Any one planning to show their handiwork at the BERA Members Crafts Exhibit must submit their entry blanks today to the BERA Sales Office where the forms are available. For more information, call Becky Bishop, Ext. 4386.

Lecture Reminder

M. Sue Davis, deputy division head of the Nuclear Waste Management Program, Department of Nuclear Energy, will give the next Brookhaven Lecture at 8 p.m. on Wednesday, February 10, in Berkner Hall. Her topic will be "Radioactive Waste Isolation: A New Challenge For Science."

Film And Photos

A two-part film, "Malcolm X," will be shown free of charge on consecutive Thursdays, February 11 and 18, in Berkner Auditorium, as part of the ongoing celebration of Black History Month. The film focuses on the qualities and characteristics that predicated Malcolm X's rise as a leader and outstanding spokesman of the Black American Movement.

Part one of the film will be shown on February 11, first at noon, and again at 12:35 p.m. Part two will be shown at the same times on February 18.

In addition, the **BLACK EYE** Photo Exhibit will be displayed in Berkner Hall (Room C) on the evenings of Black History Month events and from noon til 1 p.m. weekdays during February. The exhibit features photographs by Ripp Bowman (BNL), Virginia Harris, and Glenn V. Tinnie.

Both activities are sponsored by the Afro-American Culture Club and are open to all BNL employees.

Exchange Program

For the second time, Ken and Gerrie Riker are host parents in the American-Scandinavian Student Exchange Program. Because they found their first experience "well worth repeating," Ken, a senior technical specialist in the Accelerator Department, and his wife, who is from Norway, are now sharing their home with a twelfth grade student — a Norwegian girl named Heidi Elisabeth Krossen.

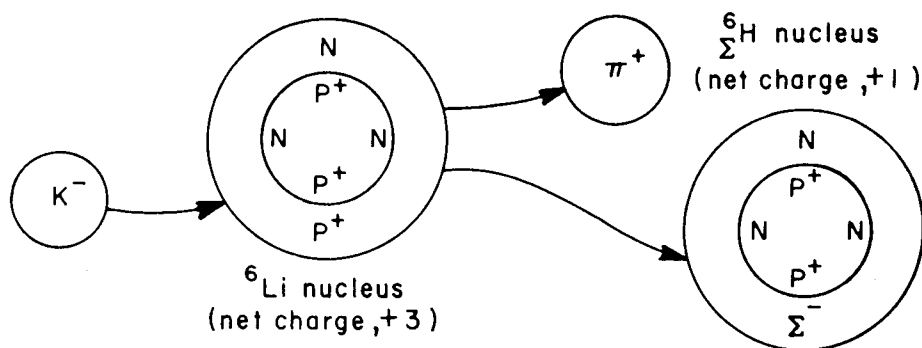
If you would like more details about becoming a host family, or if you know a teenager who might like to be an exchange student in Scandinavia, contact Mrs. M. McKendrick, 363-6547 or 666-8404.

Employees Note:

Next week, Wednesday, February 10, don't be alarmed if you see the High Flux Beam Reactor surrounded by emergency vehicles with flashing lights. It will just be a drill — for a few BNL groups — on the HFBR's emergency plan.

The drill will involve only the Reactor Division, Safety and Environmental Protection Division, the Public Relations Office, and certain individuals from other BNL groups.

The rest of the Lab will have business usual.



This drawing shows how a hyperon is created and then forms a hypernucleus in a typical $K^- \pi^+$ reaction at the Hypernuclear Spectrometer. The K^- particle beam is aimed at a target of Lithium-6 atoms, each of which contains 3 protons and 3 neutrons and has a net positive charge of 3. When a K^- particle hits a nucleus, one positive proton is changed to a Σ^- hyperon and a π^+ is released, so the nucleus contains 2 protons, 3 neutrons and 1 hyperon. Since the negative charge on the Σ^- cancels out the positive charge of one of the remaining protons, the nucleus now has a net positive charge of 1. The atom with this charge is hydrogen — not lithium. However, the usual hydrogen, H, contains 1 nucleon; this hypernuclear hydrogen, ${}^6\text{H}$, contains 6 nucleons.

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Cooking Exchange

The Cooking Exchange meeting on February 10 will feature Colonial favorites. The preparation of Creole peanut butter soup, apple fritters, rabbit and Dey Mansion cake will be demonstrated.

Meetings are held from 12:30 to 2:30 p.m. in the Recreation Building the second and fourth Wednesdays of the month and are open to employees and their families. Admission is \$1 and includes sampling of foods prepared and copies of the recipes. Babysitting is provided at 50¢ per child.

Wanted: Valentines

Who do you think deserves to be called a BNL Valentine? Your patient secretary? Your understanding boss? Your congenial co-worker? Surely you work with someone whom you consider a real sweetheart. The Bulletin would like to know who that someone is and what makes him or her so special. Send your written nomination to the Bulletin, Bldg. 134, before noon on Tuesday, February 9. The best of the bunch will appear in the February 12 issue and the Valentine will receive a special treat.

Bowling

White League
The Gropers are in first place at the start of the second half. G. Hassell converted the 6-7 split, J. Griffin rolled a 266/612 scratch series, J. Petro 211, B. Jones 203, S. Smith 208, and M. Brenner a 223 which is high game for the ladies thus far.

Red & Green League
R. Wiseman bowled 226/243 for a 606 scratch, 663 gross series, R. Sick 211, C. Tomesch 203, R. Eggert 202, F. Powers 201, R. Larson 207, J. Connelly 202, H. Marshall 211, N. Parrinello 202, R. Barberich 221, R. Jones 203, M. Iarocci 202.

Pink League
High games were bowled by R. Rosati 176, K. Kissel 174, E. Kristiansen 186, M. Connelly 174, D. Johnson 174/177/182, M-G. Meier 161, H. Keeley 160/191/168, A. Donegain 200, J. Thiede 186.

Purple League
W. Milian rolled a 192, B. Brown 197/220, E. Meier 199, T. Romano 196, G. Riker 174, M-G. Meier 178, M. Connelly 188, N. Mayeski 187.

Arrivals & Departures

Arrivals

Margaret Chin Sun Chong N. Energy
Paul S. Furcinitti Saf. & Env. Prot.
Luis Lederman N. Energy
Charles A. Miller N. Energy
Robert K. Schoen Energy & Env.

Departures

This list includes all employees who have terminated from the Laboratory, including retirees:
Jerome D. Bernstein Biology
Gordon E. James Reactor
Frank B. Kainz Energy & Env.
Charles L. Knauff III Energy & Env.
Michael D. Mapes Accelerator
Morris L. Shapiro Accelerator

The most difficult tongue-twister is said to be "The sixth sick sheik's sixth sheep's sick."

BERA Candidates

The BERA Nominating Committee met on January 27 to select a slate of candidates for the 1982 BERA Board election. Those selected were: Richard Holroyd, Chemistry; Sandra Lane, Nuclear Energy; James Roesler, Safety/Environmental Protection; and Joseph Skelly, Accelerator.

During election week, the latter part of March, on-site employees will be invited to vote for two of the above four candidates to replace outgoing BERA Board members Donald David and Patricia Oster.

Cafeteria Menu

Week Ending February 12, 1982

Monday, February 8	
Cream of potato soup	(cup) .60 (bowl) .70
Cheese omelet w/hash browns	1.70
Beef liver w/onions & 1 veg.	1.70
Hot Deli: Pastrami	(bread) 1.75 (roll) 1.85
Tuesday, February 9	
Split pea soup	(cup) .55 (bowl) .65
Baked ziti & 1 veg.	1.70
Chinese pepper steak on egg noodles	1.80
Hot Deli: BBQ pork sandwich	(bread) 1.75 (roll) 1.85
Wednesday, February 10	
Minestrone soup	(cup) .55 (bowl) .65
Beef hash & 1 veg.	1.70
Sweet and sour pork over rice	1.80
Hot Deli: 8-foot hero	.85 (per inch)
Thursday, February 11	
Turkey & rice soup	(cup) .55 (bowl) .65
Spaghetti special "All the spaghetti with meat sauce you can eat" with garlic bread	1.70
Top round of beef & 1 veg.	1.85
Hot Deli: Grilled Reuben	1.75
Friday, February 12	
Manhattan clam chowder	(cup) .60 (bowl) .70
Ham steak & 1 veg.	1.75
Western type chili over rice	1.75
Hot Deli: Breaded fillet of fish	(bread) 1.75 (roll) 1.85

Volleyball

Mixed League	
Standings as of 2/1/82	
A Division	
Dinkers	14-4
Teddybares	12-3
Mixed Ups	10-5
High Society	7-8
Nuts & Bolts	7-8
Las Bolas	3-12
Leftovers	1-14
Three fantastic games were played by the Teddybares and the Mixed Ups with scores of 14-16, 15-4, and 15-13. Nuts & Bolts over Las Bolas, 15-7, 9-15, and 15-8. Dinkers over the Leftovers, 15-12, 15-4, and 15-6.	
B Division	
Puff & Stuff	12-0
Semi Tough	9-3
TNT	8-4
KMA	3-6
Quirks	1-8
Big Boopers	0-12
TNT over Quirks, 15-1, 15-2, 15-8. Semi Tough over Big Boopers, 15-6, 15-3, 15-5. Puff & Stuff over KMA, 15-6, 17-15, 15-7.	
The games scheduled for February 15 will be played on February 22 due to Washington's birthday.	
Open League	
Standings week of 1/27/82	
Burnouts over Roga, 15-7, 15-9, 15-1, and 15-6. Line One over Brewmasters, 15-10, 15-4, 11-15, and 15-7. Toga and Spikers split, 15-4, 15-8, 15-6. 15-8.	
Spikers	6-2
Toga	6-2
Burnouts	8-0
Line One	3-5
Brewmasters	1-3
Roga	0-8
Pick-Ups	0-4

Semester Students



Doug Humphrey

The Brookhaven Semester Program kicked off its 28th semester in mid-January with the arrival on site of these eight students. They will stay at BNL through May 7 to take advantage of educational opportunities that may not be available at their home campuses. These include individual research assignments in the departments of Biology, Medical, and Energy & Environment. The students will also study physical chemistry with Peter Haustein, Chemistry Department, and biochemical and molecular and cellular biology with Ed Popenoe, Medical Department. From left, the students are Irma Herron, Jackson State; Rada Blevins, Jarvis Christian; Kimberly Daily, Hampton Institute; Sandria Pamplin, Wiley College; Gloria Mangum, Jackson State; Daphne Tillman, Alcorn State; Karen Williams, Hampton Institute; and Kerry Hughes, Jackson State.

Microcomputer Club

The BNL Microcomputer Club meets weekly to discuss hardware and software for microprocessor based computers. Each meeting consists of time to share new developments or programs, followed by a prepared informal talk on such subjects as: microprocessors, interfacing, A/D conversion, interrupt structures, video control, power supplies, memory management, modems, different program languages, remote control, and applications for home or work. Several members own personal computers and these are discussed as well.

Meetings are every Thursday from 12 — 1 p.m. in the Biology Dept. (Bldg. 463) small conference room (first floor, NE corner). All are welcome. Contact Jim Hainfeld, Ext. 3372, for more information.

Swimming Pool

Schedule:	
Monday through Friday (Employees Only)	
11:00 a.m. to 1:30 p.m.	
(Employees/Families/Guests)	
5:00 p.m. to 9:30 p.m.	
Saturday and Sunday (Employees/Families/Guests)	
1:00 p.m. to 6:00 p.m.	
Fees:	
Season Tickets — three months (fees are not prorated)	
Individual Membership	\$15.00
Family Membership	\$20.00
Daily Admissions —	
Employee/Family Member	\$1.25
Employee/Family Member	\$1.25
Guest	\$1.75
Season tickets for the coming three months, February 1 through May 2, will be sold at the pool.	

Try Kayaking!

The Mountain Club will again hold kayak lessons at the Lab pool on Sunday mornings for the remainder of the winter.

At a meeting on Wednesday, February 10 at 7:30 p.m. in the north room of the Center, camping trips will be discussed, kayaking slides will be shown and prospective kayakers will have an opportunity to meet the instructor and discuss the lessons.

Also an open house will be held at the Lab pool from 11 a.m. to 1 p.m. on Sunday, February 14. Bring a swim suit, climb into a kayak and find out if you'd like to learn how to handle it. Call Ext. 3788 with any questions.

NYC Train Trip

The Hospitality Committee is planning a group railroad trip to New York City on Wednesday, February 17. Departure will be at 7:55 a.m. from the Patchogue LIRR station. Round-trip fare for adults is \$3.50; children under six years ride free.

Reserve a ticket by sending your fare through the U.S. mail to P.O. Box 322, Upton, New York 11973, no later than Thursday, February 11. Please make checks payable to "Brookhaven National Laboratory," and put the date of the trip, your BNL life number, and your telephone number on the check. Your tickets will be given to you on the train. Refunds will be made only if cancellations are received by the Monday morning preceding the trip.

We have been informed by the LIRR that we have to cancel the planned March 17 (St. Patrick's Day) train trip to the city. Therefore, the second trip during March has been rescheduled for Wednesday, March 31.

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 Personnel Placement Supervisor, Ext. 2882.

The vacancies listed below have been exempted by the Director's Office from the current freeze on open requisitions.

LABORATORY RECRUITMENT: Opportunities for present Laboratory employees.

1654. PROGRAMMER/ANALYST - Requires BS in computer science or engineering or equivalent work experience. Must have working knowledge of FORTRAN and MacroAssembler (Vax-780) language, and RSX-11M and Vax/VMS operating systems. Hardware knowledge desirable. Duties will include system software development for small-angle x-ray scattering station at NSLS and maintenance of Vax computer system. Biology Department.

OPEN RECRUITMENT: Opportunities for present Laboratory employees and outside applicants.

1655. PROJECT ENGINEER - Requires BS in engineering or equivalent background. Should also have either reactor operations or reactor design and maintenance experience, preferably at DOE reactor facilities. Requires excellent written and verbal communication skills. Duties include the application of nuclear standards, codes, and guides to research reactors and nonreactor nuclear facilities. Must be able to obtain or have a current Q security clearance. Reactor Division.

Autos& Auto Supplies

80 AMC CONCORD - 50,000 mi., 4 spd, 6 cyl, 20 mpg, moon roof, am/fm, extras. Must sell. \$3,800. Ext. 7513 or 929-6980.

79 FORD PICKUP - 4 w/d, 29,000 mi. \$6,000. 475-0249 after 6 p.m.

76 VOLVO - 264GL, excel. cond., low mi., auto, a/c, sunroof, stereo, alarm, leather int., rustproof, polyglycoat. \$5,500. 671-5714 eves.

72 PINTO WAGON - 4 cyl. \$250. 585-4038.

69 TOYOTA CORONA - Rebuilt eng., good tires, paint, body, int. excel. \$950. 751-7140.

65-66 MUSTANG BUMPERS - orig. front and rear, no dents. \$50 for both. Saxon, 929-8105.

2 VW SNOW TIRES - Town & Country, studded, less than 500 miles. Fred, 289-1085.

DUNE BUGGIES - (2) VW, fiberglass, less engine, \$150 & \$250. Augie, Ext. 2419.

81 HONDA - GL 1100 Goldwing, metallic black/blue, showroom cond., 2,300 mi., must sell. \$3,300. 744-6892.

70 FORD - Maverick, auto., new paint, tires, etc., good mpg, excel. cond. Avail. Feb. Ext. 7112 or 3017 eves.

CHROME SLOTTED WHEELS - (6) w/Chevy pattern, \$5 each. Augie, Ext. 2419.

69 MUSTANG - 302, a/t, all new parts, radiator A-1, \$950. Karl, 732-4435.

69 VW - 4 new radials, new paint, am/fm, 4 sp., A-1, \$1,200. 732-4435.

AUTO ROOF CARRIER - 37"x37"x5", new, \$18. Jag, Ext. 5080 or 751-1884.

75 CORDOBA - 360, a/c, all pwr., silver/black, excel. cond., asking \$2,250. 724-6661 after 6 p.m.

79 CHEVY PICKUP - 350, 4-wheel dr., short-bed, 4 sp., dual tanks, Scottsdale package, rear sliding window, rust-proofed, economy rear, 10,000 mi., like new, \$7,200. Ext. 7130 or 929-8323.

74 PLYMOUTH - Duster, 3 sp., good cond., new parts, 5 new tires, \$1,000 firm. Al, 234-1389 after 5.

63 LINCOLN - very clean, A-1, collector's item, 4 new tires, must see. Karl, 732-4435.

74 PONTIAC - Catalina, 4 dr., hdtp., ps/pb/ac, good body, needs some mech. work, \$775. M. Rosen, Ext. 2382.

74 VW - Super Beetle, excel. cond, low mi., \$2,200. 698-4444.

YAMAHA MOTORCYCLE - 250 cc, 2 cycle eng., new brakes, saddle bags, clean. Roy, Ext. 4664 or 744-8779.

76 VW - Dasher. 4 dr., auto., \$3,000. Marj, Ext. 3396.

72 DODGE DART - 225 eng., good cond., (for parts) Neg. 399-0864.

76 DATSUN - 710, new tires, 4 doors, excel., 30 mpg. Bermudez, Ext. 7953 or 282-3117.

72 PONTIAC - Catalina, ac/ps/pb, am/fm radio, rebuilt trans., excel. cond. Asking \$775. Damian, 744-5079.

TIRES - 2 new, sz. 15. Asking \$75. 399-0864.

CAMPER - Fifthwheel Midas, 31 ft., less than 1,000 mi., must sell. Asking \$9,000. Ext. 7130 or 929-8323.

CAMPER - Mobile Traveler, slide in, 11 ft., like new, \$2,000. John, Ext. 4312.

CAMPER - 1975, slide on, 11 ft., sleeps 4, stove, oven, 3-way refrig. Dave, Ext. 3365.

Boats & Marine Supplies

23' ALLMAND FIBERGLASS - 150 hp, Mercury I/O, cuddy cabin, w/trailer. \$3,800. 475-2679 eves.

Moving & Yard Sales

MOVING SALE - 1 day only, indoors, clothes, toys, household items, etc. Sat. Feb. 6th, 10 a.m.-4 p.m. 8 Gerard St., Bellport, 286-1688.

Miscellaneous

DINING SET - Drexel, table w/leaves, 4 chairs, china closet, pecan wood. \$300. 929-4942 eves.

QUALITY BLANK CASSETTES - Chrome, ferrachrome and metal, BASF professional series. Ext. 2521 or 928-8379 eves.

FREEZER - \$200; b/w TV, needs repair, \$25; shag rug, \$40; girl's bike, \$45. Paul, Ext. 4156.

ARLBERG SKI BOOTS - made in Austria. Sz. 10. \$25. 924-4789.

BOX WOOD BURNING STOVE - \$60. Cash. Firm. Angelina, 924-4789 or 924-3702 after 8 p.m.

QUALITY SEASONED HARDWOOD - cut, split, delivered. 727-5649 eves.

SKI RACK - gutter clamps for 4 pr. skis. \$30. Nick, Ext. 4615.

COLOR TV - Sears, 19". \$125. 281-3992.

CASTRO CONVERTIBLE - 2-pc sectional sofa and matching chair, good cond. \$200. Ext. 5274 or 281-2767 eves.

SHEEPSKIN COAT - men's, long, suede, sz. 38, like new. \$75. Ext. 7513.

KITCHEN TABLE - w/6 chairs, \$100; 3-piece living rm set, \$100. 473-1761.

BEDDING - 2 sets, DeLux Shifman, twin size. 475-8658 after 6:30 p.m.

COURT STENOGRAPHER'S MACHINE - w/stand, new. Orig. \$350, asking \$250. Cheryll, Ext. 4207 or 654-2041 eves.

SKI BOOTS - Henke sz. 5 and Koflack sz. 6, leather w/buckle, \$10/each pr.; catcher's mitt, Regent, like new. Georgia, Ext. 2772 or 286-8869.

FIREWOOD - split, seasoned oak, 4'x16'x18". \$110 delivered. 924-4284 or 924-3919.

DINGO BOOTS - sz. 8 D, brown, excel. cond., \$20; antique bathtub, lion paw legs, red, never used, \$500. Claire, 732-6712.

GUITAR - Applause by Ovation, 6 string w/case. \$125. 589-2338.

ELECTRIC WALL OVEN - 24" Hardwicke, \$100; propane camping heater, Primus catalytic, 4,000 BTU, \$20. Saxon, 929-8105.

CHANDELIER - modern, chrome and lucite. \$35. 588-5489.

ATARI VIDEO GAME - w/extra paddles, \$125; 13 cassettes, \$325. \$400 for both. Eric, Ext. 2973 after 5 p.m.

KITCHEN TABLE & CHAIRS - Brown formica table & yellow/brown print chairs. Asking \$40; 2 wood dark stained tressel benches. Asking \$35. 281-0369.

CAMERA - 35mm SLR Minolta SRT 102; 50mm 1:17 lens & filter. Shutter 0-1000; Vivitar flash. Asking \$175. Ext. 3284 at noon or 281-0360 after 6 p.m.

NECKLACE - Lapis Lazuli, 24" w/gold clasp; love seat, gold, modern, w/3 back cushions. 363-7032.

SCALES - (2) digital computing, tec. mod. SL-31-30, displays weight, unit & total price, used only 3 mo. Cost \$1,295 ea., sell for \$900 ea. Jim, Ext. 4040 or 289-0876.

ATARI CARTRIDGES - Video Olympics, \$15; Black Jack, \$9; Brain Games, \$14; Key Board Controls, \$14. Ext. 3671 or 744-8632 after 6 p.m.

WASHING MACHINE - \$25; gas stove, \$25; upright 16 cu. ft. freezer, \$95. 727-6258 after 6 p.m.

FURNITURE - contemp., good cond., lv. rm. couch, 2 chairs, \$225; dinette set; \$125. Ext. 7103.

WOODBURNING STOVE - brand new, 1/4" hot rolled steel welded, 2 cast iron gasketed doors, \$295. Haeg, Ext. 4863.

PROCESSOR - Hamilton Beach, 4 blades, brand new, \$40; b&w TV, 25" console, \$20. Ext. 3403 or 751-1826 after 5 p.m.

ANSWERING MACHINE - new, never used, "Call Jotter" records up to 30 messages, \$60; electric organ, Conn Electric Band, 12 voices, 5 rhythms, auto-chord, mini synthesizer, 5 octave range, \$725. Roy, Ext. 4664 or 744-8779.

STEREO RECEIVER - Hitachi, 0.08% distortion at 27 watts rms. Asking \$165. Andy, 286-8698.

BIKE - Fuji Grand Tourer, 12 sp., black, excel. cond., water jug, pump. Must see to appreciate, \$175. Ron, 878-1731.

DEEPWELL PUMPS - 1 hp, 2 stage, \$95; 1/2 hp single stage, \$75. Compl. overhauled. 924-3565.

HANGING BATHROOM SINK CAST - pink w/faucet legs, very good cond., \$35. 924-3565.

EXECUTIVE WOOD DESK - glass top, excel. cond., \$200. 728-6142.

PEGBBOARD PANELS - Transite, 4'x8'x1/4" Cost \$48 ea., asking \$22 ea. Have 350 on hand. 286-1522 eves only.

RECEIVER - Fisher "400" Stereophonic FM Multiplex, excel. cond., \$75. John, Ext. 4680 or 5329.

BOW - Bear, Kodiak Hunter, like new, left hand, \$45. John, Ext. 4312.

ANSWERING MACHINE - needs new tape, \$25; aluminum combination door w/closer, 3'x6'x8", \$25; 472-0339.

G.E. - 4-burner counter top, oven & sink, elec., avocado, \$175 takes all. Ext. 2964.

COOKBOOK - Amer. Heart Assoc., good cond., \$5; bowling ball, approx. 16 lbs Susan, Ext. 4267.

PANASONIC - Port., 8 trk. tape player; Oster mist set curling wand; 2 pc. knit dress. Ext. 2950

EXERCISE BIKE - Huffy w/Raleigh tension wheel, excel. cond., \$85 firm; queen sz. bed & and mattress set, \$30. Ravi, Ext. 4331 during lunch or 924-6835.

MEDICAL THERMOMETERS - electronic, brand new, \$10. Charlie, Ext. 3935 or 325-0968.

FUEL TANK & GAUGE - 275 gal., \$35. Hank, Ext. 3848 or 472-0553.

GUITAR - Pan by Arai, carrying case, excel. tone, needs 2 strings, \$20. Ext. 3514.

DRAPES - thermal lined, 2 panels, rust/white, 109"x63", \$15; Sears air purifier, table top model, \$25; braided rug, 12x15, rusts/white, \$40; custom braided rugs, oval, 9x12, golds/white, \$40; round, 9 ft. greens/white, \$40; runner, \$15. 929-6692.

C.B. TOWER - 40 ft., tilt, Wilson "Y" quad antenna, rotor, cable & many other extras, \$150; 6 ft. credenza, all wood, Japanese, black, silkies (chicken), beautiful for dining or liv. rm. 751-5539.

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 Sale

MILLER PLACE - Contemp. ranch w/\$-saving heat, 4 bdrms, eik, l/r, den, fenced yard, excel. cond. Rustic Acres, \$72,500. 331-3724.

WADING RIVER - 3 bdrm, older brick home, adj. to Wildwood Pk. & priv. beach, beautifully renovated, hw floors, pvt. 1 bdrm apt. on sep. floor w/pvt. ent., (\$250-\$300/mo), landscaped, wooded lot, 80'x100', treed street, nice neighborhood, low taxes, Riverhead schools, \$55,500. 929-4180 before 10 p.m.

LAKE PANAMOKA - 3 bdrm, high ranch, eik, d/r, full bsmt., gar., 1 blk. to beach. 924-4660.

MASTIC BEACH - 4 bdrm, cape, d/r, l/r w/Franklin, 8% Farmers mort., 160x100 prop., gas, hot water & cooking, \$1,100 taxes, walk to stores & beach, \$28,000. 281-0360.

MIDDLE ISLAND - 3 bdrm, Col. on wooded 2-3/4 acres, eik, l/r, d/r, den w/fp, s/s, w/w carpet, 2 baths, apt. in bsmt, kennel. 924-4054.

For Rent

PORT JEFF VILLAGE - furn. room, priv. bath, priv. ent. \$250/mo. 473-7739.

STONY BROOK - 3 bdrm. house. fireplace, water-front, walk to univ. & stores, avail. March. 928-8522.

Car Pools

PATCHOGUE VIA E. PATCHOGUE -on-time, opening for paying rider. Alyce, Ext. 2902.

Lost & Found

LOST - men's Fordham Univ. class ring, 1960. \$50 reward. Haeg, Ext. 4863.

LOST - man's brown wallet, in vicinity of Bldg. 701. Ext. 4835 or 289-9811.

LOST - meteorology bicycle, well marked. R. Brown, Ext. 2263.

Wanted

GOOD HOME - to adopt a Labrador Retriever, black, male, 1 yrs. 924-3756.

Classified Ad Policy

Deadline is 4:30 p.m. Friday for publication Friday of the following week.

1. The Brookhaven Bulletin's classified section may be used only by active and retired Laboratory employees.

2. All items for sale or rent must be the advertiser's property.

3. Ads for material acquired for resale in association with a full or part-time business cannot be accepted.

4. Ads for the sale or trade of firearms will not be accepted.

5. Ads not carried because of space restrictions will be held for publication in the next issue.

6. Ads are run only once and must be resubmitted if they are to be repeated. One ad per person per week.

7. Property for sale or rent cannot be accepted on this form. Special Real Estate Ad Forms are available at the office of the Brookhaven Bulletin, Building 134.

☐ For Sale: Autos & Auto Supplies

☐ For Sale: Boats & Marine Supplies

☐ For Sale: Miscellaneous

☐ Car Pools

☐ Lost & Found

☐ Services

☐ Wanted

☐ Free

Please print your ad below in 15 words or less using one word per block. Include name and phone number to call.

Note: The following must be completed for your ad to appear.

NAME (Please Print).....

Employee's Signature.....Life No.....Ext.....

Send to: Brookhaven Bulletin, Building 134 (Ext. 2345)

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