

## Practicing 'Sourcery' at BNL

In 26 years, the Alternating Gradient Synchrotron (AGS) has accelerated over 1,000,000,000,000,000,000,000 (one sextillion) protons for high energy physics research. But where have those protons come from? And where have the billions and trillions of neutrons, electrons and heavy ions come from for Brookhaven's other "big machines?" There's no magic in the answer. It's a simple case of sourcery.

"Sourcery" is the term sometimes used to describe the science of designing and building the sources from which beams of particles originate. John Benjamin, a physicist at the Tandem Van de Graaff accelerator, says, "What's required in sourcery is to be both clever and lucky. You have to use several disciplines — vacuum, engineering, electronics, chemistry — on a very small scale. You can make it big and expensive, but you're not going to get any more beam."

### Mini-Source, Maxi-Beam

Following this principle, the Tandem source is no bigger than a pill box, but it can generate over 100 microamperes of heavy ions. Essentially, the source is a simple vacuum vessel into which is fed a vapor of cesium. The vapor strikes a surface called the ionizer because it ionizes the cesium by taking away some of its electrons to make a positive charge. Still inside the vessel, the cesium ions are accelerated to a target, sputtering target material off its surface. At the same time, the cesium ions donate electrons to the sputtered atoms and molecules, creating negative ions.

Though cesium is a constant, targets change depending on the heavy ion beam desired. For example, an iron oxide target yields oxygen ions, gra-

phite produces carbon ions, and lead sulfide generates sulfur ions.

The tiny source can be mounted in three places: on an injector just in front of the first Tandem tank, in the middle of the first tank or in front of the second tank. Wherever it is mounted, a large positive voltage — about 15 million volts — accelerates the newly created negative ions to a positive terminal at the middle of the Tandem. There they pass through a thin foil, freeing most of their electrons and creating the positive ions, which, after further acceleration out of the Tandem, form the final high velocity beam. The beam is used for research in atomic and nuclear physics, and, with the completion of the transfer line to the AGS, high energy physics.

### The Proton Process

Accelerating heavy ions is new for the AGS, which was designed to deliver protons at energies up to 33 billion electron volts. The proton source used today doesn't generate protons. It generates negative hydrogen ( $H^-$ ) ions, which, after a journey down the AGS linac, pass through a thin carbon foil where they are stripped of two electrons and converted into positive protons.

This process begins with a bottle of hydrogen ( $H_2$ ) gas. James Alessi, who heads the AGS Source Development Group, explains that the gas is fed into a source "about as big as a pack of cigarettes, where the molecules are separated into neutral atoms [ $H^0$ ] and ionized." The positive hydrogen ions then collide with a low work-function surface, one that easily gives up electrons. This promotes a charge exchange that yields a beam of  $H^-$  ions. The source sits within the high dc vol-

**The pillbox-sized ion source for the Tandem is at the center of this vacuum vessel, which is being examined by John Benjamin.**



Mort Rosen

tage of the Cockcroft-Walton (C-W) preaccelerator.

Since 1984, the AGS has also accelerated polarized protons, with all particles spinning in the same direction. Though  $H^-$  ions are again produced, a much larger source is needed to accommodate the equipment associated with one additional step: The  $H^0$  atoms must first run a magnetic gauntlet, leaving only atoms with the same polarization to be ionized by charge exchange with a neutral cesium beam. Though this source is the size of a small office, Alessi says the smaller source used for unpolarized protons produces about 1,000 times more beam.

Its size also makes the polarized source unable to fit in the C-W. So it has been placed before a radio-frequency quadrupole preaccelerator, the first such device to be used in an operating accelerator.

### The Source at the Source

At the National Synchrotron Light Source (NSLS), high-energy electrons produce x-rays and ultraviolet light for materials research. The electrons are "shot" out of an electron gun that NSLS Project Engineer Norman Fewell says "is very much like the one in a TV set. It's one of the simplest sources at the Lab."

The heart of the NSLS source is a tiny button, about 1/4-inch in diameter, made of thoriated tungsten, a substance that gives off electrons when heated. In an ultra-high vacuum, these electrons pass through a fine wire mesh (control grid) and are accelerated to the gun output at 100,000 volts. As the control grid voltage is switched off and on, narrow pulses of electrons come out of the source. "Making electron guns is an old art," Fewell says, "but getting these pulses so narrow, that's state-of-the-art." The NSLS source can generate up to 1.0 ampere per pulse, which translates into more than 30 billion electrons per five nanosecond pulse.

### Another Way to Generate Electrons

But there's more than one way to generate electrons, explains Joseph Wall, a biophysicist with the Scanning Transmission Electron Micro-



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**All NSLS electrons originate in this source cabinet. The half-circle in the bottom part of the cabinet is the electron gun that generates the particles. The cabinet is kept under an ultra-high vacuum and yields more than 30 billion electrons per pulse.**

scope (STEM), which uses electrons to study minute biological specimens at a resolution of 2.5 angstroms ( $\text{\AA}$ ). "At the NSLS, the electrons kind of boil out of the button," he says, "but here, the electrons are cold and just leak out of the material as a high field is applied to it." The material is a sharp point of tungsten wire about 1000  $\text{\AA}$  in diameter.

### An Ever-Present Source

At the High Flux Beam Reactor (HFBR), the particles that interest researchers are neutrons. The neutrons are by-products of nuclear fission, a process in which a heavy nucleus divides, usually into two parts. This is generally accompanied by the emission of neutrons and gamma rays.

(Continued on page 2)

## BNL Meets Small Business Goals

Brookhaven was recently honored with two DOE awards for meeting 1985 purchasing goals for Disadvantaged Business and for Small Business. David Schweller (seated, center), manager of DOE's Brookhaven Area Office, presented plaques to Deputy Director Martin Blume (right) and Richard Chester (left), Small & Small Disadvantaged Business Liaison Officer. Also on hand for the presentation were (standing, left to right) Joseph Haeg, manager of Contracts and Procurement; Earl Blanton, Assistant to the Director for Affirmative Action; Gregory Ogeka, DOE; James Desmond, BNL's business manager; and AUI President Robert Hughes.

Each year, BNL contracts with DOE to do a specified amount of business with disadvantaged and small firms. Says Chester, these goals are consistently attained only through the diligent efforts of the Division of Contracts and Procurement. "In seeking out these firms, we have to do business all over the country," he says. "And it's even harder to find these kinds of firms in specialty fields."

The recently completed addition to Personnel, Bldg. 185, was done by a minority company. According to Chester, the project was a demonstration that such businesses can be found and that they can do the job well.



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## Sourcery (Cont'd)

In the case of the HFBR, explains Deputy Division Head Dave Rorer, the heavy nucleus comes from fuel elements containing uranium-235. Heavily shielded deep within the reactor core, the fuel elements are submerged in heavy water, which has neutrons in the hydrogen nuclei, unlike naturally occurring water molecules. Immediately after fission, the emitted neutrons move very quickly; collisions with the heavy water slow them down to what are called thermal neutrons. Many of these thermal neutrons are channeled down beam lines to be used for research, but some stay in the core. The core neutrons strike the heavy U-235 nuclei, and the chain reaction continues.

But how did it begin? "Originally," explains Rorer, "there was a radioactive source, which emitted neutrons directly. But after a while, the fission reaction created some artificially radioactive isotopes in the reactor vessel, which give off energetic gamma rays. These gamma rays strike the heavy water nuclei, liberating neutrons and creating a background of 'photoneutrons' that is always there, an ever-present source."

Sourcery is also practiced at many smaller facilities around the Laboratory, as well as at individual experiments. Though they may differ in size, complexity and the kinds of particles they generate, behind every source, stands at least one clever "sourcerer." — Anita Cohen

## Meet the Challenge

Brother, can you spare a pint? How about 600? The next BNL blood drive will be held in the gymnasium between 10 A.M. and 3 P.M. on June 25 and 26. If you want to help Brookhaven reach its goal of 600 pints of blood, please contact the blood captains for each department listed below. Signup cards will be mailed Monday and should be returned by June 16.

### Blood Program Captains

| Department              | Bldg.     | Captain           | Ext. |
|-------------------------|-----------|-------------------|------|
| AGS                     | 911B      | Paula Hughes      | 4619 |
| Applied Math            | 515       | Muriel Kolomick   | 4109 |
|                         | 515       | Les Lawrence      | 4107 |
|                         | 515       | George Taylor     | 4159 |
| DAS                     | 179A      | Pat Taylor        | 2452 |
| AUI                     | 134A      | Monique Toler     | 5174 |
| Biology                 | 463       | Richard Sautkulis | 3381 |
| Chemistry               | 555A      | Sophie Kostuk     | 4302 |
| Central Shops           | 462Z      | Ed Harmer         | 3498 |
|                         | 462A      | Sheldon Martin    | 3354 |
|                         | 462U      | Christine King    | 3352 |
|                         | 462W      | Richard Savoy     | 2012 |
| Contracts & Procurement | 355       | Harry Klein       | 4917 |
| Director's Office       | 134       | Janet Sillas      | 2345 |
| DOE                     | 464       | Claire Gash       | 3438 |
| Fiscal                  | 134A      | Marge Stoeckel    | 2459 |
| Instrumentation         | 535B      | Doug Sweely       | 4237 |
| High Energy Facilities  | 1005      | Harvey Lotko      | 4689 |
|                         | 902A      | Ann Flood         | 4779 |
|                         | 902A      | Vera Mott         | 7108 |
| Medical                 | 490       | Peter Heotis      | 2304 |
| MIS                     | 459       | Karen Natoli      | 3305 |
| NSLS                    | 510E      | Judy Ferrero      | 2145 |
| DNE                     | 197C      | George Grigg      | 5185 |
|                         | 130       | Sharon Moore      | 3513 |
|                         | 475B      | Lydia Ryan        | 2380 |
| Personnel               | 185       | Marsha Kipperman  | 2871 |
| P&GA                    | 197B      | Terry Jones       | 2950 |
| Physics                 | 901A      | Cora Feliciano    | 7681 |
|                         | 510A      | Liz Mogavero      | 3940 |
| Plant Engineering       | 134C      | Bill Fleischer    | 3239 |
|                         | 452 Mech. | Martin Klein      | 4669 |
|                         | 452 Elec. | George Elias      | 4669 |
|                         | 326       | Slim Blevins      | 3084 |
|                         | 422       | John Mollica      | 3254 |
| Reactor                 | 750       | Randi Vogt        | 4421 |
| S&ES                    | 50        | Elaine Zukowski   | 4271 |
| S&EP                    | 599       | Michael Carroll   | 2351 |
| Staff Services          | 179B      | Nick Pisco        | 2524 |
| Supply & Materiel       | 211       | Lou DiCarlo       | 2302 |
|                         | 211       | Barbara Boerjes   | 4956 |
| Technical Information   | 477A      | Maria DeNatale    | 7692 |

## Retirement Note



Tony Torre plays third base.

Anthony P. Torre retired from Instrumentation in 1974. Today he is 69 years old. He dropped by the office the other day on a visit from his home in Florida and asked if we were interested in items about retirees. Yep, we are.

Torre retired early and moved to Leesburg, Florida, but continued to work. For eight years, he took care of the medical instrumentation at Lake Community Hospital. But working is not the only thing he has done all his life; playing softball is a close second.

In Florida, his team just won the Lake County Seniors Softball League championship and was undefeated for the season. Torre recently moved to Ocala and there plans to organize another team to participate in the same league next season. He says the game is very healthy and relaxing. As the photo shows, Torre is in such good shape everybody ought to take up softball.

## Coming Up

**Sanford Lacks, Senior Geneticist in the Biology Department, will give the last Brookhaven Lecture of the season on Wednesday June 18. Lacks will speak on "Bacterial Weapons: Tools of Biotechnology," at 4:30 p.m.**

## In Memoriam

Ludvik Burgar, Project Engineer in the Applied Mathematics Department, died on June 2 at the age of 46. Burgar had been a member of the Applied Mathematics Department since 1968 and, for the last four years, was on assignment at the AGS. He was a senior member of the IEEE. Burgar is survived by his wife, Marie, a son Marko and a daughter Alexandra. He was a resident of Centereach.

## Equipment Demo

Flexible Business Systems, Inc. will introduce PC Cluster Networking on June 9 from 10 a.m. to 2 p.m. at Berkner Hall. Their representatives will be on hand to demonstrate this network, which they say creates a multi-user environment where users share data and peripherals without sacrificing speed.

## Pick Your Own Strawberries

'Tis the season to be . . . picking strawberries! June is the month to indulge your passion for the ripe red fruit. The following list offers a representative selection of farms in the Brookhaven area. The berry-picking experts at the Bulletin recommend calling the farms in advance and planning early morning expeditions. Black tie strictly optional. Happy picking.

**Anderson Farms:** Route 58, Riverhead. 727-1129. Open 7 days a week from 8 a.m. 5 p.m.

**John Berezny:** Sound Avenue, Riverhead. 727-4661. Open 7 days a week from 8 a.m. to 5 p.m.

**John Condzella:** Route 25A, Wading River. 929-4697. Open 7 days a week from 8 a.m. to 5 p.m.

**Edward's Farm:** N. Edwards Avenue, Calverton. 727-0472 (after 7 p.m.). 9 acres. Open 8 a.m. to 6 p.m. Containers available or bring regulation baskets.

**Fox Hollow Farmstand:** 143 Sound Avenue, Calverton. 727-1786. Open every day but Wednesday from 9 a.m. to 5:30 p.m. starting from the second week of June.

**Kenneth Glover:** 633 Horse Block Road and Strawberry Lane, Brookhaven. 286-8721. 50 acres. 8 a.m. to 7 p.m. Containers may be purchased. At least one adult for every two children.

**Green Thumb:** Route 27, Water Mill. 726-4989. 10 acres. Open 8 a.m. to 5 p.m. seven days a week. \$.75 per pound. Carton provided. Children welcome.

**Hodun Farms:** River Road, Calverton. 727-2618. Open 9 a.m. to 7 p.m. Containers available at no cost.

**Fritz Lewin Farm:** Corner of Sound and Edwards Avenues, Calverton. 727-3346. Open 8 a.m. to 5 p.m. Containers sold.

**Thomas R. Muller:** Center Moriches. 878-0621. (Ask for Chris or Barbara.)

**Osborn Farm:** Main Street, Wainscott. 537-1328. 8 acres. Open 7 a.m. to 7 p.m. Closed Sundays. Children especially welcome.

**William J. Polak, Jr.:** Church Lane, Aquebogue. 722-3049. 4 acres. Open 8 a.m. to 6 p.m. Containers available at cost.

**Sep's Farm Stand:** Route 25, East Marion. 477-1583. 5 acres. Open 8 a.m. to 5 p.m. Seven days a week.

**Wickham Fruit Farm:** Main Road, Cutchogue. 734-6441. Open 9 a.m. to 5 p.m. Monday through Saturday. Containers included.

**Young's Orchard:** 54 Sound Avenue, Riverhead. 727-5363. 4 acres. Open 8 a.m. to 6 p.m. Containers may be purchased.

## Lite Weight

For three weeks, the Cafeteria menu has featured new "lite weight" dishes, such as fresh vegetable plates, pasta salads, and vegetable and cheese quiches. As well, you may have noticed that some of the standard fare, like broiled fish, are now labeled lite weight.

These lite-weight dishes are now being offered daily, in response to requests from Health Promotion Specialist Elaine Friedman and those enrolled in the on-site Weight Watchers program. "We are trying to accommodate our diners who wish to watch their weight yet eat well," says Assistant Food Service Director Dave Lambert.

Every day, one hot entree, like fresh broiled perch, and one cold salad plate, such as tortellini and vegetables, will be prepared for those who wish to be "lite weight." Low-calorie tossed salads and fresh fruit plates are as always displayed for sale on the ice table. Dannon yogurt, the lowest fat yogurt on the market, in plain and vanilla, as well as fruit flavors, can be found there too.

For those who want a sandwich or just some cold cuts on the side, all cold meats and cheeses now weigh four ounces, a Weight Watchers portion. The regular pick-and-choose salad bar, a mainstay of those watching their weight up to now, will continue, as will low-calorie dressings. The salad bar hours have been expanded from 11:15 a.m. to 1 p.m., Tuesday through Friday.

In addition to fresh fruit in season, seven flavors of Carvel Thinny-Thin dietetic ice cream and two flavors of sherbet can be purchased.

To offer these lite-weight foods, the Cafeteria staff has consulted with Weight Watchers, read dieter's cookbooks, found new food suppliers and retrained their staff to cook with fresh produce and less fat. Two cafeteria workers have extra motivation to see that all would meet Weight Watchers' approval — they are in the program.

"It is up to individuals to follow their diet programs and look for what they need — the choices are there," says Lambert.

## Cafeteria Menu

### Week of June 9

|  |                             |
|--|-----------------------------|
| <b>Monday, June 9</b>                              |                             |
| Chicken noodle soup                                | (cup) .65<br>(bowl) .85     |
| Baked herbed chicken w/1 veg.                      | 2.45                        |
| Skinless baked chicken (lite weight)               | 2.45                        |
| French bread pizza w/sausage topping               | 2.25                        |
| Hot Deli: Ham & mozzarella melt                    | 2.35                        |
| <b>Tuesday, June 10</b>                            |                             |
| Okra Creole shrimp soup                            | (cup) .65<br>(bowl) .85     |
| Pot roast of beef w/1 veg.                         | 2.45                        |
| Broiled fresh fish w/1 veg. (lite weight)          | 2.65                        |
| Chicken salad & cottage cheese plate (lite weight) | 2.35                        |
| Hot Deli: Grilled Reuben                           | 2.45                        |
| <b>Wednesday, June 11</b>                          |                             |
| Tomato rice soup                                   | (cup) .65<br>(bowl) .85     |
| Baked meatloaf w/Spanish sauce and 1 veg.          | 2.50                        |
| Cheddar broccoli quiche (lite weight) w/1 veg.     | 2.50                        |
| Top your own baked potato                          | 1.50                        |
| Hot Deli: Pastrami                                 | (bread) 2.35<br>(roll) 2.50 |
| <b>Thursday, June 12</b>                           |                             |
| Garden vegetable soup                              | (cup) .65<br>(bowl) .85     |
| Vegetarian lasagna w/garlic bread (lite weight)    | 2.50                        |
| Shrimp & broccoli stir fry over yellow rice        | 2.50                        |
| Pasta primavera (served from ice table)            | 2.25                        |
| Hot Deli: Italian sub sandwich                     | 2.50                        |
| <b>Friday, June 13</b>                             |                             |
| New England clam chowder                           | (cup) .65<br>(bowl) .85     |
| Seafood Newburg over rice pilaf                    | 2.45                        |
| Broiled fresh fish (lite weight) w/1 veg.          | 2.65                        |
| Tuna salad plate (lite weight)                     | 2.25                        |
| Hot Deli: Roast beef                               | (bread) 2.35<br>(roll) 2.50 |

# Summer Program

The 1986 summer recreation program will begin on Monday, July 7.

## Swimming Classes

Place: BNL Swimming Pool  
 Activities: Each child will be scheduled for one lesson each week for seven consecutive weeks. American Red Cross certificates will be awarded to those children who qualify.

Time: Monday through Friday - 1:30 to 3:00 p.m.

Fee: \$17 for each child upon registration. Also, each child will pay the daily admission fee of \$1.25, or present a season ticket.

Participation: Children of all employees. A minimum height of 48" is a participation requirement.

Registration applications may be picked up at the Recreation Office between the hours of 8:30 a.m. and 5:00 p.m.; the BERA Sales Office in Berkner Hall between 9:00 and 2:00 p.m.; and the swimming pool during open hours. Mail or deliver applications with registration fees (checks payable to BERA) to Recreation Office, Building 185, no later than June 27.

## Tennis Program

Place: BNL Tennis Courts  
 Activities: Basic tennis instruction  
 Time: Monday through Thursday - 3:00 to 4:00 p.m.

Fee: No fee or registration required.  
 Participation: Children of all on-site employees. Children will provide their own racquets and balls. Children who wish to play in the end-of-season tournament will be asked to pay a \$2 entrance fee.

## Friday Pool Specials

Place: BNL Swimming Pool  
 Activities: Water games and contests  
 Time: Each Friday, 3:15 to 4:30 p.m.  
 Fee: \$1.25 daily pool admission or present a season ticket. No registration is required.

Participation: Children of all on-site employees.

## June Fly-In

On June 23 the Aviation Club is planning a Fly-In to Nantucket. Non-members are welcome to participate in this trip or in any future trip. Check the schedule below and call Audrey Karzenski, Ext. 3962, if you are interested.

- June 23 Nantucket (RD-6/26)
- July 12 Night flight to the Statue of Liberty

Aug. 16 Provincetown

### Possible Trips:

- June ?? Balloon Rally
- July ?? Tanglewood
- June ?? Golf outing
- Aug. ?? Boston Pops
- Aug. ?? Rally at Oshkosh, WI

The next meeting will be held on June 11 in Room C, Berkner Hall, at noon. All are invited.

## Long Island Guide

The Public Relations Office has a limited supply of the 1986 edition of the Long Island Guide available for summer visitors. The Guide is published by Newsday, and is a listing of what to do and where to go on Long Island. To obtain a copy, call Public Relations at Ext. 2345 or stop by our office in Bldg. 134.



Mort Rosen

The annual BNL Volunteer Tour Guides Luncheon was held on May 22 at the Brookhaven Center. These men and women volunteer their time to escort college and professional groups on tours of the Lab site during the work week. Pictured are: (front row, from left) Victor Gonzalez, Peter Boyle, Lucian Wielepolski, George Taylor, Juanita Heyliger, Arlene Clay, Janet Tempel (Tour and Exhibit Coordinator), Jackie Mirzadeh (Tour Organizer), Jackie Larrie, Jean Stafford, Sue Monteleone, Graham Smith, Janice Lamb; (back row, from left) Mark Culp, Fran-

ces Scheffel, Vinnie LoDestro, Payman Mortazavi, Gerry Callister, Audrey Bangel, Tom Dickinson, Andy Feldman, David Comstock, Evelyn Ritter, Peter Kohut, Richard Seebeck, Betty Pergan, Thelma Dawson, Don David. Missing from the picture are: Ron Clipperton, Garfield Hawthorne, Richard Jackimowicz, Les Lawrence, Vincent Lettieri, Elizabeth Mogavero, Lucy Sanchez, Richard Sautkulis, Janet Sillas. If you are interested in becoming a volunteer tour guide, contact the Tour Program, Ext. 4049.

## Motorcycle Club

The club will meet on June 9 at 4:45 p.m. at the Recreation Building.

## Softball

### League I

- Games Week of May 26
- Blue Jays 15 - Ravens 2
- Cool 'n Gang 15 - Dirty Sox 9
- Six Pax 12 - Phoubars 6
- Moles 20 - A-Team 14

### League II

- Cutting Edge 17 - Phase II 11
- Scram 13 - Magnuts 12

## Arrivals & Departures

### Arrivals

- Mark A. Andrews ..... Chemistry
- Ralph Mevs ..... Reactor
- Stephen R. Springston ..... DAS
- Xiao-Qing Yang ..... DAS

### Departures

- This list includes all employees who have terminated from the Laboratory, including retirees:
- Henry Boyd ..... Staff Services
  - Paul C. Dozier ..... Plant Engrg.
  - Edward Fowler ..... Medical
  - Walter G. Hansen ..... Medical
  - Janet V. Hayes ..... DAS
  - Betty L. Heldman ..... Medical
  - Thomas F. Kelly ..... Medical
  - Deborah Moore ..... Biology
  - Charles E. Pearson ..... AGS
  - Stephen F. Tyler ..... Safeguards & Sec.
  - Suzanne C. VanDerKolk ..... Medical

## PSI News

The PSI Upton Chapter will be hosting their annual Installation Dinner and Ceremony on Wednesday, June 18, in the Brookhaven Center at 6:00 p.m. Guest lecturer Dean Mildred Green of Suffolk County Community College, Selden, will discuss "Preparing for the 21st Century."

Ticket price is \$15. Make checks payable to Upton Chapter PSI, and mail to P.O. Box 416, Upton, N.Y. 11973, by June 13. For information contact: Sharon Moore, Ext. 3513; Frances Ligon, Ext. 3709; or Mary Cooper, Ext. 4105.

## Tennis

### Court Reservations

Two tennis court reservation systems will go into effect on Wednesday, June 11. The rules for court use are posted at courtside and in the BERA Sales Office, Berkner Hall. Under the advance reservation system (A), three of the courts may be reserved for weekday play the day before play (thus Friday for Monday play). On-court scheduling (system B) offers the three remaining courts on a first-come, first-served basis to players who sign the blackboard at courtside at the time of play.

Reservation sheets for system A are held at the BERA Sales Office from noon to 1 p.m. on the day preceding play. Reservation sheets for the day's play will be posted at courtside in the morning, where players may reserve any courts that remain open. Only

group 1 from the priority players list below may use system A. Only groups 1 and 2 may use system B:

1. Laboratory employees, including Visiting and Guest appointees.
2. Laboratory employees playing with family members or personal guests.
3. Immediate family members of Laboratory employees.
4. Personal guests of Laboratory employees.

## Singles Club

A meeting will be held on June 10 in Berkner Hall lobby at 12:20 p.m. An important announcement will be made about the future of the club.

## Call for BNL Artwork

The 10th BERA Members' Art Exhibit opens on Monday, August 4 at 4:45 to 7:00 p.m. in Berkner Hall. All BERA members including employees, immediate family 16 years of age and over, and retired employees are invited to contribute their work to the exhibit, which will run from August 4 to 13 during the hours of 11:30 a.m. to 1:30 p.m. Two categories — pictures and sculpture — will be displayed in the exhibit. Contributions done in watercolor, oils or acrylics, drawings and graphics, and mixed media will be accepted under the picture category. All works should be suitably framed and ready for hanging. Because of limited space, exhibitors may be requested to limit their contributions. Crafts should not be submitted for this exhibit; a craft show is planned for 1987.

In order that a printed catalogue can be ready for the opening, the Art Committee requests that two forms be completed for each work intended for exhibit and returned to the BERA Sales Office in Berkner Hall no later than July 15. Additional forms may be picked up at the BERA Sales Office. Works should be delivered to Room B, Berkner Hall, August 4 between 8:30 a.m. and 12:30 p.m., and picked up there on August 13 between 1:30 and 3:00 p.m. The Committee cannot be responsible for works left after that time.

### Return To BERA Sales Office - Berkner Hall

Name of Artist ..... Phone .....

Title of Art Object .....

Medium .....

Laboratory Contact .....

# BROOKHAVEN BULLETIN

Published weekly for the employees of BROOKHAVEN NATIONAL LABORATORY

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 MARSHA BELFORD, Reporter

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## 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 and/or appropriate bargaining unit, 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.

### THE VACANCIES LISTED BELOW HAVE BEEN EXEMPTED BY THE DIRECTOR'S OFFICE FROM THE CURRENT FREEZE ON OPEN REQUISITIONS.

**SCIENTIFIC POSITIONS OPEN:** The following staff positions are open. Candidates may apply directly to the department representative named, or through the Office of Scientific Personnel, Ext. 3338.

**SCIENTIST-MECHANICAL ENGINEER:** Ultra high vacuum specialist, to head a vacuum group, with responsibility for research and development, construction and operation of the vacuum systems in an expanding AGS accelerator complex. Contact: D.I. Lowenstein.

**LABORATORY RECRUITMENT** - Opportunities for present Laboratory employees.

2445. RIGGER GROUP LEADER - Plant Engineering Division.

2446. SECRETARIAL POSITION (1 year-term) - Requires excellent secretarial and communication skills and a broad-based knowledge of BNL procedures and policies to provide clerical support to a large EXXON PRT staff. Duties include correspondence and scientific manuscript preparation, record keeping and facility scheduling. National Synchrotron Light Source Department.

**OPEN RECRUITMENT** - Opportunities for Laboratory employees and outside applicants.

2447. ENGINEERING POSITION - Requires MS or PhD in mechanical engineering and relevant experience in high vacuum systems, large magnets, electromechanical devices, support structures, survey and alignment and rf cavities. Will be responsible for the design, construction and installation of mechanical components and systems. Accelerator Development Department.

### Autos & Auto Supplies

85 DODGE CHARGER - 2.2 liter, 5 spd. manual, h/b, sunroof, w/extras, red, 727-2861, after 6 p.m.

71 CHEVY NOVA - for restoration, runs, Ext. 4914 or 924-4922 after 5

73 CHEVY NOVA - 4 dr sedan, V-8, p/s, a/t, just tuned, new tires, new brakes, good running cond. \$550. Ext. 3370 or 751-2469 eves/weekends.

84 PLYMOUTH VOYAGER - 25k, mint, a/c, 2.6, \$9,000 Al Ext. 4926 or after 5 p.m. 231-4613.

84 CHRYSLER TOWNE & COUNTRY WAGON - mint condition, fully loaded, 32,000 mi., \$6950. Call 477-2262 after 6 p.m.

75 MUSTANG II - GHIA, 4 cyl. a/t, p/s, a/c, \$975. 473-0027

72 OLDS CUTLASS SUPREME - very good running condition, \$600 negotiable, evenings 924-0582.

68 AMC REBEL - runs, \$250 will negotiate, Ext. 5012.

74 MONTE CARLO - new engine, new trans., mag wheels, cassette. Asking \$850, will negotiate, after 5 p.m. 727-1025.

78 FIAT 128 - 2 dr, 4 spd., blue, very well kept, good on gas. \$1,000 reliable transportation. 732-6712.

4 RIMS 16" - 5 hole Chevy. Call Ext. 5316, Walt.

71 FORD VAN - long bed, heavy duty, ex-telephone truck, \$1,100. Don, Ext. 4009.

67 CHRYSLER CONVERTIBLE - new top, new seats, p/s, p/b, p/w, a/t, 383-V8. Tony, 698-6274.

82 CHEVROLET S.W. - Malibu classic V6, very good condition, \$3,900. 78 CADILLAC - Fleetwood Brougham - like new. \$3,900 good investment. 475-4596.

75 F100 PKUP - 68K original miles, engine excellent, lots of rust, \$850. John Ext. 4153, 744-1845.

74 CADILLAC - Fleetwood Brougham, fully loaded, p/s, p/b, a/c, am/fm, 4 dr. sedan, 68k mi., \$1,575. Fred, Ext. 3259 or 473-8622.

GM PU - front bumper, \$35; slide out tire carrier, \$15; st. st mirrors \$35 pr.; am radio, \$10. Tony Ext. 2462

59 CHEVROLET WRECKER - mechanically sound, cosmetically unsound, \$350. 286-1829.

73 VW - Squareback, very good running condition, many new parts: clutch, brakes. Wolfgang, Ext. 5295, 744-7006.

78 TOYOTA PICKUP - very good condition, \$1,500 firm. John Schuller, Ext. 3082.

74 YAMAHA MX400B - dirt bike, many extras, moving, must sell \$300. Jim, Ext. 4986, 798-3385, eves.

82 SCOTTY TRAILER - 15', sleeps six, all utilities, extras. \$4,300 neg. 654-8585, eves.

85 HONDA SCOOTER - elite 80 - orig. owner, \$600. Steve 744-8087.

81 MONTE CARLO - excel. cond., ps/pb, t-roofs, am/fm, mag wheels, midnight blue. \$4,500 firm. 475-5399.

75 CADILLAC COUPE DE VILLE - excellent condition, \$1,200. 751-1413.

80 HONDA HAWK - 400 cc, 2,300 miles, \$150, 473-2473.

75 IMPALA - blue, a/c, a/t, p/s, p/b, am/fm, good tires & body, recent tuneup & exhaust system, reliable. Ext. 4118 or 928-5714.

77 HONDA CIVIC - 2 dr., 4 spd., am/fm, good cond., \$1,100. 751-1026.

78 CAMARO - p/s, am/fm cassette, straight 6 cyl., 3 spd., standard shift, good tires, good condition. 744-3203 after 5:00 p.m.

75 OLDSDELTA 88 - p/b, p/s, a/t, a/c, am/fm cass, runs well, new tires, \$600. Ext. 2788 or 2337.

84 CHRYSLER LeBARON - 4 door, p/w, p/dr. lk., 6 spker, etr stereo/cass, p/ant, a/c, white/blue vel. int., 23k, mint \$7,500, Ext. 5176.

79 PLYMOUTH VOLARE - Wagon, white 6 cycl, p/s, p/b, new a/t, roof rack, 71k, asking, \$2,150. Ext. 7505, 689-8605.

TIRE - G78-14, 4-ply on Olds wheel, \$30. Ext. 3312.

TRAILER - 4'x7' w/univ. hitch, \$100. Ext. 7234.

83 NISSAN PULSAR - silver, 4-D sedan, 5-spd manual, a/c, 44k mi, mint, 0.35 co. Ext. 2198 or 744-4662.

77 PLYMOUTH TRAILDUSTER - 4x4, a/t, a/c, p/s/b, body bad, mech. sound, new parts, 76k mi., \$2,700 neg. Ken, Ext. 2350, 698-4254.

TIRES - 2 P195/75R14 Firestone 722 steel belted radial w/w. 727-5912.

6 PLYMOUTH VALIANT - 6 cyl, a/t, p/s, p/b, a/c. Jim, Ext. 1000, 369-0432.

74 DATSUN 710 - a/t, 2 dr., am/fm, new battery, alternator & starter, runs well. \$600, Ext. 3511, Don.

76 HONDA - CB360T blue, 4,800 mi., good condition, garaged, \$400; 68 FORD FALCON - wagon, 6 cyl, running condition, plus extra engine and parts, \$70. Ed, Ext. 3062.

76 VOLARE WAGON - p/s, p/b, a/c, new exhaust, good cond., 83k, \$950. Ext. 3458 or 369-2504.

71 TORINO - 4 DR, 302, a/t, p/s, stereo, new tires, good running, body fair, asking \$450. 473-7186 after 6 p.m.

80 OLDS OMEGA - 2 dr., a/t, V6, p/s, p/b, am/fm cassette, \$2,000. Bill, 472-4684, weekends.

82 DATSUN SENTRA - 4 dr. hatchback, sunroof, a/t, p/s, p/b, a/c, am/fm, exec/cond., \$4995. 728-6353.

TIRES - (2) CR78-14 snows, \$20 ea; (1) LR78-15 snow \$25. Ext. 4597 or 924-8213 after 5.

76 BUICK ELECTRA - loaded, mint cond., one owner \$3,200. Rob, Ext. 3472.

75 LINCOLN CONTINENTAL MARK IV - ac/pw/pl/ps, moon roof, black, 82,000 mi., garaged, perfect condition, asking \$3,200. 728-2265.

79 SUNFUN - Pickup truck camper for 8' bed. 283-7950.

84 SHASTA - travel trailer, 23.5', sleeps six, \$7,500. 286-9217 after 5 p.m.

81 CUTLASS SUPREME - 2 dr; V6, a/c, p/s, p/b, am/fm, radials, \$4,300. Ellie Ext. 3395 or 325-1537 after 6.

**Boats & Marine Supplies**

21' ALUMINUM BOAT - with large galvanized trailer, no motor, \$900. 475-4199.

1984 CENTURY BRONCO - 18' Bowrider, 120 hp, Merc I/O, swim platform, compass, extras, mint, \$9000. 286-0372, Alan.

8' DINGHY - w/British seagull motor, \$450. Don, Ext. 4009.

DINGHY SAILBOAT - sail, carrier, 2-3 people capacity. \$375. 286-3211.

20' MAKO - 175 hp, trailer, winch, full canvas, many extras, like new. \$10,500. MERCURY OUTBOARD - 4 hp. \$250, 286-1829.

**Miscellaneous**

AIR CONDITIONER - Whirlpool, 5,500 btu, oldie but goodie, \$35.; Caloric wall oven, gas, used 1 year, \$250.; yellow formica dinette, table & 4 chairs, \$35, after 5, 589-4327.

BICYCLES - man's 10 spd., \$50.; woman's 5 spd., \$50; child's 20", \$30. Ext. 7953; 289-0532 after 6.

PHOTO SCREEN - new 18'x24'; tennis racket, cat gut strings, \$5; wallpaper, new, cocoa. Susan, 4267.

TERMINAL - and manual, Hazeltine model 1000, works fine, \$75; computer printer stand, \$15, Rich 4172.

POOL SLIDE - turquoise, exc. cond., \$200, call evenings, Bill, 585-2563.

COMB ALUM. STORM DOOR SCREEN - wood front door, weatherstrip with weatherstrip jams, 1 1/2x36x6'8". Ext. 2557.

STRAWBERRIES - pick your own in Center Moriches. Chris or Barbara at 878-0621.

BABY CRIB - walnut, \$20; table saw, \$45; antique pot belly stove, \$75; single bed-cherry, \$10. Ext. 7234.

SANSUI STEREO - rack system with extras, \$500; Super 8mm movie camera - with extras, excel. cond., \$50. Mark, Ext. 5350.

3M DISKS - 5 1/4" ds/dd, new \$10/10; portable typewriter, \$25. Jim, Ext. 3372.

COLONIAL - sofa, chair, rocker, ottoman, pine frames, coffee table, three side tables, excellent, \$950. Ext. 2529.

FREEZER - Amana upright, \$100; large walnut china closet, \$300; Castro convertible, 8', \$150. Ext. 2529.

CIRCULAR SAW - craftsman 7", 1 1/4 hp, \$30; bench vise, 3" with 4" opening, \$15. Ext. 4745 or 722-4076.

B&D ELEC EDGER - \$35. Joe ext. 4255 or 289-1831.

GENERATOR - 5 KW elect. start B&S motor, never used, \$695. Fred, Ext. 3259 or 473-8622.

CUSTOM ROD - Penn Internat'l 30, #50 rod blank. \$350. 286-1829.

CAMPING INSULATION MATS - like new, \$5 each. Ext. 5295 or 744-7006.

A/C - Fedders, 16,000 btu, 220V, cools perfectly but motor makes noise. \$50/best offer. Ext. 2676.

30" FOLD UP BED - 5" mattress 26" & 18" softside tan luggage, 2 upholstered folding chairs. Mike, Ext. 4987.

T.V. - 19" b/w good cond. \$10. Ext. 7732.

PLAYER PIANO - Lowrey, excellent condition, purchased at \$1,500 sell for \$500 or best offer. 567-8280, eves.

ELEC LAWN MOWER - B&D, \$45. Sal, Ext. 2460.

SLIDING PATIO DOOR - 5' wide alum. frame, single pane w/screen, \$50. Ed, Ext. 4447.

BICYCLES - 20" dirt, rarely used \$25; girl's 10-speed \$20; girl's 1-speed \$10; 331-4538, Ext. 3780.

REFRIG. FRIGIDAIRE - works well, good 2nd refrig. \$35. 924-7658.

CLUB CHAIR - blue velvet, excl/cond. 758-5659.

NIKKORMAT - with 50mm 1:1.14 lens & bushnell 200m lens, 90-230mm, leather cases. 286-8563.

BABY'S DRESSING TABLE - brown wicker, w/white padded top, 4 storage compartments, hamper, shelf. S. Spark, Ext. 4111.

VACUUM CLEANER - Hoover, almost new, \$150; chandelier, \$15. Ext. 3136.

CHAIN SAW - Sears 14", gas, brand new, w/manual \$125. Ext. 7578.

SOFA - excellent condition, \$75. Ext. 4192 or 751-7787.

TV - b/w, 12", \$30. 475-4394.

BICYCLE - Sears 20" 10-speed, \$70. Matt 588-3365.

MAPLE BABY BED - w/mattress and bumper. like new, \$100; (10) wood frame screens, 30x54 1/2; plastic coated, hurricane fence, 4'x30', \$10. Terry, Ext. 2945 or 744-4594.

REFRIGERATOR-FREEZER - GE, 15 cu. ft., frost free, excellent condition, almond, \$375; 30" Well-bilt gas range w/hood; sink, avocado, excellent condition, both \$200. 821-1215.

LR FURNITURE - sofa bed, two chairs, (red, white), telephone table, recliner. Pat, Ext. 4628 or 286-8490.

WINDOW FAN - 12" reversable, two speed, good condition, \$10. Ext. 7732.

FRANKLIN MINT COLLECTORS - collection for sale or individual items; Avon collectors - collection 60s & 70s all for sale; bargains, some bottles, some MB. 395-1903 aft. & eves

**Yard Sale**

JUNE 7 - 10 am-4 p.m corner of Everett and Clinton St., N. Patchogue.

**Car Pools**

GREENPORT - or vicinity, Ed, 3293, 477-2880.

BABYLON - (3) person car pool needs 1 more driver 8:30 to 5:00. Mike, ext. 2705.

BELLPORT AREA - Driver to complete four person car pool. Ext. 2388

NEED RIDE - from Bellport. Will pay. Santi, Ext. 4618, afternoons.

**Free**

SOFA BED - water pump (needs repair), sink. You carry. Gail, Ext. 3338.

DOG - save this loving 3 yr. old female Doberman, Retriever mix, needs good home. 331-4987.

WINDOWS - wood frames, all sizes. Ext. 7234.

CAP - Fits 73/74 Blazer. complete with glass. Ext. 2171 or 957-7159.

KITTENS - mixed colors, cute and need a loving home. Ext. 3302 or 924-0651.

72 VOLVO - for parts, you tow away; rabbit hutch. Dick, Ext. 4255.

**Lost & Found**

FOUND - Day at a Glance, 1986. Physics Dept. seminar room. Carolyn, 3717.

FOUND - Lady's gold watch in vicinity of Building 179. Call Lost & Found, Ext. 2873.

**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**

STONY BROOK - July and August, 3 bdrms, 2 baths, Cape on quiet wooded property, close to beaches. \$700 per month + util. Call office hours, 282-3855.

SHOREHAM - 8 rm furn. house, 4 bdrms., 2 1/2 baths, SWR schools, pool. 744.7642.

SHOREHAM - large, clean 1 bdrm apt. Full kitchen, bath, private entrance. Furn or unfurn. Security, no pets. \$550 includes utilities. 744-8659 or 744-0648.

ORLANDO - stay at our place, 90 mi. from Disneyland near West Coast Beaches, air conditioned, all appliances, incl. washing machine, weekly \$200. 261-2454.

SHIRLEY - 2 bdrms, l/r, eik, full bath, newly decorated, walk to beach, \$675/mo, incl. utilities. 744-2821.

SOUND BEACH - large 2 room apt., full kitchen, pvt. ent. partial use of yard, no children/pets, \$450 mo. pays all. 2 mos. security. After 6 p.m. 744-6668 or 744-5122.

**For Sale**

PATCHOGUE - 2 bdrm. ranch, sunroom, l/r, eik, h/w heat, attached garage, immaculate, garden-er's delight. \$99,900. 286-2093.

MEDFORD - 2 b/r, l/r, d/r, kit, fp, w/w, appliances, attached 1 car garage, fenced yard, landscaped, residential & extras. \$105,500. 698-0576 after 9 a.m., 286-2005 after 12 noon

BIRCHWOOD - 2 bdrm condo, 2 baths, on golf course, central a/c, all appliances, club house, indoor and outdoor pools, tennis, \$110,000. 698-6470.

WILTON TOWNSHIP, N.Y. - 5 acre building lot, flat, wooded, 230' country road frontage electric, 6 mi. NE Saratoga, 1 1/2 mi. from Northway exit, homes nearby, call for info, photos, map. Ext. 7578.

OAKDALE - Idle Hour section near water, 2 story tudor, 4 bdrms, 2 baths, garage, attached full apartment with private entrance, located on 1/2 acre on dead end street, \$189,000. 363-6940, eves.

SHOREHAM - 3 bdrm ranch, garage, cul-de-sac, 1/2 A, Florida room, all appliances, pool, extras, low taxes. \$110,000 firm. Earl 744-1429.

SHOREHAM - spacious 4 bdrm colonial, eik, formal l/r, d/r, family room w/fp, mud room, 2 car garage, full basement 3/4 acre, garden, fruit trees and raspberries, SWR-SD, \$204,000. 744-4594.

**Wanted**

HOUSE TO SIT - I'm remodelling and need a place to stay July-Aug. George, Ext. 3262.

SAILBOAT CREW - male/fem. college students with some exp. pref., 7 wks starting 7 July to Azores. Ext. 4676.

CAT - home for affectionate, neutered male, indoor-outdoor. Lois, Ext. 2959 or 732-4776.

FEMALE HOUSEMATE - own room, 6 min. from Lab., \$250/mo., incl. all. Pat, 281-0973, eves and weekends.

APT/HOUSE - 2 bdrm, August 1. Gene, Ext. 5614; Mohan, Ext. 5718, leave message.

HOUSE TO SIT - Free experienced, reliable, caring, any period of time after June 27. J. Allentuck, Ext. 2412.

AIR CONDITIONER - for roof of motor home. Bill, Ext. 4988.

APARTMENT - 1 bdrm, sunny, airy, unfurnished, for single prof. female, non-smoker, immed. occupancy. 437-5275, eves.

CHILD CARE - 20 + hrs/wk, my home, Center Moriches area, 2 children, own transportation. Sue, 874-3693; Creighton, Ext. 3063.

HOME FOR - adult cats and kittens, shots and neutered. 928-9537 or 744-2821.

LAWN SPRINKLER REPAIR - extent of work and price negotiable. Port Jeff Sta. 928-5714 or Ext. 4118.

CONNIE FRANCIS RECORD - or album with song "Baby's First Christmas". Larry, Ext. 2021 or 281-7240.

82 YAMAHA - YZ80, for parts. 924-8213 after 3 p.m.

DOCK SPACE - for 14' sailboat, Peconic or Moriches bays. Ext. 3166, Pete.

**Services**

*Services are listed as a courtesy to BNL employees. They are neither screened nor recommended by the Bulletin.*

ROTOTILLING - free est., small gardens, can make rows. Paul, 924-8143.

HORSE BOARDING - priv. home, lg turn-out area, access to trails, Ilc. Paul 924-8143.

BABYSITTING - my home, Bellport, experienced references. Maryann 286-2435.