

First Electron Beam Stored in U.S. Compact Synchrotron

Last Sunday for the first time, electron beam was stored in the first room-temperature prototype of a compact superconducting x-ray lithography source (SXLS) built in America.

At 10:10 p.m. on October 21, the SXLS project team at the National Synchrotron Light Source (NSLS) passed this major milestone in the international race to build a compact synchrotron using superconducting magnets that is dedicated to producing supercomputer chips by x-ray lithography.

X-ray lithography is the world's most promising new production-line method of manufacturing high-resolution computer chips, with line widths six times smaller than at present. The thinner the pattern lines on a silicon chip, the denser the integrated circuits; the denser the circuits, the more information that can be stored and the faster its flow within a computer.

A synchrotron is a ring-shaped device for storing electrons traveling near the speed of light in a closed orbit of a fixed radius. Either conventional or superconducting dipole magnets are used within a synchrotron to bend the electron beam around the ring. As the electrons accelerate around each bend, they emit bright light. Because of the intensity of synchrotron light, a synchrotron is an ideal light source for x-ray lithography.

Since 1986, it has been the hope that U.S. development of x-ray lithography and compact synchrotron technology will reverse this country's increasing dependence on foreign suppliers of supercomputer chips and increase its share in the world's semiconductor market.

Stored Beam Milestone

"We let the beam circulate for about an hour while it slowly decayed in the normal way," reports Senior Physicist Richard Heese, who heads the NSLS Electrical Systems & Operations Section and is the SXLS project manager. In addition to its one-hour lifetime, the electron beam had an energy of 200 million electron volts (MeV) and started out with a current of about 1 milliampere.

Witnessing the milestone in the SXLS control room along with Heese were: Physicist James Murphy, who is one of the two designers of the SXLS lattice, the periodic arrangement of magnets that bend and focus the electrons and correct for focusing errors; Senior Technical Specialist Thomas Romano, who developed the high-speed fast kicker circuit that transfers the electron beam from the transport line into the compact synchrotron; and Technical Specialist Joseph MacKenna, who was at the NSLS controls that evening.

In addition, Physicist Stephen



The men behind the SXLS success: (from left) Richard Heese, Joseph MacKenna, James Murphy, Thomas Romano and Stephen Kramer.

Kramer came in to measure the first rotation frequency of the stored beam.

Warm vs. Cold Magnets

The prototype differs from the final SXLS by the type of dipole magnets that are used to bend the electrons around the 8.5-meter-in-circumference synchrotron.

The prototype uses conventional "warm" bending magnets. The SXLS itself, which will be built beginning in 1992, based upon the lessons learned from the prototype, and commissioned by the end of 1993, will use "cold" superconducting bending magnets.

While the design energy for the electron beam within the warm-magnet prototype is 200 MeV, the final SXLS will have an energy of 700 MeV — almost the energy of the NSLS' 51-meter-around vacuum ultraviolet ring.

Smallest Synchrotron

The success with the SXLS prototype comes after over a month of commissioning. Before it got under way, however, much work went into building and assembling the NSLS' fourth and smallest synchrotron.

Components for the SXLS prototype were machined by BNL's Central Shops Division and the NSLS' Engineering Section headed by Hank Hsieh. Starting last spring, they were assembled into the compact synchro-

tron by the NSLS Mechanical Engineering Group under Hsieh, the Electrical Group and the RF Group under John Keane. The computer-control system for the SXLS prototype

was adapted by Edward Desmond of the NSLS Controls Group from the system used to run the Colliding Electron Beam Accelerator Facility in Newport News, Virginia.

By August 16, the electron beam from the booster synchrotron, which is also used for the NSLS' x-ray and vacuum ultraviolet synchrotrons, was first brought down the new SXLS transfer line designed by Heese, to the under-construction device.

With the prototype sufficiently assembled, commissioning officially began on September 6. By September 14, electron beam made its first lap around the racetrack-shaped SXLS prototype.

October 19 was a record day: The first synchrotron light was seen, the rf system first added energy to the beam, and bunches of new electrons were first stacked on top of circulating electron bunches. Two days later, beam was first stored.

"Now that we can store beam in the ring, we can do accelerator physics," says Heese.

Among other things that they must learn about the prototype before building the SXLS itself, the SXLS project team will study injection at lower energy, and how to inject efficiently using the single-kicker method, how to correct the orbit to keep the photon flux constant at each port, and how to increase the current.

NSLS Initiative

The initiative to develop a compact synchrotron for x-ray lithography (continued on page 2)

Honoring Program Participants



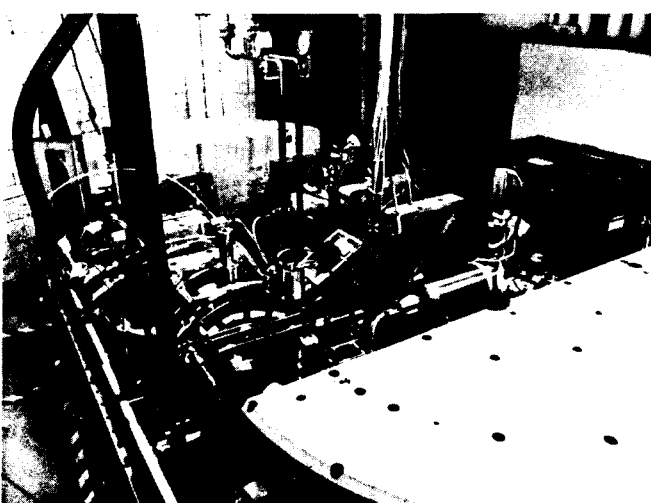
For two weeks a summer, five years in a row, specially selected high school students have come to BNL to work on experiments as part of the High School Honors Research Program, sponsored by the U.S. Department of Energy (DOE) and run at BNL by the Office of Educational Programs (OEP).

This summer, 59 students came from 49 U.S. states, Washington, D.C., Puerto Rico and eight foreign countries. In gratitude for the support that made this year's program possible, BNL participants recently received plaques signed by Secretary of Energy James Watkins; James Decker, Acting Director, DOE's Office of Energy Research; and BNL Director Nicholas Samios.

Here, for example, Mark Sakitt (left), Assistant Director for Planning and Policy; Karl Swyler (second from right), OEP; and Donald Metz (right), who heads OEP, present a plaque to Dean Chapman, National Synchrotron Light Source (NSLS), who, with his team, guided students through a diffraction experiment.

Other researchers who, with their teams, received plaques for working with students at NSLS experiments were: Stephen Cramer, Chi-Chang Kao, and Gwyn Williams, all of NSLS; and Paul Zschack, Oak Ridge National Laboratory. David Weber, Medical Department, received one for work done with students in the SPECT facility.

To acknowledge the contributions of various BNL groups, plaques were also presented to the Chemistry Department, Department of Applied Science, Medical Department, National Synchrotron Light Source Department, Photography & Graphic Arts Division, Physics Department, Public Affairs Office, Reactor Division, Staff Services Division, and the Supply & Materiel Division.



A view from dipole to dipole of the prototype of the superconducting x-ray lithography source. This very compact synchrotron is four meters long and measures a little over two meters across.

Photos in this issue by Roger Stoutenburgh

25 Years on the Course — the Hole BGA Story in One!

It was 1965 when the grip of golf and the opening of the Middle Island Country Club drove BNL staff into forming the BERA Golf Association (BGA).

"Until that year, the nearest courses were in Bethpage and Hauppauge," recalled Ronald Webster, BGA president since 1981, "although the army had left us with a putting green, now gone, behind the Brookhaven Center. So a new, 27-hole championship course on our doorstep at Middle Island — offering a discount for Lab employees — made it a good starting time for the BGA."

Since then, a quarter-century of magnificent tee shots, superb short play and brilliantly sunk putts has carried BGA golfers through innumerable games — with a few hooks, slices and lost balls to add dark relief.

BGA membership varies from year to year, but during the BGA's just-completed 25th season, members stood at just under 130. Said Webster, "There's a team league, an individual league and various tournaments. The idea is to be as flexible as possible, so that everyone can join. At present, men form most of the group, but we encourage women members, and we have a few husband and wife teams. When there are enough women players, we hold a women's championship in addition to the annual team and individual league championships."

For the team league, which currently has 44 teams, Webster explained, two teams, each with two partners, choose a mutually convenient day and place for a match. The teams are divided into four groups by handicap so beginners don't come up against the best players.

This year, 24 players are participating in the individual league, which is a match-play league and also uses handicaps to even the odds. Again, players set their own time and place for the match.

Tournaments are held once a month at different golf courses, for all comers — BGA members, family or friends. Sometimes they are held as scrambles — with all players on a team each hitting a ball. The best ball position is chosen, everyone hits another ball from that spot — and so on till the ball is in the hole. "We get some remarkably good scores!" commented Webster.

Tales From the 19th Hole

Webster's memory of one remarkable score is especially vivid. "It was a par-three hole," he said. "One player put a ball well on the green — but it couldn't be found. Just as he was getting furious, someone looked in the hole, and there it was. Not only that, but his partner, whose tee shot landed in a sand trap, made a great recovery, got the ball out of the sand trap and right in the hole for a two!"

Several other BGA members have realized the golfer's dream of a hole-in-one. This year, it was Ron Weider at Heatherwood golf course. In 1980, Mike Zguris got what the Bulletin reported as the first league-play hole-in-one,



This year's BGA champs are Ron Weider (left), who won the individual league championship, defeating Dave Kirby 5 and 4; and team league champions Mike Losquadro (center) and See-Meng Wong, who beat Joan and Les Lawrence at the 18th hole.



At the site of the old Camp Upton putting green behind the Brookhaven Center are the members of the BERA Golf Association committee: (from left) John Nagy, league statistician for four years; John Usher, handicap secretary for 12 years; Bob Mills, treasurer for 10 years and a past president; Ron Webster, president for 10 years; and Joe Carbonaro, tournament secretary for three years.

123 yards at the 16th hole of Swan Lake course, using his number 9 iron. "But I was so shook up, I took an eight at the next two holes!" lamented Zguris.

No true golfer ever played without deciding at least once that, even if all of his or her clubs should not be broken in half, at least they should be sold off cheap at the next family yard sale.

One well-known BGA story recounts how a bad day's golf infuriated a player to the point where he hurled his club in the air in frustration. Inevitably, this was a most successful throw, and the club flew so high that it stuck in a tree. It took the combined Tarzan-style maneuvers of all four players to retrieve it.

A Cold-Blooded Lie

There are no lengths to which a golfer will not strain to save a stroke. A ball in the worst imaginable position, or lie, may still make the green — and, thereby, with any luck, break the morale of an opponent.

On one occasion, very early in the year, two BGA members played a match at Timber Point golf course. Bouncing on the hard ground, one ball rolled out on the ice that still edged a small pond. Rather than take a penalty stroke for picking up the ball, the player gingerly tested the ice. It seemed safe. He ventured out.

No creaks came from the ice. He swung.

However, he forgot to allow for the shift in body weight as he pivoted. On the downswing, his weight moved smoothly to his left foot, which shot under the ice. For the rest of the game, the player had a pretty cold foot. "But it was a great shot," recalled his opponent, whose morale weathered the onslaught.

While there is always one more golfing tale to be told, a past BGA president, Bob Mills, put first things first. When asked to provide more highlights of BGA golf — by what was then "tomorrow" — he replied that, though he might well think of some good stories, it would not be for tomorrow. "Tomorrow," he said, "I'm playing golf." — Liz Seubert

Coming Up

Halloween Carnival

The Upton Nursery School will hold a Halloween Carnival tomorrow, Saturday, October 27, from 1 to 4 p.m. at the Recreation Building, rain or shine. The carnival will feature a pumpkin decorating contest, with a \$3 entry free for each already-decorated pumpkin entered and exciting prizes. Refreshments will be sold. For information, call Cal Roberts, 874-2992, or Jim Roberts, Ext. 7990.

Archery Tournament

The Archery Club will hold a fall tournament on Saturday, October 27, at noon at the archery range. After the tournament, there will be awards, a drawing for prizes, and hamburgers, hot dogs and soda.

Entry fees are \$2 for members, \$3 nonmembers and \$1 non-shooters. The rain date is Sunday, October 28, at noon. For information, call Bill Schoenig, Ext. 2377.

First BERA Concert

The 1990-91 BERA Concert Series will be ushered in on Monday, October 29, at 8 p.m., in Berkner Hall, with a recital by internationally renowned pianist John O'Connor. His program will include works by Beethoven, Chopin, John Field, Haydn, Alexander Scriabin and Schubert.

Tickets can be purchased at the door for \$12 general admission, \$9 students and those over age 65, and \$5 children under 18. Block tickets, good for any concert, will also be sold at the door at this first concert, for a cost of \$9 each for a minimum of five tickets.

Wine & Cheese Party

Brookhaven Women in Science (BWIS) will hold its annual Wine and Cheese Party at the Brookhaven Center on Thursday, November 1, from 4:30 to 6:30 p.m. All BNL employees are welcome.

The party is held every year to introduce BWIS's new officers and recruit new members. For more information, call Betty McBreen, Ext. 5111.

In Memoriam

Henry P. Noehren, who retired from the Alternating Gradient Synchrotron Department (AGS) as a principal technician in 1982, died on September 6. He was 71 years old.

Noehren spent 20 years at BNL, all of them with the AGS. He started at the Lab in November 1962 as an intermediate technician, and moved steadily up the technical ranks. He was promoted to his last position in 1979 and retired in May 1982.

Noehren was a resident of Bellport, and he is survived by his wife Doris Noehren; a son, Thomas Noehren; a daughter, Nancy Cavaliere; a grandson, Thomas Noehren; and two sisters, Helene Pritchard and Grace Meurman.

As in past years, reservations will be made in the order determined by a lottery, which will be held for those attending the meeting. As long as dates are available, subsequent reservations may be made through Friday, November 16, by contacting the Recreation Office, Ext. 2873.

Brookhaven Center

To make reservations for parties at the Brookhaven Center, call Jean Byrne, Staff Services, Ext. 2553.

Year-End Golf Standings

In addition to the overall championships won by Mike Losquadro, Ron Weider and See-Meng Wong (see photo), champs of BGA's regular season play were:

Individual League

- Group 1 — Steve Heald
- Group 2 — Jane Monhart
- Group 3 — Art Waligura

Team League

- Group 1 — Mike Losquadro & See-Meng Wong
- Group 2 — Ralph Brown & Cliff Weiner
- Group 3 — Joan & Les Lawrence
- Group 4 — Andy Warkentien & Dan Wilson

The awards for best-overall performances in BGA tournaments went to Tony Baltz for net-score standings, and John Usher for gross-score standings.

In the year's final tournament at the Middle Island Country Club, 64 golfers competed, with the following results:

Flight	Low Gross Score	Low Net Score
A	John Millener, 80	Les Lawrence, 70
B	Jim Morris, 93	Bob Lofaro, 75
C	See-Meng Wong, 94	Hank Arnesen, 71
D	Bob D'Angio, 106	John Nagy, 77
E	Dick Schonberg, 106	
	Bob Kelly, 110	Ron Yuhas, 71

Long drive: Vinnie Racaniello, John Usher

Closest to the pin: Joe De Pace, Howard Vetter

Beam Stored

(cont'd)

began at the NSLS in 1986 with a series of workshops that brought together the semiconductor industry, equipment manufacturers and NSLS accelerator-physics expertise. As a result, industry decided that they wanted a room-sized, push-button, inexpensive synchrotron designed to emit x-rays at the ideal wavelength and energy for x-ray lithography.

By 1988, a five-year, \$32-million program was initiated by the U.S.

Department Defense for the SXLS project team to work with Grumman Aerospace and General Dynamics to develop the U.S. capability to manufacture compact synchrotrons.

Six engineers from Grumman Aerospace in Bethpage have been working with the NSLS groups involved in the SXLS project. In addition, Grumman manufactured the RF cavity used in the SXLS prototype, and General Dynamics in San Diego will build the superconducting magnets for the final SXLS. — Marsha Belford

Holiday Parties: Time to Reserve

Recreation Building

Lab organizations and BERA activity groups interested in reserving the Recreation Building in the apartment area for holiday parties are invited to send a representative to a meeting on Monday, November 5, at 11 a.m., in the conference room of Bldg. 185A.

Inside Info

James D. Watkins, Secretary of the U.S. Department of Energy (DOE), recently sent a letter to BNL Director **Nicholas Samios** supporting the Federal Laboratory Consortium (FLC) for Technology Transfer and commending the Lab "for your contribution to the outstanding record DOE has achieved in supporting the FLC in its effort to promote domestic technology transfer from Federal laboratories."

BNL's representative to the FLC is **William Marcuse**, Technology Transfer Office (TTO). As Watkins wrote, "Especially noteworthy are the contributions of Dr. Marcuse as the Regional Coordinator for the Northeast Region and member of the Executive, Member Services, and Industrial/Government/University Relations Committees. Ms. **Dorry Tooker** [TTO] is a member of the Marketing and Public Affairs Committee and the Alternate Representative. Brookhaven National Laboratory has contributed one case study summary to the FLC publication *Putting Technology to Work*."

Watkins also noted that of 80 FLC Technology Transfer Excellence Awards received by DOE since 1984, BNL staff have taken eight. He also observed that Marcuse won the 1988 Representative of the Year Award.

Swim Club

In their fifth season of competition, six members of the BNL Swim Team brought home 22 medals for top-three age-group finishes at the Flushing YMCA masters swim meet October 21. **Marsha Belford** came back after an absence of almost two seasons to set one personal record and contribute 24 of the team's 179 points towards the small-team standings in Empire State Masters Swimming.

50-yard Freestyle		
Peter Heotis	26.03	1st men 35-39
Roger Klaffky	29.74	2nd men 45-49
Paul Michael	32.59	2nd men 60-64
Marsha Belford	34.01*	2nd women 30-34
100-yard Freestyle		
Peter Heotis	58.04	3rd men 35-39
Roger Klaffky	1:05.95	4th men 45-49
Marsha Belford	1:16.23	2nd women 30-34
Paul Michael	1:19.44	1st men 60-64
200-yard Freestyle		
Ron Wittlock	2:42.36	3rd men 55-59
50-yard Butterfly		
Peter Heotis	29.24	4th men 35-39
Paul Michael	49.32	2nd men 60-64
100-yard Butterfly		
Peter Heotis	1:07.31	1st men 35-39
Wlodek Guryn	1:18.24	1st men 40-44
50-yard Backstroke		
Ron Wittlock	33.90	1st men 55-59
100-yard Backstroke		
Ron Wittlock	1:15.24	1st men 55-59
200-yard Backstroke		
Ron Wittlock	2:51.40	1st men 55-59
Roger Klaffky	2:57.29	2nd men 44-49
50-yard Breaststroke		
Wlodek Guryn	35.26	2nd men 40-44
Marsha Belford	43.81	3rd women 30-34
Paul Michael	43.82	1st men 60-64
100-yard Breaststroke		
Wlodek Guryn	1:16.83	2nd men 40-44
Roger Klaffky	1:21.20	2nd men 45-49
200-yard Breaststroke		
Wlodek Guryn	2:50.55	1st men 40-44
100-yard Individual Medley		
Marsha Belford	1:28.90	3rd women 30-34

* Indicates personal record.

Ghosts of Halloween Past

*Rub-a-dub-dub, three men in a tub,
And who do you think they are?
The butcher, the baker, the candlestick maker...*



You may think these three are the butcher, the baker and the candlestick maker — but you're wrong! They're (from left) **Ann Fort**, **Jeanne Danko** and **Kathy Nasta**, all of the Department of Nuclear Energy, as they appeared on site last Halloween.

Every Halloween since 1987, the trio has concocted a clever costume for three, then taken vacation time to don their disguises and visit their friends around site. What will it be this year? Wait till Halloween!

Hospitality Office

Sharda Sahni, Hospitality Committee Chairperson, invites those living in the on-site apartment area to stop by her office in the Recreation Building or call Ext. 3310.

Since the Hospitality Committee cares about the special needs of people who have relocated from other countries to work at the Lab, Sahni will be happy to talk about this and other committee functions and activities.

For the convenience of apartment residents, a sewing machine is also available during Sahni's office hours, which are:

Tuesday & Wednesday, 12:30 to 2 p.m.
Thursday & Friday, 3:45 to 5:15 p.m.

Cafeteria Menu

Luncheon

Monday, October 29

Soup: Chicken noodle .75/.95
Entree: Shepherd's pie w/1 veg. 3.10
Entree: Cheese ravioli in marinara sauce 3.10
Fitness: Tarragon-baked chicken & veg. 3.10
Carvery: Hot pastrami sandwich 2.85
Grill: Swiss mushroom burger 3.10
SPICE: Try today's breakfast sandwiches

Tuesday, October 30

Soup: Old-fashioned lentil .75/.95
Entree: Italian sausage w/peppers & onions 3.10
Entree: Linguini w/clam sauce 3.10
Fitness: Stir-fried beef & broccoli & veg. 3.10
Carvery: Hot roast beef sandwich 2.85
Grill: Cheese & bacon burger 2.10
SPICE: Soup & sandwich special

Wednesday, October 31

Soup: Cream of chicken .75/.95
Entree: Quiche Lorraine w/1 veg. 3.10
Entree: Eggplant Parmesan w/1 veg. 3.10
Fitness: Oven-broiled fish Italienne w/1 veg. 3.10
Carvery: Hot Black Forest ham 2.85
Grill: Grilled cheese 1.95
SPICE: Trick or Treat

Thursday, November 1

Soup: Cream of broccoli .75/.95
Entree: Southern-fried chicken w/1 veg. 3.10
Entree: Pizza w/1 veg. 3.10
Fitness: Macaroni, beef & tomatoes w/1 veg. 3.10
Carvery: Hot corned beef sandwich 2.85
Grill: Double cheeseburger 2.90
SPICE: Chip away

Friday, November 2

Soup: Fish chowder .75/.95
Entree: Sweet & sour pork over rice 3.10
Entree: Baked macaroni & cheese 3.10
Fitness: Baked fish w/1 veg. 3.10
Carvery: Hot turkey sandwich 2.85
Grill: Tuna melt 2.10
SPICE: Tater toppers

Breakfast w/coffee, 7:30 - 10:30 a.m. 2.65

Mon.: 2 eggs, bacon & pancakes
Tue.: Western omelet, French fries, toast
Wed.: Spanish omelet, home fries, toast
Thu.: 2 eggs, bacon, cheese on croissant, fries
Fri.: French toast, 2 eggs, bacon, home fries

Archery Club

The Archery Club will meet on Thursday, November 1, at noon, in the seminar room lounge of Physics, Bldg. 510. New members are welcome. For information call Bill Schoenig, Ext. 2377.

Oktoberfest

Enjoy German dinner entrees at the Brookhaven Center.

October 29 — November 2

Change Your Clock, Change Your Batteries

At 2 a.m. on Sunday, October 28, be prepared to fall back to Eastern Standard Time — and to change your batteries.

Joining with fire departments across the nation, BNL's Fire/Rescue Group is encouraging all employees to coincide their annual battery changes in their home smoke detectors and flashlights with the clock change.

Working smoke detectors reduce the chance of dying in a fire by half. But the key word is working.

As smoke detectors began being used, the number of fire deaths dropped correspondingly. But progress began to halt — until 1988, when the number of deaths caused by fire actually rose.

The increase in fire-related deaths is attributed to neglect of smoke-detector maintenance.

Studies show that as many as half of all smoke detectors are not working because of old or missing batteries. Survey respondents say that they do not maintain their smoke detectors for two reasons: They forget or they didn't know that the batteries must be changed.

Changing batteries is simple: Besides new batteries, you need a stepladder and a screwdriver. Because cobwebs and dust can impair a detector's sensitivity, take the time to clean it as well.

While you are at it, use fresh batteries to change the ones in your flashlights. Because most fires happen at night, handy working flashlights can be lifesavers too, lighting the way to a dark exit.

With fresh batteries in place ready in case of emergency, resist the temptation to borrow them for other purposes.

Last Call for Crafts For BERA Show

The 5th BERA Members Craft Show, sponsored by the BERA Art Society, is scheduled for Berkner Hall, Rooms B and C, from Tuesday to Friday, November 6 to 9. Viewing hours will be from 11:45 a.m. to 1:30 p.m. daily, as well as 5 to 7 p.m. on Tuesday, November 6.

All BERA members — employees, their family members of 15 years and older, retirees and guests of BNL — are eligible to exhibit their crafts. More than one piece may be entered by an exhibitor, to be shown as space permits. No sales may be made on site during the show, but a name and phone number may be attached to the work so an exhibitor can be contacted.

Entry forms are available at the BERA Sales Office, or from Liz Seubert, Ext. 2346. They must be returned by Monday, October 29, to Jackie Mooney, Bldg. 510.

Exhibitors should bring their work to Berkner Hall, preferably on Friday, November 2, from 1 to 5:30 p.m.; or Monday, November 5, from 8 to 10 a.m.; and collect it on Friday, November 9, from 2 to 4 p.m.

Bowling

Purple League

Joe Ferrante had a 204, Gail Schuman 185, Georgia Irving 180.

Red/Green League

R. Eggert had a 265/236/683 scratch series, R. Larsen 233, R. Mulderig 223, E. Sperry IV 222, R. Wells 215, K. Riker 214, A. Warkentien 212, C. Dimino 208/202, H. Arnesen 207, H. Marshall 206, M. Guacci 203, C. Bohnenblusch 202.

Local Users Group

The next meeting of the Upton Local Users Group (LUG) will be on Wednesday, October 31, at 10:30 a.m., in Room B, Berkner Hall. All interested users are welcome. For more information, call Zohreh Parsa, LUG Chairperson, Ext. 4748.

This
October,
Make A
Change
That Could
Save Your
Life

CHANGE YOUR CLOCK



CHANGE YOUR BATTERY

BROOKHAVEN BULLETIN

Published weekly by the Public Affairs Office for the employees of BROOKHAVEN NATIONAL LABORATORY

ANITA COHEN, Editor
MARSHA BELFORD, Assistant Editor
LIZ SEUBERT, Reporter

35 Brookhaven Ave., Upton, N.Y. 11973
(516) 282-2345

