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ON TARGET

THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY • A DEPARTMENT OF ENERGY FACILITY

Lab Director discusses
accelerator operations

FEL team celebrates
First Light; upgrade nears completion

DOE Site Office
oversees, champions Lab

Caccetta tackles range
of challenges as Admin. Division Associate Director

JLab experimental data support evidence of exotic 5-quark particle

by Melanie O'Byrne
contributing writer

Researchers working at Jefferson Lab recently revealed the most convincing evidence yet of a subatomic particle consisting of five quarks — dubbed the "pentaquark."

At the Conference on the Intersections of Particle and Nuclear Physics (CIPANP) held May 19–24 in New York City, researcher Stepan Stepanyan from Jefferson Lab reported "convincing evidence" of a subatomic particle with five quarks. Stepanyan was representing Hall B's CEBAF Large Acceptance Spectrometer (CLAS) collaboration, a multi-national group of researchers, as he presented Jefferson Lab research supporting the existence of the pentaquark.

According to Hall B Leader Volker Burkert, the pentaquark discovery could have profound implications not only for baryon spectroscopy, but for hadronic physics in general — a major research focus at many nuclear physics laboratories around the world. "With the Jefferson Lab results, the existence of the exotic baryon can now be considered firmly established," he says.

Physicists have been hunting for five-quark states for over 35 years. Their searches proved fruitless until recently, when the CLAS collaboration and two

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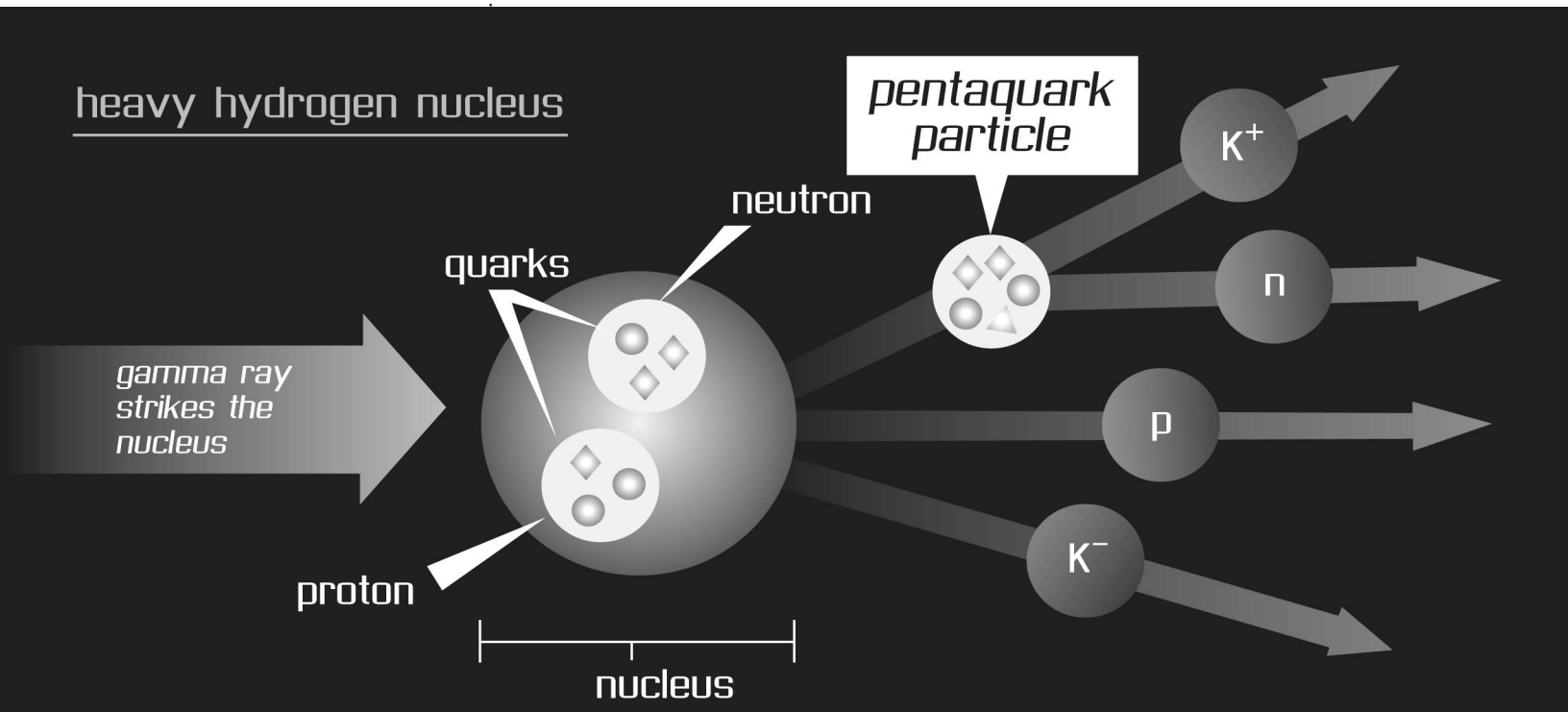


Lori Powell / Jefferson Lab

Congratulations Team!

Upgraded FEL produces First Light

Researchers at Jefferson Lab produced First Light from the 10 kilowatt Free-Electron Laser (FEL) on June 17. This device has been upgraded from the "one kilowatt Infrared Demonstration" FEL, which broke power records by delivering 2,100 watts of infrared light in 2001. Only one and one-half years after the one-kilowatt FEL was dismantled, the newly improved FEL, designed to produce 10 kilowatts of infrared and one kilowatt of ultraviolet light, is undergoing commissioning toward the goal of producing 10 kilowatts by summer's end.

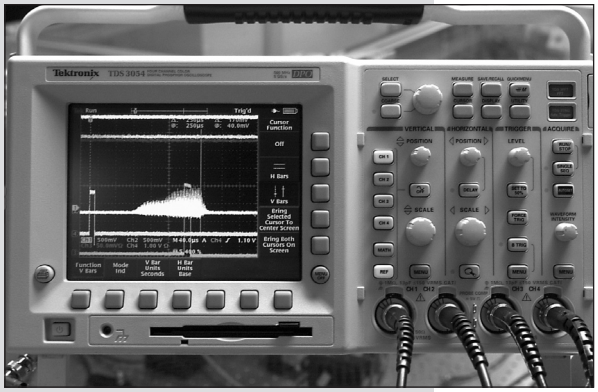
According to Rear Admiral Jay Cohen, Chief of Naval Research, "This project builds on the successful seven-year partnership forged between the Office of Science's Jefferson Lab and the Office of Naval Research. The original kilowatt FEL exceeded the Navy's goals and expectations and we expect no less from the upgraded FEL."

The Free-Electron Laser upgrade project is funded by the Department of Defense's Office of Naval Research (ONR), the Air Force Research Laboratory and the Joint Technology Office.

Jefferson Lab pioneered superconducting technology for accelerating electrons to high energy in efficient, cost-effective accelerators for the Lab's primary mission in nuclear physics. Superconducting electron-accelerating technology offers two commanding cost advantages for FELs: the laser can stay on 100% of the time instead of only 1% or 2%, and more than 90% of the energy that is not converted to useful light in a single pass can be recycled.

The Navy's interest in this technology is the development and demonstration of an electrically driven tunable laser that can operate at infrared wavelengths where light is most efficiently transmitted in the atmosphere for potential applications toward shipboard defense.

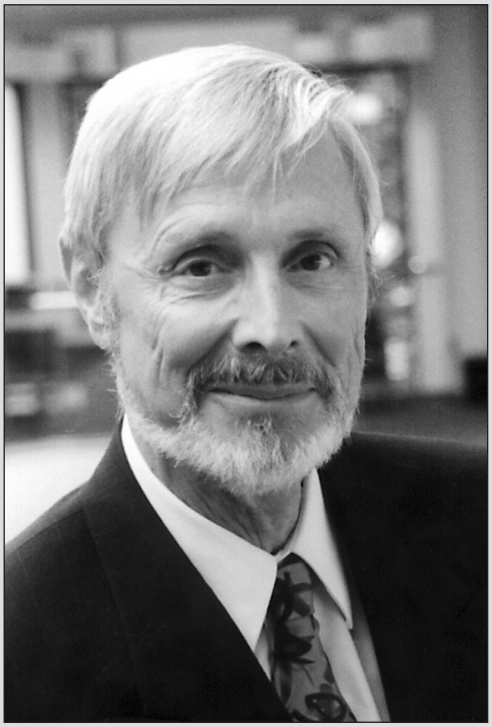
During the two and one-half years the so-called one-kilowatt FEL operated, it broke all existing power records for tunable high-average power lasers. It was used by more than 30 different research groups representing the Navy, NASA, universities and industry for a variety of applications ranging from the investigation of new cost-effective methods for producing carbon nanotubes and understanding the dynamics of hydrogen defects in silicon to investigating how proteins transport energy. These research groups are eagerly awaiting the newly upgraded FEL and are making plans for its use.



The tracer shown on this Digital Oscilloscope indicates laser light in JLab's upgraded Free-Electron Laser.

Many members of Jefferson Lab's Free-Electron Laser team gathered two days after First Light for a group photo.

From the Director



Christoph Leemann
Jefferson Lab Director

Accelerator performance critical to Lab success

Dear Colleagues:

Every organization has a core business, a set of irreducible activities that define its very heart and reason to exist. For our laboratory, this core is the operation of accelerator and endstation equipment to produce the scientific data our user research program calls for. This newsletter begins with a report on the Pentaquark and the worldwide attention it has earned JLab. This discovery is the second event – after the surprising results in the measurement of the proton electric and magnetic form factors – that has provided JLab high scientific and general visibility, and it is of the kind the research community and the funding agencies hope for at the outset of a major initiative such as the construction of CEBAF. The very base of this research enterprise, the fundamental enabler of scientific insight, is the operation of accelerator and endstation equipment. To design, set-up, run, and evaluate experiments for discovery and definitive understanding of nature is our first obligation and our highest priority. Everything else hinges on it: news making scientific discovery, the scientific and political support for upgrades, the justification for new ventures, and the acceptance of work for others.

Given this importance, you will not be surprised that about 40% of the grade we receive under our contract with the DOE is directly or indirectly derived from operations. And it will not surprise you that the first and foremost reason for having systems experts on the staff – and the first and foremost criterion to evaluate their performance – is the reliable operation to specifications of all systems. Only a small fraction of JLab staff will be visibly associated with the research breakthroughs, but by providing impeccable operation and impeccable administrative support, we all can be partners in this exciting enterprise.

The CEBAF accelerator is a marvelous tool, designed and built to the very specific needs of JLab's research program. The specifications are daunting, and the machine is at the absolute cutting edge and very complex. As a consequence, its operation has always been challenging and always has demanded the most careful attention. Most importantly, the requirements of the scientific program are not static but evolve, and users and newly proposed experiments keep pushing the limits. Accelerator Division staff respond and rise to the occasion most of the time, but early this year, a combination of circumstances led to an unacceptable decline in accelerator availability. We resolved that not only were we going to turn this trend around, but set ourselves ambitious goals to improve the machine availability beyond what we had ever achieved.

At this time, the Accelerator Division has managed to turn the decline of operational effectiveness around, producing many weeks of outstanding running, and furthermore is positioning itself to work towards our challenging future goals. It is my deep conviction that with the appropriate diagnostics, with correct calibration of hardware, with user-friendly software, and with thorough beam dynamics modeling time spent "tuning" the beam can be radically reduced, if not completely eliminated, and I have seen progress in that direction.

To tackle these tasks, Andrew Hutton, Director of Operations, has revitalized and re-energized a concept he developed many years earlier: Systems Owners and Performance Integrators. Many complex systems have to work correctly and work together to produce beams to the users' specifications. Keeping a single system in top notch operating shape is both a matter of expert knowledge and of accepted responsibility, ownership in other words, and hence the name "systems owner." Systems owners put the resources they account for and their knowledge to work – and their reputations on the line – to make the system under their control optimally functional. Interactions and interfaces between systems, however, are very complex, and assigning a root cause of inadequate beam performance to a particular system can be tricky. That's where the Performance Integrators come into play. Their task is to assure the harmonious coordination of systems functions, and the analysis of complex, multi-systems failures.

These teams have been hard at work, and it is deeply gratifying to see the noticeable impact they are having. Whenever my schedule allows, I attend their meetings, and I am delighted to observe a new or renewed spirit of "can-do" determination, creativity, and fresh ideas to ensure that our marvelous accelerator can be operated in an impeccable fashion to produce more exciting science.

Joe Gubeli, staff engineer, performs diagnostic work in preparation for bringing the upgraded FEL on line.

JLab's Free-Electron Laser

Upgraded machine continues to be most powerful device of its kind

by James Schultz

Some puzzles are easier to put together than others. In the case of the most powerful device of its kind in the world — Jefferson Lab's Free-Electron Laser, or FEL — it's not a mystery of what goes where. The challenge is assembling the pieces just so to guarantee optimum performance.

The Lab's FEL team is putting the finishing touches on a 10-kilowatt upgrade that will make the laser 250 times more powerful, in terms of average power, than any other existing FEL. Experiments in photochemistry and atomic physics that thus far haven't been possible will become so, as should a series of advanced industrial applications. The military is also keenly interested in potential defense applications: the Navy contributed more than $18 million over the last three years and the Air Force roughly $5 million to the improvements. Additional monies have been provided by the state of Virginia and NASA.

"Calling it an upgrade is a bit of a misnomer," says FEL program manager Fred Dylla. "We've changed 90 percent of the hardware in the machine. We've gone beyond just tweaking. This is a significantly new machine."

Eight more superconducting cavities in a unit termed a cryomodule were added to the linear accelerator, or linac, portion of the laser, and a new electron-gun injector has been installed and commissioned. Early in May, the first electron beam was attained. Since then, beam has been transported through the linac and optimized. First lasing was achieved on June 17, followed by a week of initial laser-light "characterization," or analysis. Early in July the last of the electron-beam recirculation system was installed, and fine-tuning is now underway. The goal is to attain 10 kilowatts in the infrared-energy regime by summer's end, and subsequent resumption of full operations.

"It can be challenging pulling together all these threads," Dylla says. "There haven't been any major problems. We've had little ones, but nothing that we, along with help from our JLab colleagues and outside suppliers, haven't been able to overcome. We still have a lot of work to do before we get the machine up and performing optimally."

The "tuneability" of the upgraded FEL across a broad range of wavelengths, from infrared to ultraviolet, is of crucial importance for materials research, as it helps scientists better understand the behavior of particles at the atomic level and below. Its enhanced capability should also provide industrial uses of the FEL with a fast and cost-effective means of changing material properties, both on surfaces and in bulk.

"If we had stopped at one kilowatt, we would have had a very interesting machine," Dylla says. "But we wanted to make the machine even more useful. And we are."

Improvements began in September 2001 but will not be complete until the fall of 2004. The FEL also produces long wavelength light with a frequency in the range of trillions of cycles per second. This "terahertz" capacity could conceivably lead to imagers that could

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quickly detect biological agents, such as anthrax, and hunt for concealed land mines.

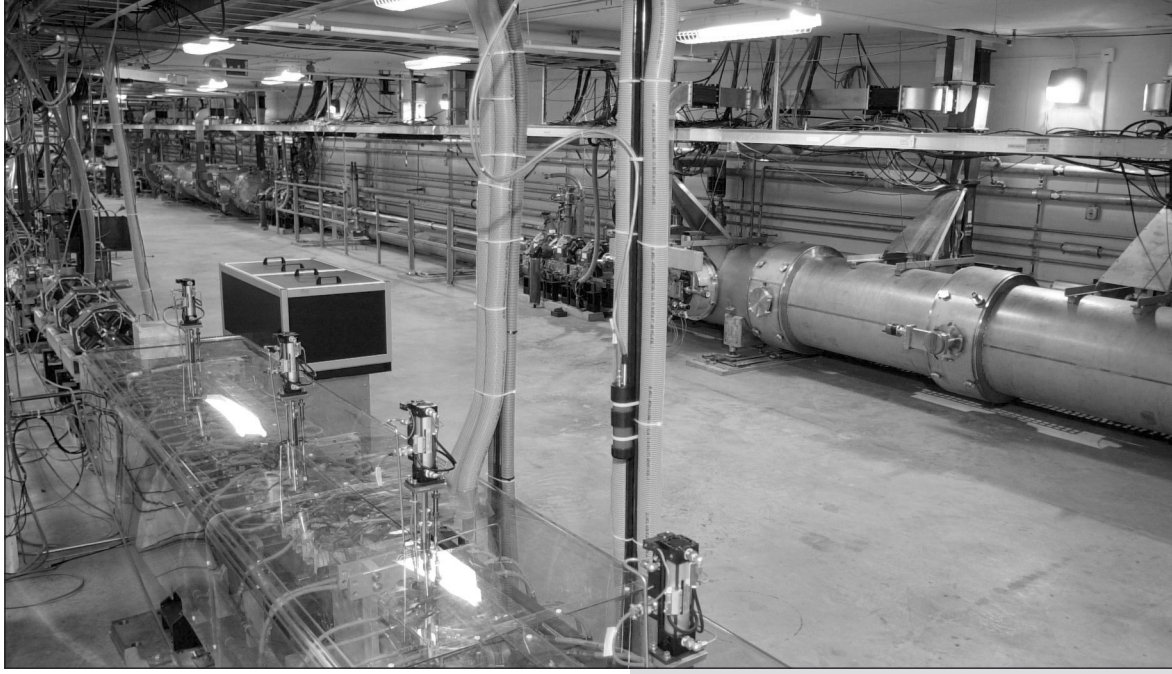
Among the FEL's enhanced capabilities is an ultraviolet-light (UV) one-kilowatt "sidecar" add-on. New experiments with the UV FEL will assess the nature and extent of the human health risk arising from increased exposure to ultraviolet light.

FEL research falls into three broad categories: photo-induced chemistry, biology and materials. FEL proof-of-concept experiments have included investigations of chemical-vapor deposition, a technique used to produce high-quality coatings and thin films for electronics and metals, as well as the effects of FEL processing on nylon, polyester and a class of materials known as polyimides, including altering the surface properties of food packaging, making it more resistant to microbes and food spoilage.

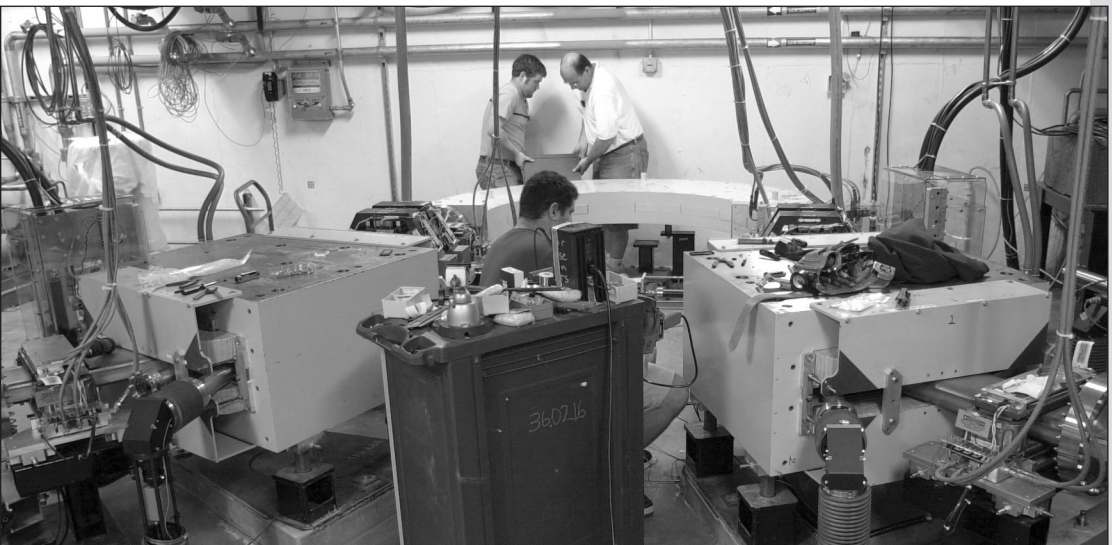
The Lab's FEL has also been able to create in quantity ultra-small but very strong structures known as carbon nanotubes, which could eventually be the heart of minuscule next-generation computers, as well as structural components for aircraft and automobiles. Areas under future investigation are expected to include the function of protein molecules within human cells, as well as the mechanisms that determine and degrade materials purity, such as the silicon that comprises many computer components. Scientists will also study the effects of new surface compounds, produced when metals bathed in nitrogen are exposed to FEL light, and explore novel areas such as "spintronics," which concerns the properties of next-generation semiconductor designs that optimize performance using the magnetic properties of materials.

The amount of FEL operational time in 2004, the first full year of operations, remains to be determined. Runtime will depend on when the machine comes fully on line, and on the demand from paying customers. Dylla expects that 40 percent of the new machine's time will be devoted to basic research conducted by universities and other national laboratories, with 40 percent derived from applied projects conducted on behalf of the private sector, and 20 percent emanating from a variety of Department of Defense projects.

"We all think the future of this FEL is a pretty good one," he says. "The team is very excited about seeing the machine come back on line for our existing and new users."



The upgraded FEL linac is on the right and the infrared wiggler magnet is on the left (foreground). The large black box houses optics instrumentation for diagnostics of FEL cavity mirrors.



Instrumentation and Controls group members align viewers (foreground) for the electron beam and prepare for high-power running (background).

DOE Site Office oversees, champions JLab

Jerry Conley
Chief Operating Officer
JLab Site Office

by James Schultz

Jerry Conley has been in Newport News long enough to remember when Jefferson Lab was little more than a collection of construction trailers, building supplies and several large holes. That was in 1987. Sixteen years later, he says the changes are visible not just in the physical sense.

"I got here just as we were breaking ground," recalls Conley, chief operating officer of the Department of Energy's Jefferson Lab Site Office. "There aren't too many places where you can see progress in every aspect of that word. Now we're a full-fledged laboratory with the best people in nuclear physics from all over the world. It's a good feeling."

The Site Office was originally intended to be a temporary posting for DOE personnel overseeing aspects of Lab construction. Once JLab became operational, the Office would close. But DOE's own evolution as a cabinet-level agency, changing organizational priorities, an array of government-wide initiatives mandated in federal laboratories and the realities of partnership between the Department and JLab manager — the Southeastern Universities Research Association (SURA) — resulted in a different future than the one originally envisioned.

The eight-member Site Office today is charged with negotiation and administration of the Lab's management and operating contract, which currently remains with SURA. In all there are 50 separate contractual performance metrics the Office monitors on DOE's behalf, including time of procurement processing and ability to meet project cost and schedule goals.

DOE expects the office to provide JLab with technical and administrative direction, support, oversight, and evaluation; to establish performance objectives and evaluate performance; to represent the Department with the Lab's regulators and stakeholders; and to serve as a Laboratory advocate within the DOE and with other agencies and institutions.

"We're the steward of government assets: people, property, funds and so forth. We take that responsibility seriously," Conley explains. "Site offices are expected to be the eyes and ears of what's going on: safety, environment, purchasing, and security, as well as being expected to understand the major science issues. We work closely with the Lab for everyone's benefit. We're advocates; we can be very useful working on those transactions that have to be processed through the Department."

Part of that advocacy is championing replacement of the Lab's aging infrastructure, including equipment. Conley says the Office strongly supports JLab's planned upgrade to 12 billion electron volts, or 12 GeV, from its current operational maximum of roughly 6 GeV. Other projects, such as the expansion of CEBAF Center, replacement of Trailer City with a permanent building, construction of a new user facility and ongoing financial and logistical support for the Lab's free-electron laser (FEL) pro-

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JLab's DOE Site Office includes (front row, left to right): Barbara Morgan, ES&H manager; Wayne Skinner, contracting officer/assistant manager for administration; Monique Perry, office manager; and Jim Turi, Site Office manager. Back row, l. to r.: Andre Bethea, business systems manager, Jerry Conley, chief operating officer; Don Baxter, contracting officer/deputy business manager; and Rick Korynta, federal projects director.

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gram also have received enthusiastic Site Office endorsement.

Although the Lab isn't a classified facility, given geopolitical realities, Conley says that security remains a priority. Potential threats have to be evaluated and anticipated. The challenge for the Office is to ensure protection of federal property and site personnel, even as access is routinely guaranteed to qualified staff, users and contractors.

In recent months, purchasing irregularities at other federal laboratories led to the Office's review of procurement and purchasing procedures at JLab, to insure that all processes are in line with established practices.

Conley lauds the Lab's performance, as underscored in annual peer reviews. These reveal the Lab to be among the best facilities of its kind in the country, if not the world. Conley points out that JLab has established an excellent relationship with its immediate "neighborhood": not simply the physical areas surrounding the grounds, but with citizens and decision-makers at all levels in the public and private sectors. He says the Lab's science education programs are top-notch, with Lab employees actively involved in community activities of all kinds.

"The Lab does a very good job. That's not just Jerry Conley talking," he says. "We have credible reviews involving objective peers who come in and arrive at the same conclusion. The annual appraisals have been outstanding for every year since the performance-based contract started."

Although he's been here for 16 years, Conley says he hasn't tired of his responsibilities. Like others at the Lab, he feels fortunate to have a vocation he values.

"It's been great to see something like this literally come out of the ground," Conley says. "It's something very few people have the opportunity to experience. All jobs are important, but this one I've especially enjoyed. People here are very, very motivated. They like to come to work. So do I."

JLab research supports evidence of pentaquark...

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other international research groups spotted the elusive pentaquark known as "Theta-plus" (Θ^+).

The first announcement came from the Laser Electron Photon facility at SPring-8 (LEPS) in Osaka, Japan, led by Takashi Nakano of Osaka University's Research Center for Nuclear Physics. Using a newly built photon-beam facility at SPring-8, the LEPS team directed high-energy gamma rays at a target of carbon-12 atoms. The reaction produced a K^- meson in the final state, along with the exotic five-quark state, which decayed into a K^+ meson and a neutron. The LEPS collaboration published their results in the July 4 issue of the journal *Physical Review Letters*.

This was closely followed by the DIANA collaboration from the Institute of Theoretical and Experimental Physics (ITEP) in Moscow, Russia, who re-analyzed old xenon bubble-chamber data and found a narrow peak with mass consistent with the pentaquark spotted at SPring-8, but of even smaller width. Their results will be published in *Physics of Atomic Nuclei* later this year.

And now Jefferson Lab has announced the most statistically significant result to date, a narrow peak 5.3 standard deviations above background. The CLAS data reveal a strong signal at a mass of 1542 MeV with a width of 21 MeV. All three facilities — in Japan, Russia and the United States — report consistent figures for the mass of the subatomic particle, with a signal width narrower than the experiments could measure.

"If this resonance exists, it can be excited in many different ways. That's a good thing," says Ken Hicks, a physics professor at Ohio University and a member of both the LEPS and CLAS collaborations. "It's good that this resonance is showing up in different reactions. Otherwise you would start to worry."

Despite the impressive statistics and three consistent data sets, some scientists may not be convinced that the Θ^+ signal is real. "We do expect some skepticism within the community

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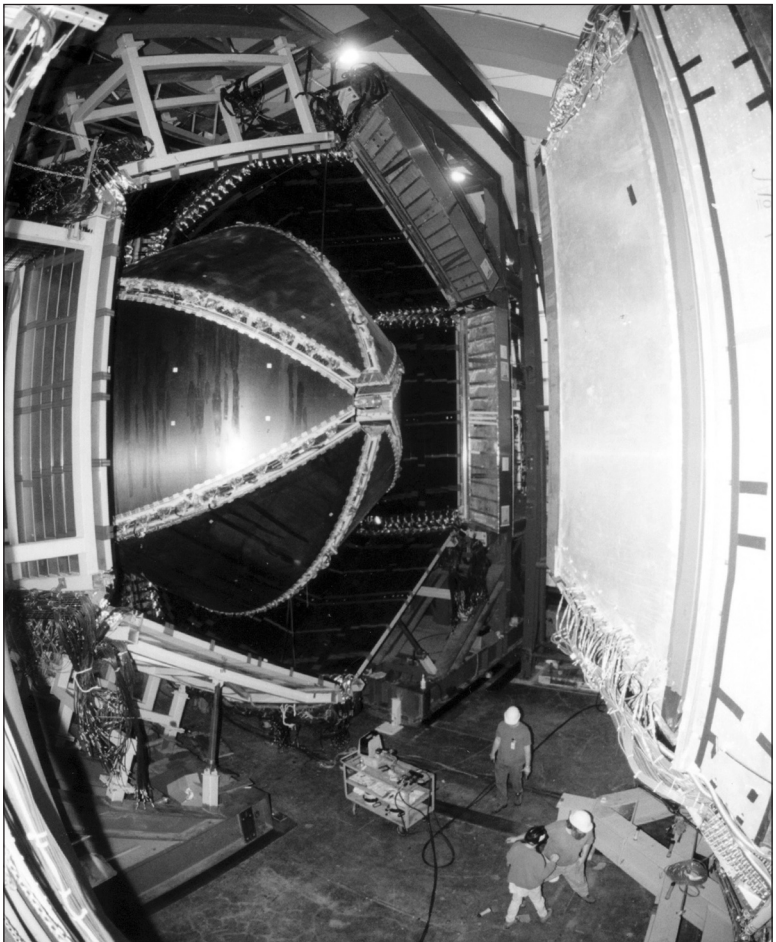

The JLab data used to find the pentaquark was taken in August 1999, during an unrelated Hall B experiment using the CEBAF Large Acceptance Spectrometer.

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because many people have searched for these states for some time," said Hicks, speaking at the Program Advisory Committee (PAC) meeting at Jefferson Lab in June. "We would like to make conclusive statements, to nail down some of the features of the pentaquark."

At the PAC meeting, Hicks successfully made the case on behalf of the CLAS collaboration for a new experiment with 30 days of beam time. "The statistics are not as good as we'd like them to be," he noted. "There is no doubt this is a real peak, but we need about 20 times more events to measure the angular distribution, spin and energy dependence of production." The PAC enthusiastically approved the experimental proposal with their highest scientific rating. The experiment could run as soon as early 2004.

Apparent dogma in the community

"Before the discovery of Theta a few months ago, there was not a single experimental hint that higher multiplets may exist," says Dmitri Diakonov, a theory professor at NORDITA, the Nordic Institute of Theoretical Physics in Copenhagen, Denmark. "For that reason, the very intuitive picture of baryons made exclusively of three quarks became kind of a dogma in the community starting in the 1970s."

That dogma may now be shattered. The new particle spotted at Jefferson Lab and other facilities is a sort of baryon-meson hybrid with five quarks — or, more precisely, four quarks and one anti-quark. It is, technically, a member of the baryon family, having a baryon quantum number of one. The pentaquark is said to be an "exotic" baryon because the anti-quark has a different "flavor" to the other quarks, and its quantum numbers — which characterize the particle's quantum mechanical properties — cannot be obtained from only three quarks.

There are six known flavors of quarks, three of which are studied at Jefferson Lab. They are up, down and strange quarks, with symbols u, d and s, respectively. The other three flavors are charm (c), top (t) and bottom (b). Each of these six quarks also has a corresponding anti-quark.

With six quarks and six anti-quarks to choose from, one could think of many possible combinations of quarks. But according to the rules of Quantum Chromodynamics (QCD), the theory that describes the strong interactions between quarks, not all of them can exist. For instance, QCD forbids four-quark configurations, while the pentaquark that left its signature on the Jefferson Lab data is an allowed state. Physicists know from conservation laws that the only possible configuration for the Θ^+ is two up quarks, two down quarks and an anti-strange quark (uudd s-bar).

Motivated by theory

The turning point in the hunt for Θ^+ came in 1997, when Diakonov and colleagues Victor Petrov and Maxim Polyakov published a paper in *Zeitschrift für Physik A*, predicting a family of 10 five-quark resonances called an anti-decuplet. They predicted an exotic baryon then called Z^+, now known as Θ^+ following a suggestion by Diakonov, with a relatively low mass of about 1530 MeV and width of less than 15 MeV.

The details of the anti-decuplet theory are hotly debated among theorists, but the theory was convincing enough to motivate experimentalists to continue searching for the Θ^+. In February 2000, Jefferson Lab staff scientist Elton Smith met with Diakonov and Nakano during the International Conference on Quark Nuclear Physics in Adelaide, South Australia, and discussed possibilities to test Diakonov's theory.

When theorists suggest a phenomenon to study, experimentalists don't usually race to the lab. "But this was a lucky day for me," recounts Diakonov, "because both men decided that it was worthwhile to look for the Theta." At around the same time researcher Anatolii Dolgolenko from ITEP

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Theta-plus Search Group

Volker Burkert
Jefferson Lab Hall B Leader

*Daniel Carman**
Ohio University, Athens, OH

*Kenneth Hicks**
Ohio University, Athens, OH

Valeri Koubarovski
Jefferson Lab Hall B

Bernhard Mecking
Jefferson Lab Hall B

*Eugene Pasyuk**
Arizona State University, Tempe, AZ

*Reinhard Schumacher**
Carnegie Mellon University, Pittsburgh, PA

*Elton Smith**
Jefferson Lab Hall B

*Stepan Stepanyan**
Jefferson Lab Hall B

*David Tedeschi**
University of South Carolina, Columbia, SC

*Luminita Todor**
Carnegie Mellon University, Pittsburgh, PA

Group members presented alphabetically.
** denotes lead authors on the submitted paper.*

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learned about the Θ^+ from a talk given by Polyakov. The hunt was on.

The real boost to the Jefferson Lab research came after the Particles and Nuclei International Conference (PaNic) in Osaka in October 2002, when the LEPS collaboration from SPring-8 publicly announced their result. Following Nakano's presentation of the SPring-8 results, a group of CLAS members met and formed a working group to search for the Θ^+ signal in existing Jefferson Lab data. The Theta-plus Search Group has met regularly since then to discuss and analyze the CLAS data. After nine months of hard work, the scientists have just submitted CLAS collaboration results to *Physical Review Letters* for publication.

"This is a real group project at Jefferson Lab," says Hicks. "A whole group of people has made fundamental contributions to this already."

Postdoctoral research associate Luminita Todor, from Carnegie Mellon University, is one such person. Todor says this is the most intense and exciting project she has worked on during her eight years of Jefferson Lab research. As the only early-career scientist and the only female scientist in the Theta-plus Search Group, she says, "I like to think that my presence on this team represents both the quality of the [young] scientists at Jefferson Lab and the women scientists' voice in this community."

The Jefferson Lab experiment made use of the unique CLAS detector, which can measure exclusive reactions over a large solid angle. The data were taken in August 1999, during an unrelated Hall B experiment. "One of the beauties of CLAS is that it gathers data for 'all possible' reactions at once," says Reinhard Schumacher, a member of the Theta-plus Search Group and professor at Carnegie Mellon University. "The Θ^+ events were accumulated along with everything else and were just waiting to be extracted."

Photons generated by Jefferson Lab's electron beam struck a liquid deuterium target and the resulting shower of particles were detected in the CLAS. Three charged particles in the final state — a proton, K^- meson and K^+ meson — were simultaneously detected. Then the researchers worked backwards to piece together the reaction mechanism, determine the missing neutron mass, and filter out other sources of background one step at a time.

"Jefferson Lab is probably in the best position to study not only the Theta, but also the other members of the anti-decuplet," contends Diakonov.

"Of course, Θ^+ is a beautiful creature just by itself. However, its real importance is that it sheds new light on how the ordinary protons and neutrons that form 99% of the visible mass around us 'work' and 'what they are made of.' I think that some of the models of ordinary nucleons will have to be reconsidered because of Θ^+."

For further reading visit www.jlab.org/news or www.phy.ohiou.edu/~hicks/thplus.htm

The Theta-plus Search Group paused for a photo during the recent CLAS collaboration meeting. Pictured from left to right: Ken Hicks, Reinhard Schumacher, Bernhard Mecking, Daniel Carman, Luminita Todor, Dave Tedeschi, Eugene Pasyuk, and Volker Burkert. Absent from photo: Valeri Koubarovski, Elton Smith and Stepan Stepanyan.

Kelly Caccetta, new Admin. Division AD: People are her priority

People are Kelly Caccetta's priority. For the past three years she's put the "human" in human resources, serving as director of JLab's Human Resources & Services department.

"We're all human," she explains. "We all have our own lives, our worries and concerns, inside and outside the workplace. Doing a good job is important, but it's part of a larger, human context. As an organization, if we get the people part right, the rest falls into place."

Caccetta brings that same philosophy to her present post as Associate Director of Administration for the Lab. She became AD late last year as part of a site-wide reorganization. In addition to the department she once ran, she now has overall responsibility for property, facilities and infrastructure; business and medical services; security; maintenance; and contracts. Her prior professional experiences in nursing, teaching and human resources, she believes, have provided an invaluable foundation for her present duties.

"I'm used to being proactive," Caccetta says. "It's figuring out what's important. Prioritizing. It's making a decision. It's communicating with people. And it's taking the emotion out of it: finding out what the facts are and deciding what to do."

Administratively speaking, Caccetta has a full plate. Ongoing enhancements to safety programs are a priority, both for staff and contractors.

Then there's the pending two-phase expansion of CEBAF Center. The first phase, adding a third floor, will replace the 22,000 square-foot Trailer City with 61,000 square feet of permanent office space. Second-phase plans include a new wing, additional conference space and expanded Computer Center facilities. Also with the realization of the planned 12 billion electron volt accelerator upgrade, additional requirements will be placed on civil construction, infrastructure upgrades and staffing plans.

And not so far down the road, the Lab's aging infrastructure will become an increasing concern. Ten years ago, when the buildings and equipment were new, they required little routine maintenance and not much in the way of repair. Now, both are requiring additional — and in some cases urgent — attention. "The Lab is starting to mature," Caccetta notes. "We have to take that into account as we look ahead and continue our planning of resources: people and structures."

Given the demands on her time, Caccetta has turned delegation into an art form. "I don't have to know everything," she explains. "I'll never know it all and don't want to. That's why I have talented people working with me. That's the key." Relying on others' expertise, she says, is a win-win activity. By leveraging her most limited resource — time — it lets her focus on crucial areas that most need her direct involvement. By encouraging growth and initiative in others, it helps build a long-term, high quality workforce — and future leadership — for the Lab.

JLab contractors, staff and researchers comprise a highly educated workforce. Because of this, Caccetta says, JLab managers are generally able to build consensus for decisions. People here respond well to a consultative, collaborative approach. Provide insight and solicit input, she points out, and most issues can be addressed effectively and quickly. "When potential conflicts are faced head-on, it's easier to resolve differences," she says. "People won't always agree, but open discussion keeps frustrations from festering."

Intensified security, as Caccetta knows only too well, has been a frustration for staff and users alike. Every time national alert levels change, the Lab has to adjust accordingly. During periods of elevated security, increased front-gate scrutiny causes delays and traffic backups. Schedules have to be changed to stagger entry and exit times. "I appreciate everyone's patience and tolerance in adhering to required enhanced security measures," says Caccetta.

With 2003 half over, Caccetta has her sights set on a number of process improvements by year's end. Working with JLab chief financial officer Mary Erwin, she wants to refine the availability and use of purchase cards. She'd like to complete revisions to the administrative policy manual, now underway. Also on her agenda are enhanced recruiting efforts and improved performance reviews.

"What I love most and what I carry over from HR is dealing with people," Caccetta says. "What motivates me is trying to help everyone achieve their potential, their goals, even as we together are pursuing the Lab's goals."

Kelly Caccetta
Associate Director
Administration Division

In their own words

With doctoral candidate & experimental physicist Fatiha Benmokhtar

When she isn't doing physics research, Fatiha Benmokhtar enjoys cooking, especially her favorite, native Amazigh dishes, including couscous, a crushed wheat dish, and chorba, a soup with meat and vegetables.

as told to Judi Tull

I was born in Algeria and grew up in Algiers, the capital. It's a very big city, and I love that kind of lifestyle where you don't need a car and everything is close by.

My family is Amazigh (many have known it as Berber), and I grew up speaking Tamazight my native language, as well as Arabic. My mother, who had been educated by French nuns, also taught us French at home. In 8th grade at my public school, we started to learn basic English, just conversational things like "Hello, how are you?" It wasn't until I went to graduate school that I learned technical English to use in my studies of nuclear physics, and not until I first came here to the Lab in 1999 that I actually interacted with English-speaking people.

I've known since I was about 12 that I wanted to study nuclear physics. I think I was attracted to it because on television, and even in my own environment, people who were considered to be very smart were the ones who went into nuclear physics. I wanted to do nuclear physics for the challenge, and to challenge myself with it. But I've always done well in my studies; it has never seemed that hard to me. My father wanted me to become a doctor, and my mother was hoping I would choose computer science, but they are happy with the decision I've made.

I received my high school diploma in mathematics, then went on to the University of Science and Technology of Algiers. It's the biggest university in Africa, with 30,000 students. It's spread out over a large area in the city, so I didn't feel overwhelmed by all those people. It's just 20 km from my home, and there is a special train that goes directly to and from the university, so I lived at home.

I finished my four-year degree in nuclear physics there, and then sat for a national examination from which three people would be selected to go on for a master's degree in nuclear physics. I was one of the three chosen, and then took formal classes for a year, concentrating in nuclear physics. There were 11 professors for the three of us, so our training was very intense.

After that year I had to choose my research subject and decided to work on the density normalization of the POLDER polarimeter in Hall C. I spent that year going back and forth to Grenoble (France), and then finished my master's in June 1999. It was a very busy 2 1/2 years.

Continued on next page

Continued from previous page

Just before I completed my work, though, I was invited to come here. It was a dream come true for me. I had expected to go to France. When the call came, I didn't talk for about five minutes afterward. My mother kept saying, "What happened? What happened?" and I was just speechless. This was the biggest lab; this was the thing I had dreamed of.

So I came here in November 1999. I was amazed and thrilled to meet people whose names I had read on papers. It was like being among my heroes. It was challenging to use my English for the first time on a daily basis, and in the beginning I often sat in meetings where I hardly understood what people were saying. I understood the physics on the slides they were showing, of course, but listening to English was still something of a mystery to me. But people here have been very helpful — especially Doug Higinbotham and his wife Marcy Stutzman — and have been willing to correct me so that I will learn.

After my year here, I had to find a university to sponsor me. I had many offers, and chose Rutgers (in New Jersey), largely because I could continue my research. I also like the fact that I don't need to have a car there, and shops are close by. My professors at Rutgers are very understanding, and I am pretty much free to do what I want to do.

Before coming to America, the only thing I knew about this country was what I had seen in Hollywood movies. I thought that all the men and women were tall, and I would be the shortest person here.

I share an apartment in New Jersey with two other people, one a sociologist and one a mathematician. I do most of the cooking, since I really love to do it. If I weren't a physicist, I'd like to be a chef. I've always been able to tell just from tasting exactly what is in a particular dish. For holiday dinners, I like to invite a crowd of other students — sometimes as many as 20 — to come for dinner. When I'm here, which is about once every three months or so for 10 to 15 days, I stay in the residence facility.

I expect to finish my data analysis for the doctoral work I'm doing in Hall A by December, and then finish my thesis — A Study of the Helium Nuclei Through Electrodisintegration at High Transferred Momenta and Energies — so I can graduate in May 2004. After that? I'd like to go home to visit since I haven't seen my parents in a long time and then find a nice post-doc job in experimental nuclear physics.

Briefs

Milestones
for June 2003

Hello

Tanya-Gaye Fraites, Senior Administrative Assistant, Chief Finance Office (started May 19)

James Shaffer, Environmental Health & Safety Assistant, Admin. Div.

Melissa Hicks, Front Desk Clerk, Southeastern Universities Research Association (Washington, D.C.)

Goodbye

Elizabeth Lear, Admin. Support, Admin. Div.

Juliette Mammei, Technical Intern, Physics Div.

Bodgan Niczyporuk, Staff Scientist, Physics Div.

for July 2003

Hello

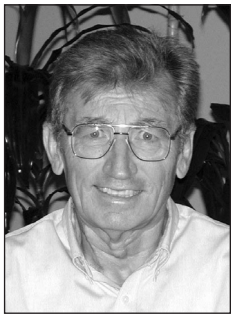
Erik Abkemeier, Radiation Control Group Leader, Accelerator Div.

Colleen Bartlett, Database Administrator, Admin. Div.

Goodbye

Nikolai Sinkine, Staff Engineer, Physics Div.

Bogdan Niczyporuk retires



After more than 15 years of service to Hall B and Jefferson Lab, Bogdan Niczyporuk retired on July 1.

Bogdan has made many valuable contributions to the CLAS detector in Hall B. He provided critical input for the computer codes that are used to reconstruct particle properties from the CLAS tracking chamber information.

Niczyporuk, now a User at JLab, says he will probably come into work two or three days a week, and will continue to take shifts occasionally. "I want to be in touch with the field, to participate and finish what I started," says Niczyporuk.

After a career working in many labs throughout the world — including the Kraków Institute of Nuclear Physics in his native Poland, CERN, the Max Planck Institute for Physics in Munich, DESY and SLAC — Niczyporuk looks forward to visiting friends in far-flung places, reading books and exploring the natural world in his newly found spare time.

Congratulations to…

Robert May, Accelerator Div., has received the degree of Master of Health Physics from Illinois Institute of Technology. May is the 22nd person to earn a degree through participation in JLab's Tuition Assistance Program; 24 degrees total have been awarded to TAP participants since 1995. For information about TAP, contact the Training and Performance office.

Ivy Thomas, Business Services Department, received her Bachelor of Arts Degree in Business Administration, Specializing in Management, from Saint Leo University on June 7.

Justine Jackson, Radiation Control Group, earned her Bachelor's Degree in Human Resources, from Saint Leo University on June 7.

"Milestones" highlights the achievements of JLab staff and users, full-time and term new hires, separations and retirements. To submit staff or users' promotions, special honors and awards send information to magaldi@jlab.org or call ext. 5102.

JLab EH&S duties change hands

James J. Murphy, director of the Office of Assessment, assumed the role of JLab's Facility Manager on June 11. He takes over for Andrew Hutton, the Accelerator Division's deputy and director of CEBAF Operations, who served as Facility Manager for the past several years. Hutton will now be focusing on accelerator operations.

Carter Ficklen will remain Facility Manager Designee for the EH&S Reporting office and John Kelly, Emergency Manager, will be Facility Manager Designee for emergency management tasks.

Effective May 12, Sandra Prior, Accelerator Division, accepted the role of Environmental Health & Safety policy and manuals manager (PMG), picking up the care and maintenance of JLab's EH&S Manual from Charlie Reece. After 10 years of guiding the development of the Lab's EH&S Manual, Reece will be pursuing R&D work.

Calling all cafeteria glasses, flatware, plates

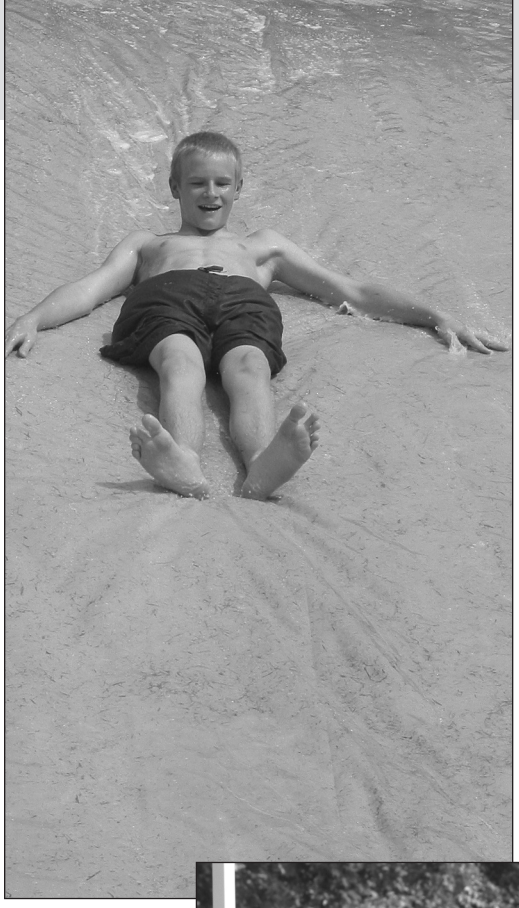
Quark Cafe needs your help in locating and returning the JLab dining facility's trays, plates, 16 oz. plastic glasses and flatware that haven't made it back after use.

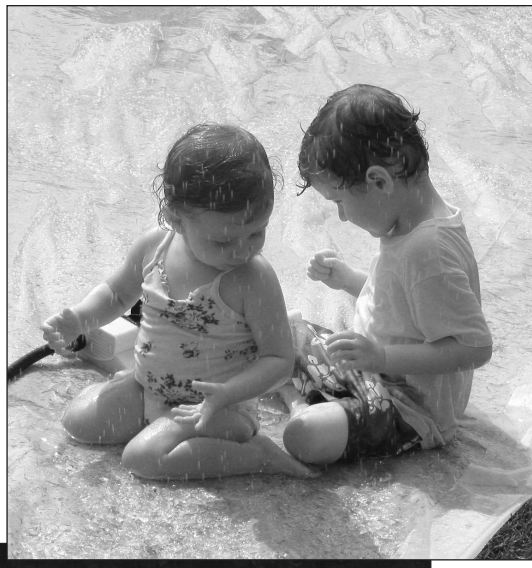
Generally, the items are carried back to offices or conference rooms during breakfast or lunch hours, or even special functions, according to Judi Casto, Eurest supervisor. From there the items may wind up on bookshelves, in drawers or moved to building kitchenettes.

But the bottom line is that the items wind up out of the cafeteria's usable inventory; and when the cafeteria is used by a large group of people, the cafeteria runs out of glasses, plates, flatware, etc.

Items may be returned to the cafeteria any time of the day by placing them in the large gray tray carriers that sit by the cafeteria's roll-up door inside CEBAF Center. If you are aware of items too cumbersome to carry back to Quark Cafe, please call Casto at ext. 7370 so a pickup may be arranged.

Family Luau
July 16, 2003





J.T. Kelley, Accel. Div., won the Hawaiian Shirt Contest.

Water games were perfect for the hot weather.

And the youth took the Tug-o-War competition.

SC changes underway

Orbach reorganizes High Energy & Nuclear Physics program

On July 11, Ray Orbach, director of the Department of Energy's Office of Science, announced a reorganization of the High Energy and Nuclear Physics Program. The changes are in accord with President Bush's Management Agenda.

Orbach has split the HENP program into two distinct parts with Robin Staffin to be appointed as Associate Director for High Energy Physics and Dennis Kovar as Associate Director for Nuclear Physics. Until these personnel actions are final, Staffin and Kovar will serve as Acting Associate Directors.

Peter Rosen will become Orbach's Senior Science Advisor at DOE Heaquarters at Forrestal. Rosen will assist Orbach in matters relating to technical aspects of the Office of Science. He will also help the director with other special projects as needed.

"Because High Energy and Nuclear Physics are two distinct fields, it is time to recognize them as such in SC," Orbach wrote in an announcement he sent out on July 15. "These offices will, of course, continue to work closely together in light of the complementary nature of their programs. I look forward to working with each of the new ADs and Peter."

Jefferson Lab comes under the Office of Science Nuclear Physics program.

ON TARGET

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