An experimental facility supporting the Lab’s strategic objectives of nuclear deterrence, threat reduction, technical leadership, and trustworthy operations.
From Toni’s desk

LANSCE—unique capabilities for science and national security

LANSCE—powered by the people

LANSCE advances

LEARN MORE ABOUT PHYSICAL SCIENCES AT LOS ALAMOS NATIONAL LABORATORY
WWW.LANL.GOV/ALDPS

A summer visitor enjoys the view of the Los Alamos Neutron Science Center from a treetop perch.

On the cover: In early June 1972, the world’s most intense proton beam was delivered through nearly a mile of vacuum tanks at the new Los Alamos Meson Physics Facility, now known as the Los Alamos Neutron Science Center, or LANSCE. As the facility has evolved over five decades, that proton beam is now delivered to five state-of-the-art experimental areas, a capability that makes the accelerator on the Pajarito Plateau unique among its peers.
I am excited to introduce the new issue of Physical Sciences Vistas, highlighting the Los Alamos Neutron Science Center (LANSCE).

LANSCE is a unique proton-based accelerator facility, delivering beam to five experimental areas in support of research programs in materials science, nuclear physics, fundamental science, and isotope production—supporting the Laboratory’s strategic objectives of nuclear deterrence, threat reduction, technical leadership, and trustworthy operations.

This issue of Vistas celebrates LANSCE’s 50th anniversary as one of LANL’s unique experimental facilities, providing an overview of the research in each of the five facilities:

- Nuclear science at the Weapons Neutron Research Facility and the Lujan Center
- Materials science at the Lujan Center
- Dynamic materials science at the Proton Radiography Facility
- Isotope production at the Isotope Production Facility
- Fundamental science at the Ultracold Neutron Facility

Interesting features in this issue include personal recollections from LANSCE personnel of their involvement with the neutron science center—from former Laboratory Director and LANSCE Division Leader John Browne to Lawrence Quintana, a LANSCE technician for 36 years prior to his retirement. Finally, we have an entertaining interview with Lady Proton and Neutron Man on LANSCE advances.

This is my last “From the desk,” as I have stepped down as associate laboratory director (ALD) for Physical Sciences at the end of July. I have been honored to lead the directorate (and LANSCE) for the past 3.75 years. I leave my ALD position knowing that the Physical Sciences Directorate will continue to lead the Laboratory in producing great science, technology, and engineering and contribute significantly to the Laboratory’s DOE and NNSA missions. Our people (you all) are central to all of the achievements that ALDPS has made over the past 3+ years. I want to thank you—the current and past staff in ALDPS and supporting organizations—for all of your hard work. It has truly made a difference to the Laboratory and the nation. Keep up the great work and take care of each other.
In June 1972, the world’s most intense proton beam was delivered through nearly a mile of vacuum tanks at the new Los Alamos Meson Physics Facility, now known as the Los Alamos Neutron Science Center, or LANSCE. As the facility has evolved, that proton beam is now delivered to five state-of-the-art experimental areas, a capability that makes the accelerator on the Pajarito Plateau unique among its peers. “LANSCE is unique in that many accelerators have just a single mission focus,” said Thom Mason, Laboratory director. “With five areas, we can work on many different types of complicated problems across scientific fields. At LANSCE, our research program in nuclear physics and materials science, as well as our fundamental science and medical isotopes programs, are as essential today as they have ever been.”

Critical supplies of medical isotopes

Starting from the injector system, the proton beam’s first destination—traveling at just more than 100 megaelectronvolts—is the Isotope Production Facility, a key facility within DOE’s Isotope R&D and Production Program and part of a tri-lab effort with Brookhaven National Laboratory and Oak Ridge National Laboratory. In April 2020, as facilities shut down in the pandemic, LANSCE started up the beam ahead of its normal run schedule to fill a supply chain gap and deliver critical supplies of the isotopes strontium-82, used in heart imaging, and germanium-68, used in cancer diagnostics.

“At LANSCE, our research program in nuclear physics and materials science, as well as our fundamental science and medical isotopes programs, are as essential today as they have ever been.”

Lab Director Thom Mason

The Isotope Production Facility excels in the basic science and applied engineering needed to produce and purify useful isotopes that can then be produced at scale in the marketplace. In the fight against cancer, recent and current clinical trials are yielding promising results with the short-lived isotope actinium-225, which delivers high-energy radiation to a cancer tumor without greatly affecting the surrounding tissue. The isotope can be chemically modified to target certain cancers—prostate cancer, colorectal cancer, melanoma, and others—that produce a distinctive antigen.
“Unfortunately, almost everyone is affected by cancer, themselves or the people they know and love,” said Kirk Rector, Los Alamos point-of-contact for the DOE Isotope Program. “That’s part of what makes the work around actinium-225 for cancer in particular very exciting. The results from clinical trials using actinium-225 to treat even late-stage prostate cancer suggest that it could be a pretty significant way to attack that horrible disease.”

New Los Alamos research indicates that actinium-225 may also be effective against bacteria, especially important in an age of increased antibiotic resistance.
Unlocking science and serving mission needs

Powered up to 800 megaelectronvolts, and now traveling at 84 percent the speed of light (more than 250 million meters, or almost 20 laps around the Earth, per second), the proton beam can be delivered to four more areas.

At the Ultracold Neutron Facility, protons are cooled to near absolute zero, about -460 degrees Fahrenheit, so that the basic properties of particles can be explored. Last year a research team measured the lifetime of a neutron with the most precision ever, finding that a lone neutron lasts for 877.75 seconds before disintegrating. Those precise measurements can impact the search for physics beyond the Standard Model—helping unlock the mysteries of new particles, even dark matter. The results could also advance understanding of the abundance of nuclei in the early universe and the formation of elements.

LANSCE also serves a national security mission, helping ensure that the country’s nuclear deterrent is safe, secure, and reliable. The Proton Radiography user center images the interior of explosions to produce data for the safe maintenance of the deterrent arsenal—an essential mission since the end of the testing era and necessary well into the future. At the Lujan Center, another user center at the end of the main proton line, a neutron beam is produced that can offer the microstructural characterization researchers need to probe materials properties, learning how they react under different conditions.

“Understanding materials as they age, along with their interaction with neutrons, represents a key challenge to our physical understanding of weapons as we continue to ensure the safety and effectiveness of the aging nuclear stockpile,” said Bob Webster, deputy director for Weapons at the Laboratory. “The essential data we gather at LANSCE through real-world experimentation complements the modeling and simulation integral to stockpile stewardship.”

The benefits of that data also extend beyond the national security mission. For instance, at the Weapons Neutron Research Facility, obtaining the right safety measurements for criticality—the point at which a fission reaction becomes self-sustaining—is crucial data not only for key Laboratory activities but also for the nuclear industry writ large. Understanding the physics properties of materials, including radiation effects on reactor components, helps ensure that civilian reactors and the people who run them are safe as they contribute zero-carbon emission energy to the grid. The Weapons Neutron Research Facility and Lujan Center

Nuclear science at the Weapons Neutron Research Facility and Lujan Center

The Weapons Neutron Research Facility nuclear science instrument suite includes

- Chi-Nu, a detector array for studying the prompt fission neutron spectrum
- CoGNAC, a detector array for studying neutron scattering
- LENZ, an instrument for studying neutron-induced charged-particle reactions
- SPIDER, a spectrometer for fission fragments
- TPC/SREFT, time projection chambers for fission cross section measurements
- Blue Room (Target-2), a flight path for proton irradiation with the primary beam
- ICE House and ICE II, flight paths for studying neutron radiation effects

The Lujan Center nuclear science instrument suite includes

- DANCE, a detector array for studying capture reactions on small quantities of radioactive isotopes, which are of interest to nuclear science, astrophysics, and stockpile stewardship science
- DICER, the Device for Indirect Capture Experiments with Radionuclides
- Flight Path 12, a multi-use flight path ideal for experiments requiring a cold neutron spectrum
Facility capabilities also mean LANSCE is the premier and only US facility for electronics testing and certification with neutron beams—technology that is applied to avionics, vehicles, medical devices, and more.

**Improvements enhance capabilities**

LANSCE has embarked on improvements to ensure that the facility remains a leader for the coming decades. This spring, the spallation target (the source of neutrons) at the Lujan Center was upgraded—with the system redesigned in the process to enhance its performance. In doing so, the Lujan Center is now able to study the kiloelectronvolt range, a new energy regime for nuclear physics. Across the accelerator, teams are replacing electrical components with newer and safer ones. Systems that use greenhouse gases are being replaced as well, in keeping with the Lab’s broader sustainability initiatives.

“The improvements and the investments we’re making result in a safer machine able to do better science,” said Mike Furlanetto, LANSCE user facility director and senior director for the Physical Sciences Directorate. “The kind of experiments we are able to do now were almost unimaginable when I joined the Laboratory 17 years ago, and I’m sure that in another 20 years we will be delivering even more exciting data.”

The accelerator is a complicated piece of machinery, and it takes a cross-organizational effort of more than 500 people—engineers, scientists, technicians, and others—to keep it performing. Those individuals are each committed to the team goal of delivering science that tackles difficult challenges—whether enhancing national security, understanding the origins of the universe, or developing medicines that allow people to live longer and healthier. That work represents an abiding mission for the decades to come.

---

This article originally appeared on discover.lanl.gov.
LANSCE—powered by the people
Passion and commitment vital to accelerator’s long life

At the core of the Los Alamos Neutron Science Center (LANSCE) is one of the nation’s most powerful proton linear accelerators (or linac). Designed with amazing flexibility and forethought, the linac has served the nation since 1972, providing beam current required by all experimental areas that support NNSA and DOE mission deliverables.

Yet if the linac is the heart of LANSCE, then the people—whose creativity and dedication have ensured LANSCE’s reliable operation—are its soul. Physical Sciences Vistas asked some of those involved in the accelerator’s lengthy history about their experiences. Here they share their perspectives.

Dick Werbeck held a variety of roles at the Los Alamos Meson Physics Facility (LAMPF) and LANSCE during his tenure in the Experimental Areas Group from 1973 to 2004, from postdoc to group leader.

Over the years, the ever-changing priorities of the programs that use the LAMPF/LANSCE facilities have required that it adapt to their needs and maintain/upgrade the various systems required for reliable beam operation. This has led to developing ever-more complicated modes of beam operation and reconfiguring/adding to the various experimental areas and facilities. I believe it is this flexibility that is one of the major factors that has led to LANSCE’s long life. But to me, the real reason for its success has been the absolute dedication over the years of a significant number of people whose career goal was to help LANSCE succeed and prosper. It wasn’t just a job. This started with Louis Rosen and continues today. I truly believe this.

John Browne served as LANSCE Division Leader from 1993 to 1997.

I became LANSCE director in 1993 at a time when the nuclear physics budget for operations was being terminated. I knew if we could demonstrate the value of the LANSCE research to (DOE Assistant Secretary for Defense Programs) Vic Reis and the newly created Science Based Stockpile Stewardship (SBSS) program that we might be able to garner new support for the facility operations. We had strong materials science and nuclear physics arguments, but it was the demonstration of proton radiography by Chris Morris and his team in 1995 that provided proof of its potential to an important new set of weapon physics issues. From that point on, we were able to slowly build a strong SBSS program that continues ‘till today.

Ed Jacobson was an electrical engineer at LAMPF/LANSCE from 1986 to 2006, primarily working in the accelerator’s injector area.

During the 20 years–1986 to 2006–I had the privilege to work with people who had started at LAMPF in the late 1960s and others who in 2022 are still keeping LANSCE running. Original design criteria was for a lifetime of 10 years. The result was components that, with great attention to myriad details, are still performing long beyond 10. That LAMPF/LANSCE is still a viable scientific instrument is evidence of a great deal of effort expended by a great many people possessing a broad range of talents and expertise, sometimes developed, and still being developed, under stress on the job. Contributors range in rank from just-released-from-a-short-Navy-enlistment to Laboratory Fellow.
Over the past 40 years throughout her career at the Lab, Mary Hockaday has been an advocate for LANSCE, from her service as a project leader to an associate director. She is division leader for Nuclear Engineering and Nonproliferation.

As project leader, I worked to gain the authorization of using 10 pounds of explosives that enabled our first series of implosions at LANSCE that made the hydro program sit up and take proton radiography seriously for the first time. Later as Science Campaign program director, I pushed for the funding of the refurbishment of the LANSCE linac. In 2014 the Office of Science made the decision to discontinue its user program at the Lujan Center. As associate director for Experimental Physical Sciences I saw this as an existential threat to LANSCE. Though challenging, it turned out that the great science that we did at the facility was key to our efforts in transitioning Lujan stewardship to the Weapons program and reaffirming LANSCE’s important role for the Laboratory.

Gary Holladay, a retired linear accelerator technical manager, was a member of the Accelerator Operations Group from 1989 to 2020.

LANSCE has been around for 50 years and the number one reason why, I can think of, is all the people who have been a part of it. I am not going to name names as it has taken a lot of smart and talented people to make this work—first, the persons who conceived and designed this machine with the ability to run three beams simultaneously along with being tailored to all kinds of experimenter’s desires. Then, there are the multitude of disciplines that are needed to build, maintain, improve, tune, and operate LANSCE. The number of experiments that have been run should be a massive list. LANSCE was the best place to work as there are smart people who work toward a common goal and it was always challenging.

Eric Martinez of LANSCE Facility Operations, is the Operations Balance the Plant Manager.

I am a father, grandfather, and a rancher all while working full time as an operations manager. I have been working at LANSCE almost seven years now and I have enjoyed every single day because every day is different. The people that I work with have treated me like family. There are always deadlines to meet, work schedules to get done—all in the name of science here at LANSCE. I really cannot single out just one year or one moment that I can mark as an operational achievement. To me, being able to help turn on the accelerator and complete another year’s mission is an achievement in its own. My advice to you all is never give up on your goals and set your mind to it and believe you will have it! Stay hungry, always strive to do your best, and conquer it!

Susan Seestrom, who joined LAMPF as a graduate student and eventually became associate director for Experimental Physical Sciences, recalled her role in realizing a fundamental physics program with neutrons. She credits LANSCE’s longevity to the “incredible flexibility” of the original machine and the “incredible partnership between the scientists using the products of the machine and the dedicated staff working to keep this complicated machine running.” She is the Advanced Science and Technology associate labs director at Sandia National Laboratories and a LANL retired senior fellow.

John Browne was LANSCE director at the time and the Lab solicited LDRD-DR (Laboratory Directed Research and Development-Directed Research) proposals around neutron science. Tom Bowles and I submitted one to develop an ultracold neutron (UCN) source. We thought there was great science to be done, and we might be able to build a competitive source. Our first idea (taking off

continued on next page
from earlier work at Argonne) was a huge rotor that created UCNs like an inverse baseball bat—the cold neutrons bounce off a mirror moving away from them and are left essentially stopped—a cloud of UCNs we could capture. It did not work out great, but we got into the field of UCNs—made them, detected them, designed experiments. It was a jumping off point to study production of UCNs in very cold frozen deuterium—something scientists in Russia claimed to have done. Steve Lamoreaux and Chris Morris went to Germany to make measurements at the Hahn Meitner reactor—and their work verified the Russian results. The team was off—moving toward a solid deuterium source. Soon we developed a prototype source we were able to test at the Weapons Neutron Research Facility. A world record density was achieved. A wonderful workshop in Russia led to the present Area B incarnation that has produced really exciting results on neutron beta decay correlations (UCNA) and, late last year, the world’s most accurate measurement of the neutron lifetime (whose value is quite relevant to our very existence). These programs are still running today.

I also worked with the DOE Office of Nuclear Physics to create a neutron program at LANL. It supported npdgamma at the Lujan Center, UCN beta decay that I have described above, and a measurement of the neutron electric dipole moment … which was the flagship experiment of the program. Since then two of these efforts have moved to the Spallation Neutron Source, but LANSCE continues to do world-leading experiments with UCNs.

**Lawrence Quintana**

Before retiring in 2015 after 36 years as a LANSCE technician, Lawrence Quintana performed remote handling work, fabricated metals in the mesa’s machine shop, assisted researchers from around the world in setting up experiments, and as a member of the Lujan Center 1L target team, helped install and operate the main target serving the facility’s experiments.

This target, the Mark III, is 9-feet tall, 2-feet in diameter, and weighs 14,000 pounds—7 tons. It’s a multimillion dollar piece of equipment and our team was in charge of putting it together and making sure it operated properly. From beginning to end we made sure it was ready to go—and this was in a Category 3 nuclear facility. It was a pretty intense job. Twice a day we would take readings of the systems, make sure everything was running right and if it didn’t … we would be there all night long trying to get the beam back up. … It was challenging and stressful but enjoyable when it all ran well.

**Joyce Roberts**

While at LANSCE from 1978 to 2005, Joyce Roberts held a range of roles—from a Physics postdoc to a LANSCE group leader, to the LANSCE Division Office chief of staff.

In the 1980s, Basic Energy Sciences (BES) gave the Lujan Center support for a new experimental hall and office building, including money to build a neutron scattering instrument. I was excited to be the prime person in the construction and operation of a new neutron powder diffractometer used to study crystal structures—then the highest resolution neutron diffractometer in the US. Researchers led active programs in crystal structures of actinides, high temperature conductors, metal hydrides, etc., contributing to weapons and scientific goals of the Laboratory. In the 1990s, a program to measure stress and strain was initiated. This program flourished with the awarding of BES money to build the Spectrometer for Materials Research at Temperature and Stress (SMARTS).

**Linda Zwick**

Linda Zwick’s last assignment at the Lab was at LANSCE, serving for 13 years as the Accelerator Operations and Technology Division’s chief of staff. She retired in 2019.

From the very start of my time at LANSCE starting in 2006, it was clear to me that people who have worked there for any length of time have a shared sense of the history of the facility and pride in the work accomplished there over its long history and a shared sense of the importance of the facility’s mission and future. This undoubtedly is key to LANSCE’s long and successful life. Workers at LANSCE comprise a community of capable, thoughtful people who care about and support each other. Since my retirement, I have very much missed working within that community and am always glad to run into people with whom I worked.
Deborah Sorensen, of Training and Mission Services, is one of three generations of family members to work at LANSCE, each with a different job title. For 11 years, Sorensen was in the mesa’s training office. That position afforded her the opportunity to often chat with Louis Rosen, who “as innovative as he was … did not like the newfangled stuff,” she said, and refused to have a computer in his office. To complete his training, the “Father of LANSCE” would read printouts of the procedures, querying Sorensen on certain points.

In 1967, my father, Richard Bagley began working at the meson facility as an engineer, helping to build the beam line. Back then, I remember going to pick him up with my mum after work (in those days, families typically had just one car) and my brother and I would fight over who got to push the red button to open the access gate.

In 1998, I began my first job at LANL as part of the training office at LANSCE. Now, not only did I get to push the gate access button almost every day, one of my responsibilities was to manage the badge reader that went with it, so I basically owned that coveted button! I was honored to be able to spend some time with Dr. Rosen, as he was still coming in every day. He told me stories of building the beam and even showed me the machine, housed in Sector J, that was named after me. During construction, the workers named components (magnets, machines, etc.) after their family members. When I asked Dr. Rosen what the machine did, all he said was “It keeps everything in line,” which is perfect because my dad has forever accused me of being bossy.

During my time at LANSCE, we had a family day, where I brought my children on-site. My son, Stephen Townsley, at age 6, was most excited about riding in the Tiger Trucks (a brand of light utility vehicles) that we used. Last fall, Stephen completed the radiological control technician program at Northern New Mexico College and was assigned to … you guessed it, LANSCE.

From left: Stephen Townsley, Deborah Sorensen, Richard Bagley

Deborah Sorensen

Deborah Sorensen, of Training and Mission Services, is one of three generations of family members to work at LANSCE, each with a different job title. For 11 years, Sorensen was in the mesa’s training office. That position afforded her the opportunity to often chat with Louis Rosen, who “as innovative as he was … did not like the newfangled stuff,” she said, and refused to have a computer in his office. To complete his training, the “Father of LANSCE” would read printouts of the procedures, querying Sorensen on certain points.

In 1967, my father, Richard Bagley began working at the meson facility as an engineer, helping to build the beam line. Back then, I remember going to pick him up with my mum after work (in those days, families typically had just one car) and my brother and I would fight over who got to push the red button to open the access gate.

In 1998, I began my first job at LANL as part of the training office at LANSCE. Now, not only did I get to push the gate access button almost every day, one of my responsibilities was to manage the badge reader that went with it, so I basically owned that coveted button! I was honored to be able to spend some time with Dr. Rosen, as he was still coming in every day. He told me stories of building the beam and even showed me the machine, housed in Sector J, that was named after me. During construction, the workers named components (magnets, machines, etc.) after their family members. When I asked Dr. Rosen what the machine did, all he said was “It keeps everything in line,” which is perfect because my dad has forever accused me of being bossy.

During my time at LANSCE, we had a family day, where I brought my children on-site. My son, Stephen Townsley, at age 6, was most excited about riding in the Tiger Trucks (a brand of light utility vehicles) that we used. Last fall, Stephen completed the radiological control technician program at Northern New Mexico College and was assigned to … you guessed it, LANSCE.

From left: Stephen Townsley, Deborah Sorensen, Richard Bagley

Deborah Sorensen

Deborah Sorensen, of Training and Mission Services, is one of three generations of family members to work at LANSCE, each with a different job title. For 11 years, Sorensen was in the mesa’s training office. That position afforded her the opportunity to often chat with Louis Rosen, who “as innovative as he was … did not like the newfangled stuff,” she said, and refused to have a computer in his office. To complete his training, the “Father of LANSCE” would read printouts of the procedures, querying Sorensen on certain points.

In 1967, my father, Richard Bagley began working at the meson facility as an engineer, helping to build the beam line. Back then, I remember going to pick him up with my mum after work (in those days, families typically had just one car) and my brother and I would fight over who got to push the red button to open the access gate.

In 1998, I began my first job at LANL as part of the training office at LANSCE. Now, not only did I get to push the gate access button almost every day, one of my responsibilities was to manage the badge reader that went with it, so I basically owned that coveted button! I was honored to be able to spend some time with Dr. Rosen, as he was still coming in every day. He told me stories of building the beam and even showed me the machine, housed in Sector J, that was named after me. During construction, the workers named components (magnets, machines, etc.) after their family members. When I asked Dr. Rosen what the machine did, all he said was “It keeps everything in line,” which is perfect because my dad has forever accused me of being bossy.

During my time at LANSCE, we had a family day, where I brought my children on-site. My son, Stephen Townsley, at age 6, was most excited about riding in the Tiger Trucks (a brand of light utility vehicles) that we used. Last fall, Stephen completed the radiological control technician program at Northern New Mexico College and was assigned to … you guessed it, LANSCE.
Nice to get a chance to chat with you Lady Proton and Neutron Man. May I start by asking you to tell us a little about yourselves for our readers who are just now meeting you?

Good day. I’m Lady Proton and this is Neutron Man. We like to think of ourselves as the dynamic duo of LANSCE. Together we make nuclear physics and materials science research at LANSCE happen! And we’ve been doing that for five decades now.

Although you won’t see our names on any research papers.

VISTAS: Nice to get a chance to chat with you Lady Proton and Neutron Man. May I start by asking you to tell us a little about yourselves for our readers who are just now meeting you?

LADY PROTON: Good day. I’m Lady Proton and this is Neutron Man. We like to think of ourselves as the dynamic duo of LANSCE.

NEUTRON MAN: Together we make nuclear physics and materials science research at LANSCE happen!

LADY PROTON: And we’ve been doing that for five decades now.

NEUTRON MAN: Although you won’t see our names on any research papers.

VISTAS: That’s about 1,797,605 lifetimes to me!

LADY PROTON: That is true!

VISTAS: Does that disappoint you?

NEUTRON MAN: Oh, not at all! We feel very appreciated. The folks at LANSCE take great care of us. Their attention is the reason we’re still going strong after so many years.

LADY PROTON: And we’re well known within our scientific community. Researchers from around the world and here at Los Alamos rely on us to make groundbreaking scientific discoveries, to generate radioisotopes for cancer treatment, and to support the Lab’s national security mission. And, we’ve appeared in some high-visibility places—like Roger Pynn’s LANSCE primer and the LANSCE exhibit at the Bradbury Science Museum!

NEUTRON MAN: We even made our social media debut this year! We’re—oh—what’s the word?

LADY PROTON: Influencers!

NEUTRON MAN: Yeah, influencers! We’re influencing others to learn more about LANSCE and celebrate its 50th anniversary.

VISTAS: Well, I think that is a perfect transition to the following: great moments in LANSCE history, as told by Lady Proton and Neutron Man. Thank you both for your time.

THE SUMMER LANSCE WILL CELEBRATE ITS 50TH ANNIVERSARY

THAT’S ABOUT 1,797,605 LIFETIMES TO ME!

ULTRACOLD NEUTRON FACILITY

LANSCE UCNTAU EXPERIMENT MEASURES NEUTRON LIFETIME WITH GREATEST-EVER PRECISION
The first proton radiography dynamic shot was executed 25 years ago this year, marking the first demonstration of dynamic radiography using a proton beam.

Are you sure this dynamic experiment will work?

Positive!

Snap!

Today, the proton radiography facility has executed more than 878 shots in support of the lab's defense programs and counterproliferation efforts.

With you in charge?

After a decade of service, the target at the Lujan center is being replaced.

It's like getting a brand new car!

I'm going to the same place but will get there in style.
In 2014 scientists used the HIPPO instrument at the Lujan Center to verify the world’s largest single crystal of gold. This distinguishing factor drastically increased its market value and provided a unique research opportunity.

Lujan Neutron Scattering Center

How much for this giant gold nugget?

For you?

No charge!

At the Isotope Production Facility, scientists are developing Actinium-225, which delivers high-energy radiation to a cancer tumor without greatly affecting the surrounding tissue. The short-lived isotope can be chemically modified to target certain cancers—prostate cancer, colorectal cancer, melanoma, and others.

WOW! That’s quite the accomplishment!

Isotope Production Facility

Combining sophisticated science with meticulous operations, a Los Alamos team has directly measured nuclear reactions on LANL-produced radionuclides with half-lives as short as six days. This first-ever accomplishment represents the first credible path to making exact nuclear cross-section measurements on many key short-lived radionuclides in a laboratory.

Weapons Neutron Research Facility

Guess you could say that’s some stellar synergy!
Past accelerator operators are recognized in a display in the Accelerator Operations Building at the Los Alamos Neutron Science Center. Their contributions have been essential to the facility’s success, from the machine’s start up five decades ago to today.

Insert: New Mexico Senator Clinton P. Anderson (right), Atomic Energy Commission Chairman Glenn T. Seaborg (center), and Los Alamos physicist Louis Rosen (far right) wield golden shovels at the February 1968 groundbreaking of the Los Alamos Meson Physics Facility. Due to inclement weather, the event was held in the Lab’s Administration Building.
AT A GLANCE

What’s LANSCE? The Los Alamos Neutron Science Center is a facility at the Lab with one of the nation’s most powerful linear accelerators, which is a half-mile in length.

What’s an accelerator? An accelerator is a machine that uses electric or time-varying magnetic fields to accelerate nuclear particles to high velocities.

Who was Louis Rosen? In 1962, Rosen, a career-long Lab physicist, proposed building the world’s most advanced nuclear science facility with the most-powerful, high-intensity-proton linear accelerator. He would become the facility’s first director and be known as the “Father of LANSCE.”

Why is LANSCE important? The Lab uses linear accelerators to improve safety and security as well as advance nuclear technology, among other areas. LANSCE’s experimental areas support

- stockpile sustainment
- future deterrents
- modern materials and manufacturing
- threat mitigation

Who uses LANSCE? In addition to Los Alamos staff, the facilities at LANSCE are also available to researchers from around the world.