

Fermilab Facts: A quick look at the Fermi National Accelerator Laboratory in Batavia, Illinois

Research

- Much of what we know about matter and energy and even how the universe began was discovered over the last four decades at Fermilab, a national laboratory funded by the Office of Science of the Department of Energy.
- Scientists at Fermilab carry out research in particle physics and astrophysics. Fermilab's fundamental research advances our understanding of the nature of the universe, from the subatomic world to the big bang.
- Fermilab is home to the world's most powerful proton-antiproton particle accelerator, the Tevatron, four miles in circumference.
- Research at Fermilab provides training for the next generation of physicists, engineers and computer scientists. In 2007, more than 100 students received their Ph.D.s based on work carried out at Fermilab.



People

- Fermilab's 1,900 employees include about 900 physicists, engineers and computer professionals. Another 2,300 scientists and students, from across the United States and around the world, spend time at Fermilab to carry out research.

Community

- Fermilab is open to visitors daily and offers guided tours and many educational and recreational opportunities, including bike paths and walking trails through the prairie.
- The Lederman Science Center provides on-line and hands-on experience for students and teachers to explore how Fermilab physicists discover nature's secrets.
- Fermilab regularly hosts concerts, art exhibits, films, lectures and folk dancing events for the public.
- Approximately 15,000 students from local schools visit Fermilab every year to learn about science and nature. In 2007, about 900 teachers participated in training provided by Fermilab.
- Fermilab scientists volunteer their time and visit schools. In 2007, they met with more than 10,000 students in classrooms throughout the Chicago area.

Environment

- The 6,800-acre Fermilab site contains wetlands, woodlands, grasslands and more than 1,100 acres of reconstructed tall-grass prairie.



- Approximately 270 species of birds, 50 species of butterflies and 10 species of frogs have been observed at Fermilab.
- The lab's standing herd of American bison, established by founding director Robert Wilson, is a popular attraction for local residents. The herd symbolizes the lab's prairie heritage and its presence at the frontier of high-energy physics. The first bison was a gift from the State of Illinois.
- In 1989, Fermilab was designated a National Environmental Research Park.

Discoveries

- Experiments at Fermilab advanced the understanding of matter with the discovery of the bottom quark (1977), the top quark (1995) and the tau neutrino (2000).
- Mapping one quarter of the nighttime sky, the Sloan Digital Sky Survey identified more than 100 million stars, galaxies and quasars between 1998 and 2005. In 2007, the Pierre Auger Observatory identified supermassive black holes as the most likely source of the highest-energy cosmic rays.
- Right now, scientists are using Fermilab's Tevatron to look for evidence for an entirely new class of subatomic particles as well as the first signs of new dimensions of space-time.
- Other Fermilab scientists are using ultrasensitive detectors as well as telescopes to unravel the mysteries of dark matter and dark energy, the two mysterious components that dominate the universe.

Benefits to society

- The extraordinary technology developed for particle physics research has often led to real-life applications. In 1992, for example, Fermilab created the second World Wide Web site ever posted in the United States, spreading the technology invented at the European particle physics laboratory CERN.
- Fermilab is well known for its pioneering of superconducting magnet technology, developing powerful electromagnets that conduct electricity without resistance. The technology, now at the heart of Magnetic Resonance Imaging machines, came directly from Fermilab's Tevatron.
- Particle accelerators, once only found at a few laboratories, have become powerful tools for industry and medicine. They provide electrons, protons, neutrons and x-rays for many applications, from studying materials to destroying cancer cells. In 1990, Fermilab built a proton accelerator for the Medical Center at Loma Linda University in California.
- Fermilab's Neutron Therapy Facility, in operation since 1976, has treated more than 3,000 cancer patients.

Budget

- In 2007, Fermilab's overall budget was about \$344 million, provided by the Office of Science of the U.S. Department of Energy. Fermilab spent about \$146 million in payroll and about \$70 million for goods and services provided by businesses located across Illinois.

More information

For more information, visit www.fnal.gov or call the Fermilab Office of Communication at 630-840-3351.