Fermi National Accelerator Laboratory (Fermilab) Encyclopedia Article

Fermi National Accelerator Laboratory (Fermilab)

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Fermi National Accelerator Laboratory (Fermilab)

The Fermi National Accelerator Laboratory, Fermilab, is one of the world's largest research facilities, with more than 2,000 workers. Over the years, more than 5,000 scientists have come from around the world to **work** at Fermilab near Chicago, Illinois. The lab houses equipment used to study **subatomic particles**, the particles in the **nucleus** of an **atom**. By smashing atoms, scientists hope to learn more about nature and the behavior of **matter**.

The U. S. Congress funded construction of the lab with $250 million in 1969. The facility was originally called the National Accelerator Laboratory until 1974, when it was dedicated to the memory of **Enrico Fermi**, the nuclear physicist who helped develop the first nuclear reaction at the University of Chicago. The Universities Research Association Inc. (URA), a consortium that now includes 77 universities in the United States and Canada, operates Fermilab for the U. S. Department of **Energy**.

Fermilab contains one of the world's largest **proton synchrotrons**, a type of oversized **microscope** for studying subatomic particles. The main particle accelerator is contained within the Main Ring, a 4-mi-long (6.4-km-long) circular tunnel that is used for examining particles one ten-millionth of one-billionth of a centimeter in size. Two kinds of particles--quarks and leptons--are believed to be the building blocks of matter. Protons and neutrons contain **quarks**. The accelerator accelerates protons in a way through equipment that tests them and notes their behavior under different conditions.

Fermilab runs 24 hours a day, 7 days a week, with the capacity to perform up to 15 experiments simultaneously. In March 1995, a new particle was discovered at the facility: the top quark, which is the sixth. In July 2000, a team of 54 internationally renowned physicists announced the discovery of the tau **neutrino**, one of two remaining major undetected particles in the standard model of theoretical physics. Work continues at Fermilab, searching for the remaining unseen particle, the **Higgs boson**.

For a cybertour of Fermilab, please see www.fnal.gov.