Fast Facts about the APS

The Advanced Photon Source (APS) at Argonne National Laboratory is a U.S. Department of Energy (DOE) Office of Science national user facility; we are funded through the DOE Basic Energy Sciences Program, Scientific User Facilities Division.

The APS occupies an 80-acre site on the Argonne National Laboratory campus.

It shares the site with the Center for Nanoscale Materials and the Advanced Protein Characterization Facility.

Facility construction started in spring 1990, and was completed on time and under budget; research started in the fall of 1996.

Total APS construction and project cost at completion in 1995 was $812 million (FY95 dollars).

The number of APS employees at any one time is approximately 450.

The APS is the largest of the 5 DOE light sources in terms of users per year.

The APS hosts approximately 5,000 users per year from all 50 states, Washington D.C., and Puerto Rico.

These users are currently carrying out more than 5,700 experiments per year.

APS users deposit more protein structures in the Protein Data Bank than any other x-ray light source in the world.

Currently, APS users publish approximately 1,900 articles in peer-reviewed scientific journals.

The APS provides this nation's brightest high-energy x-ray beams for science.

The APS has 35 sectors dedicated to user science, managed either by the APS X-ray Science Division (XSD, by collaborative access teams (CATs) made up of independent groups of scientists from universities, industry, and/or research laboratories, or shared by the APS and a CAT or other entity.

Scientific disciplines investigated at the APS. Here are just a few examples:

Materials and chemical science; environmental, geological, and planetary science; physics; polymer science; biological and life science; pharmaceutical research; atomic, molecular, and optical physics; and the properties of nanoscale materials.

Research at the APS benefits nearly every aspect of our lives:

Clues to the causes of and treatments for a multitude of diseases including AIDS, and toxic threats such as anthrax

A greater understanding of human physiology

Better materials for lithium-ion batteries and other energy-related technologies

The path to more efficient designs for fuel-injection systems

Ways of eliminating and remediating environmental depredations

Insights about conditions at the center of the Earth, the causes of earthquakes and volcanoes, and the composition of cosmic dust

A nearly endless array of new information about materials that support the development of practical applications like advanced digital storage media, more efficient lighting, environmentally friendly refrigerants, methods for increasing the durability of man-made structures, and the characterization of nanostructures whose sizes are measured in atoms, to name but a few.

Research at the APS played a central role in the studies that garnered the 2009 and 2012 Nobel Prizes in Chemistry.

The APS facility:

There are more than 2,000 conventional electromagnets and 16 pulsed electromagnets in the APS electron accelerators

Over 700 beam-position monitors, 600 corrector magnets, and 80 computer systems monitor and correct the electron orbit, steering x-ray beams onto experiment samples to micro tolerances APS beam diagnostics control multiple x-ray beams simultaneously utilizing more than 500 ultrahigh-resolution beam-position monitors, each resolving beam motion that is a fraction of the size of the period at the end of a sentence, while nearly 100 remote computers collect data from the 500 monitors and re-steer x-rays 1,500 times per second

More than 120 programmable logic controllers monitoring over 25,000 signals comprise radiation interlock systems protecting personnel and equipment

The APS beam control system comprises 80 workstations, 227 distributed input/output computers (IOCs), more than 7,000 replaceable hardware components, and more than 100,000 IOC points monitoring or controlling more than 450,000 technical parameters

The storage ring radio frequency (rf) systems contribute to a combined accelerating voltage equal to a 16-million-volt power supply

APS rf systems produce more rf power than the combined output of every radio and television station in the city of Chicago

The outer diameter of the APS experiment hall is 1,225 feet; slightly less than the height of the Willis (Sears) Tower in Chicago (1,454 feet)

Experiment hall construction required 56,000 cubic yards of concrete (equal to a football-field-sized block 30 feet high); 5,000 tons of structural steel (enough for 3,500 mid-size cars); 2,000,000 linear feet (380 miles) of electrical wire; and 190,000 feet of pipe for water, steam, drainage, and HVAC.

Total floor space of all APS buildings is 1,042,811 feet^2

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