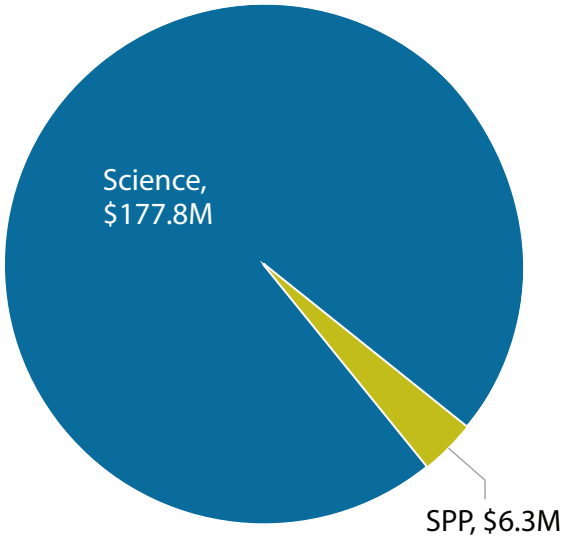
Thomas Jefferson National Accelerator Facility
At a Glance

U.S. DEPARTMENT OF ENERGY

The Thomas Jefferson National Accelerator Facility (TJNAF), located in Newport News, Virginia, is a laboratory operated by Jefferson Science Associates, LLC, for the Department of Energy's (DOE) Office of Science (SC). The primary mission of the laboratory is to explore the fundamental nature of confined states of quarks and gluons, including the nucleons that comprise the mass of the visible universe. TJNAF also is a world-leader in the development of the superconducting radio-frequency (SRF) technology utilized for the Continuous Electron Beam Accelerator Facility (CEBAF). This technology is the basis for an increasing array of applications at TJNAF, other DOE labs, and in the international scientific community. The expertise developed in building and operating CEBAF and its experimental equipment has facilitated an upgrade that doubled the maximum beam energy (to 12 GeV (12 billion electron volts)) and provided a unique facility for nuclear physics research that will ensure continued world leadership in this field for several decades. The upgraded facility has completed commissioning runs to each of the four experimental halls and is poised to begin the experimental program.

FY 2016 Costs by Funding Source



Lab operating costs **$184.1M million**
DOE costs: **$177.8 million**
SPP costs (non-DOE/non-DHS): **$6.3 million**
SPP as % total lab operating costs: **3.4%**
SPP **$6.3M**

Facts

Location: Newport News, Virginia
Type: Single-program laboratory
Year Founded: 1984
Director: Stuart Henderson
Contractor: Jefferson Science Associates, LLC
Responsible Site Office:
Thomas Jefferson Site Office

Physical Assets

169 acres and **68** buildings
880,269 GSF in buildings
Replacement plant value: **$415M**
0 GSF in Excess Facilities
83,542 GSF in leased facilities

Human Capital

699 full-time equivalent employees (FTEs)
26 joint faculty
28 postdoctoral researchers
39 graduate students
9 undergraduate students
1,530 facility users
1,368 visiting scientists

Core Capabilities

- Accelerator Science and Technology
- Large-Scale User Facilities/Advanced Instrumentation
- Nuclear Physics

Mission Unique Facilities

- Continuous Electron Beam Accelerator Facility (CEBAF)

Jefferson Lab

Thomas Jefferson National Accelerator Facility
Accomplishments

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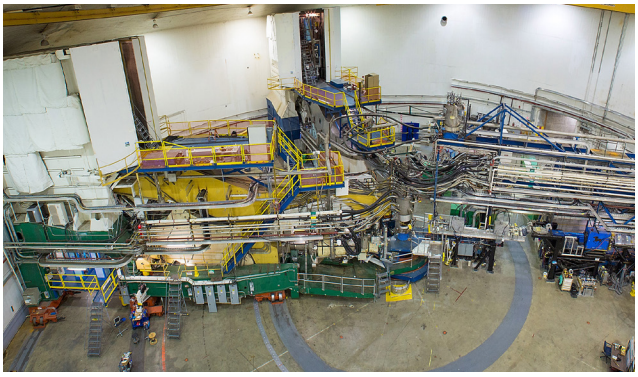
Research Highlight
Elucidating the Internal Structure of the Proton

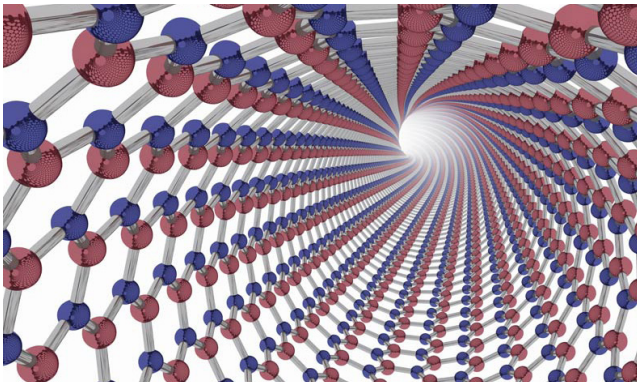


A robust description of the internal structure and dynamics of protons and neutrons is a fundamental goal of nuclear physics. Key ingredients of this characterization are the elastic electric and magnetic form factors of the proton, which are directly related to the charge and current distributions inside the nucleon. Jefferson Lab experiments discovered that the spatial extension of charge in the proton is surprisingly larger than that of magnetization.

Unique Facility
Newly Upgraded Electron Accelerator Facility

In operation at Jefferson Lab since 1995, the Continuous Electron Beam Accelerator Facility (CEBAF) has been upgraded to double the beam energy to 12 GeV and outfitted with new experimental equipment. The research program at CEBAF is a unique and essential part of the national and global program in nuclear physics, spanning the study of hadronic physics, the physics of complex nuclei, the hadronization of colored constituents, and precision tests of the standard model of particle physics. The original 6 GeV machine has been upgraded to deliver 12 GeV maximum beam energy and is poised to begin a scientific program that will allow breakthroughs in hadronic physics including searching for an answer to the question “Why are quarks never found alone?”

Technology To Market Highlight
Boron Nitride Nanotubes (BNNT)



In 2009, researchers developed a now-patented process to synthesize high-quality BNNTs at DOE’s Jefferson Lab in collaboration with NASA Langley Research Center and the National Institute of Aerospace. BNNTs are resistant to high temperatures, efficiently conduct heat but not electricity, and can be useful in a wide range of applications, including heat and electrical insulation and - in the biomedical realm - for drug delivery. Patents regarding the material developed at Jefferson Lab have been licensed to a small start-up company, BNNT, LLC. The company has scaled up production and is now manufacturing and offering for sale high-quality BNNTs for scientific investigation, application R&D and commercial products.

For additional information visit: www.jlab.org