Thomas Jefferson National Accelerator Facility (Jefferson Lab)

The Jefferson Lab is a 169-acre Department of Energy (DOE) facility located in Newport News, Virginia. It boasts state-of-the-art, one-of-a-kind facilities and technologies, setting it apart from other research labs around the globe. These resources and facilities encourage research in a variety of technology sectors, including Energy, Environment, Life Sciences, and Information Technology. In fact, the Jefferson Lab has an international user community of almost 1,400 researchers, taking advantage of its world-class R&D capabilities, staff experience, and facilities. As of the end of 1Q 2011, the Jefferson Lab had a staff of approximately 760, and each day, nearly 100 users from the United States and around the world visit and utilize the Lab and its resources. In addition to conducting research, the Jefferson Lab also provides outstanding science education programs for K-12 students, undergraduate and graduate students, and teachers.

Jefferson Lab's five priority areas leverage its strengths and provide a basis for teaming and partnering with other DOE laboratories, universities, and private sector partners. Research at the Jefferson Lab focuses on: experimental, theoretical, and computational nuclear physics; accelerator science; applied nuclear science and technology; and large-scale user facilities/advanced instrumentation. The Jefferson Lab also addresses issues in nuclear instrumentation, medical imaging, large-scale computing, materials science, and other related areas.

A specific project – and the primary mission of the Lab – is to utilize its unique Continuous Electron-Beam Accelerator Facility (CEBAF) to explore the fundamental nature of confined states of subatomic particles such as quarks and gluons. In accelerator science, the Jefferson Lab leads the world's development of the superconducting radio-frequency (SRF) technology utilized for CEBAF. In addition, Jefferson Lab is building a tunable free electron laser (FEL) capable of record-breaking power levels and has fostered the growth of key technologies for future state-of-the-art light sources.

The Jefferson Lab provides a unique facility for studying quark structures using continuous beams of high-energy polarized electrons. Its detector and data acquisition capabilities, coupled with high-energy electron beams, provide the highest luminosity capability in the world. With CEBAF, the Jefferson Lab has more integrated operating experience of superconducting linacs than any other institution. In addition, the Jefferson Lab has processed more multi-cell superconducting cavities to consistently higher performance levels than any other facility in the world.

Currently the Jefferson Lab is in the process of upgrading the CEBAF to 12 GeV to allow scientists to explore the complex make up of nucleons. Future initiatives include playing a leading role in the next large-scale light source and constructing an electron ion collider, which would ensure continued world leadership in nuclear physics.