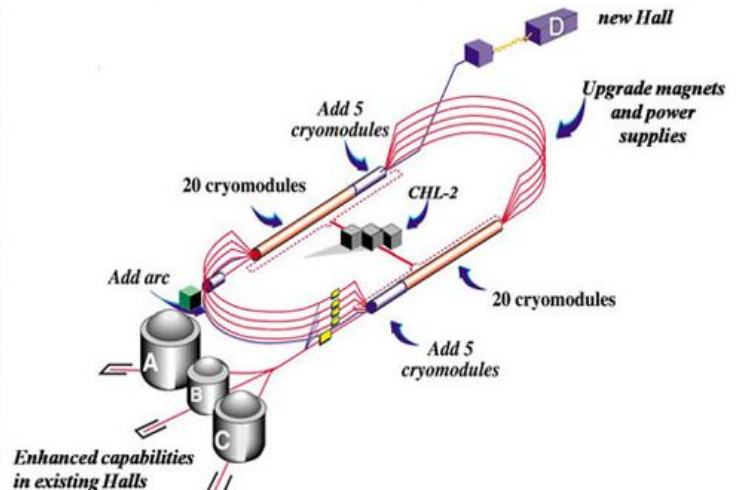


**JEFFERSON LAB 12 GEV UPGRADE -  
REALIZING THE SCIENCE FROM A NATIONAL SCIENTIFIC PRIORITY IN NUCLEAR PHYSICS**  
April 2014

Thomas Jefferson National Accelerator Facility in Newport News, Virginia, one of ten Office of Science national laboratories in the Department of Energy, is nearing completion of the federally funded \$338M 12 GeV Upgrade Project that will maintain Jefferson Lab's and our nation's world leadership position in the field of Nuclear Physics. Funding is critical to support operation of this new facility as we commission the facilities and equipment and transition to 12 GeV Operations and to realizing the discovery-caliber science program it was built for.

The 2013 report to the Nuclear Science Advisory Committee (NSAC) titled "Implementing the 2007 Long Range Plan," stated unequivocally that **"under all scenarios we must capitalize on the investment has been made to upgrade CEBAF."** The 12 GeV CEBAF upgrade provides capabilities unique in the world, poised to begin discovery caliber experiments to answer fundamental questions such as why quarks are never found alone. With the accelerator 98 percent complete and beam commissioning underway, new experimental Hall D 90 percent complete and Halls B and C 65 percent complete, the upgraded accelerator and Halls A and D will be ready for initial physics experiments in FY15.



**Leveraging Significant Investments to Advance US Scientific Leadership**

- Jefferson Lab is a unique national resource that will deliver groundbreaking science and discovery well into the next two decades.
  - Original facility represents over \$600M investment with significant contributions from the Commonwealth of Virginia and foreign collaborators.
  - Over the past 6 years, the US has invested nearly \$500M in facility and scientific upgrades - 12 GeV Upgrade, Technology Engineering and Development Facility (TEDF), and other infrastructure projects.



**Realizing Scientific Potential – Supporting Laboratory Operations in the 12 GeV Era**

- Demand for 12 GeV CEBAF beam time is extremely high with 61 peer-reviewed and approved experiments requiring more than 7 years' worth of physics running awaiting the beginning of 12 GeV operations. In order to support the needed run time for these experiments, the NP operations budget should support a sustained level of 30 weeks of operations in FY15 and ensuing years through

FY20 under a constant overall budget with modest growth per year.

- A shortfall in the operations funding in FY15 will have lasting detrimental effects on the 12 GeV program such as delaying the start of nuclear physics science at the facility and increasing the wait time for experiments. (The President's Budget Request of \$96.1M would only allow 19 weeks of run time, vs. \$104.1M needed to achieve the optimal 30 week level.) If a shortfall continues in the out years, the detrimental effects would be exacerbated. At the current guidance funding level for operations, the start of the forefront 12 GeV experimental program will be delayed 2-3 years and the 7-year backlog of experiments will stretch to 14 years. The net effect of this is that 50% of the science in the nation's medium-energy physics could be lost.

**Conclusion:**

***As stated in the recent NSAC Subcommittee report, the US Nuclear Physics program should be capitalizing on the federal investment made in the 12 GeV Upgrade.*** A shortfall in the operations funding in FY15 will have lasting detrimental effects on the 12 GeV program and the field - delaying the start of nuclear physics science at the facility, doubling the backlog at this new facility and risking the loss of 50% of our nation's medium energy physics program.