

Physical Science Research and Development and the American Reinvestment and Recovery Act

The American Reinvestment and Recovery Act (ARRA) includes \$1.6 billion for the U.S. Department of Energy Office of Science (DOE-OS) and \$3 billion for the National Science Foundation (NSF). ARRA funding is being utilized to create jobs, foster research by supporting and accelerating science programs and rebuild the aging national scientific infrastructure. These goals are being achieved through shovel-ready projects that have already been approved but lacked funding in previous years.

On March 23, 2009, \$1.2 billion of the DOE-OS appropriation was released. A significant fraction of that funding is being invested in the national laboratory and university research efforts. Some specific examples of ARRA investments in the physical sciences include:

- **\$68.3M to SLAC National Accelerator Laboratory.** These funds will be used for laboratory infrastructure and to accelerate the completion of the Linac Coherent Light Source (LCLS). The LCLS will soon use the world's most intense X-ray laser pulses to make the first stop-motion movies of chemical processes in action. The LCLS will discover new states of matter, elucidate biological processes, and reveal nanoscale chemical and structural properties of materials. The funds will also energize the Facility for Advanced Accelerator Experimental Tests, or FACET, the only program in the world with the capabilities to study short-distance particle acceleration.
- **\$75M to Fermi National Accelerator Laboratory.** Of this total, \$50M will be appropriated jointly with the University of Minnesota for construction of the Nova neutrino project, including civil construction of the experimental facilities as well as accelerate the purchase of technical equipment. The Nova project will investigate the nature of neutrinos, one of nature's most elusive particles. The remaining \$25M will be utilized to upgrade and improve aging laboratory infrastructure.
- **\$90M for core university-based research.** These funds will provide support for graduate students, postdocs, and Ph.D. scientists across the nation. This will create jobs and stimulate the economy both directly – in creating and saving research jobs – as well as through scientific advancements that ultimately can be applied in the marketplace.
- **\$277 million for Energy Frontier Research Centers.** These centers will be awarded on a competitive basis to universities and DOE National Laboratories across the country. These centers will accelerate the transformational basic science needed to develop plentiful and cost-effective alternative energy sources and will pursue advanced fundamental research in fields ranging from solar energy to nuclear energy systems, biofuels, geological sequestration of carbon dioxide, clean and efficient combustion, solid state lighting, superconductivity, hydrogen research, electrical energy storage, catalysis for energy, and materials under extreme conditions.
- **\$184.3M to Brookhaven National Laboratory.** The majority of this allocation (\$150M) will accelerate construction on the National Synchrotron Light Source II, a new \$912 million project approved to start construction earlier this year. The remaining funds will be used on laboratory infrastructure and to purchase equipment for the Relativistic Heavy Ion Collider.
- **\$99M to Argonne National Laboratory.** These funds will be used to clean up several of Argonne's former nuclear research facilities and pave the way for future construction and research activities at the lab. Argonne will use \$50 million to remove and dispose of irradiated fuel specimens and other waste materials from the Alpha Gamma Hot Cell Facility, another \$35 million to demolish two excess nuclear facilities, including the former Chicago Pile-5 (CP-5) research reactor facility.
- **\$75M to Thomas Jefferson National Laboratory.** Of the total, \$65 million will be applied to the 12 GeV Upgrade, a construction project that will double the energy of the lab's electron beam from 6 billion electron volts (GeV) to 12 GeV. When complete, the project will allow the lab's international community of physicists to continue Jefferson Lab's mission of expanding our knowledge of nuclear and particle physics with an unprecedented level of precision. The additional \$10 million will be used to modernize lab facilities.
- **\$71.2M to Oak Ridge National Laboratory.** These funds will be used to accelerate construction of a new chemical and materials sciences research building designed to replace an aging facility that contains a number of inefficient laboratories that are in need of repair.