

Nuclear Physics Program

Nuclear Science Advisory Committee

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for Nuclear Physics

November 5, 2009

Outline

- Program Activities
- 2009 Recovery Act Funding
- FY 2010 Appropriation
- Office of Nuclear Physics



Nuclear Physics Activities

Reviews

- Completed Science and Technology Reviews of four National User Facilities
- Construction project, MIE, and other project reviews
- Completed more than 200 actions on grants and awards
- Agency Reviews of international projects
- Joint Agency Review of the 88-Inch Cyclotron Operations
- Recovery Act Solicitation Reviews (completed and on-going)

Advisory and Coordination Activities

- National Academy of Science Decadal Survey starting in FY 2010
- Approval of NSAC Charter for two years
- Interagency Working Groups: The Physics of the Universe, Large Scale Science, Mo-99, He-3, Forensics
- OECD Global Science Forum's Working Group on Astroparticle Physics
- DUSEL Joint Oversight Group (JOG) with NSF, HEP, NP

Interactions with Congress

- Testimony before the House Science and Technology Committee's Subcommittee on Energy and Environment regarding the Isotopes Program
- Testimony before the House Science and Technology Committee's Subcommittee on Energy and Environment regarding the Nuclear Physics Program

Other

- Annual Workforce Survey
- Transitioning to the STRIPES procurement process



Status of Solicitations for Proposals

- Graduate Fellowships in Science, Mathematics, and Engineering (ARRA)
 - At least 80 graduate fellowships across SC; for three years (\$50,500/yr)
 - U.S. citizens; undergraduate seniors, first or second year graduate students
 - Application deadline in November 30, 2009
 - See <http://www.scied.science.doe.gov/scfg.html> for information on applying
- RIB Science Initiatives
 - Twenty-three proposals reviewed; selection and notification underway
- R&D on Alternative Isotope Production Techniques (ARRA)
 - Approximately fifty-five applications; ten awards are in process
- Applications of Nuclear Science and Technology (ARRA + Base)
 - Approximately 200 applications; twenty-two selected for funding; notifications in process
- Science Early Career Research Program (ARRA + Base)
 - Fifty-six applications; five to be supported at universities, three at laboratories
 - Five year awards; additional awards each year in the future
- Topical Collaborations in Nuclear Theory
 - Nineteen applications, reviews beginning
- Continuing Solicitation for New, Renewal, and Supplemental Applications to be updated

12 GeV CEBAF Upgrade Project

TPC: \$310 Million

Funds redirected from CEBAF Operations

Successful CD-2, CD-3 in FY 2008

Project (Lehman) Review—Sept. 22-24, 2009

Operations anticipated in FY 2015

Unique, world-class facility and scientific program

- New insight into the structure of the nucleon
- Investigate transition between hadronic and quark/gluon description
- Address one of great questions of modern physics: the mechanism that “confines” quarks together

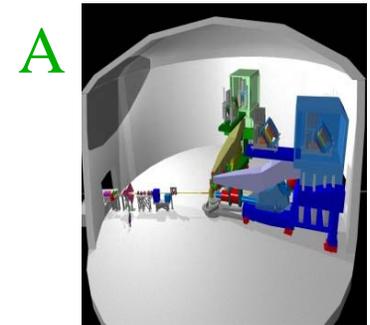
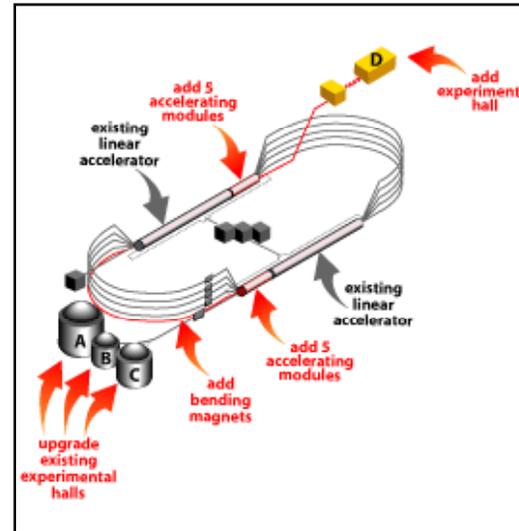
Scope of the project

- Doubling the accelerator beam energy
- New experimental Hall and associated beamline
- Upgrades to the existing three experimental Halls.

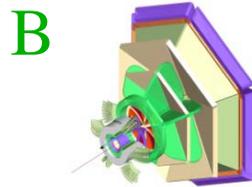
Recovery Act funding advances project funding by \$65 Million

- Reduces cost and schedule risk

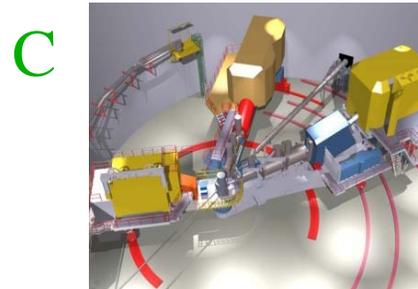
Project is on schedule



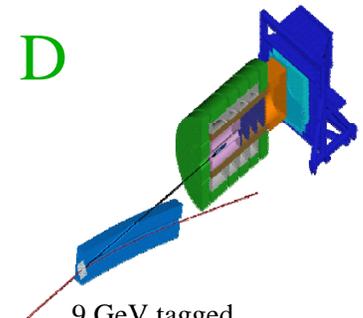
A High Resolution Spectrometer (HRS) Pair, and specialized large installation experiments



B CLAS upgraded to higher (10^{35}) luminosity and coverage



C Super High Momentum Spectrometer (SHMS) at high luminosity and forward angles



D 9 GeV tagged polarized photons and a 4π hermetic detector

Facility for Rare Isotope Beams

DOE TPC: \$450-\$550 Million

MSU Cost Share: \$94.5 Million

CD-0 in FY 2004

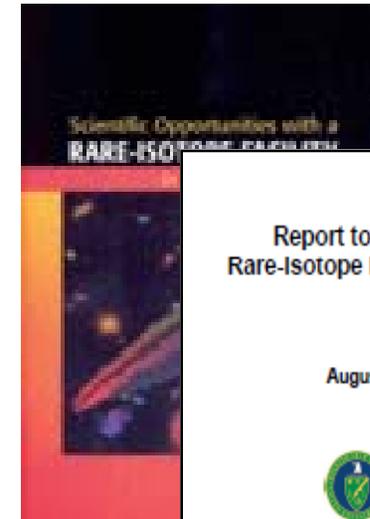
First Project (Lehman) review—September 1-3, 2009

CD-1 planned for FY 2010

World-leading facility and scientific program

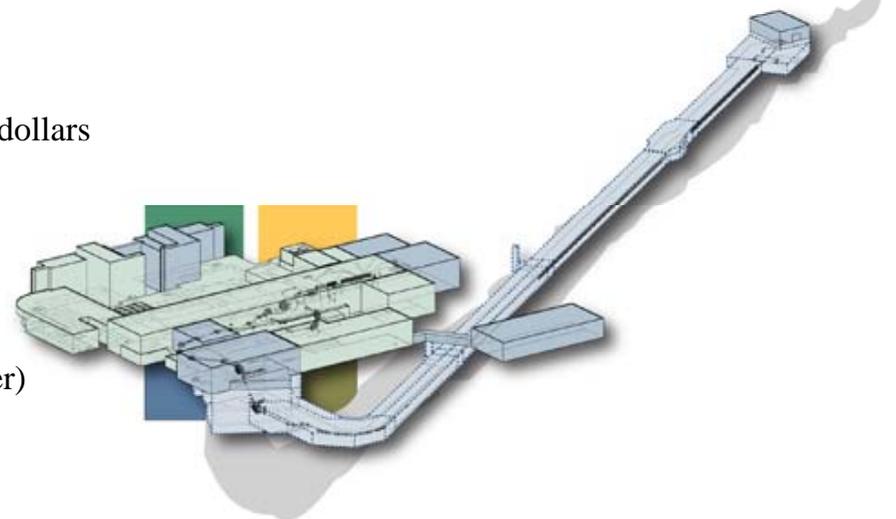
- Nuclear structure and nuclear astrophysics
- Fundamental symmetries
- R&D for applications

- Recommended by the Nuclear Science Advisory Committee, the DOE 20-Year Facilities Plan, and the National Academies
- Funding Opportunity Announcement called for proposals due July 21, 2008
- Conducted peer review with Merit Review Panel
- Michigan State University selected for award
- Cooperative Agreement signed June 8, 2009 – funded with operating dollars
- R&D, NEPA and Conceptual Design activities supported in FY 2009 and FY 2010; engineering and design starts in FY 2011
- Adopted an Enhanced Environmental Assessment process; public scoping meeting to be held at MSU on November 11, 2009; public comments are open until December 11, 2009 (See the Federal Register)



Report to NSAC of the Rare-Isotope Beam Task Force

August 20, 2007





Status of NP Projects

Project	TPC	Start	Completion	Status
12 GeV Upgrade	\$310 million	FY 2004	FY 2015	CD-3
<i>FRIB</i>	<i>\$450-550 million</i>	<i>FY 2009</i>	<i>FY 2017</i>	<i>CD-0</i>
STAR Time-of-Flight	\$4.8 million	FY 2006	FY 2009	Complete
GRETINA MIE	\$18.8 million	FY 2004	FY 2011	CD-2b/3b
FNPB MIE	\$9.3 million	FY 2004	FY 2010	CD-4a
EBIS (w/NASA)	\$14.8 million	FY 2006	FY 2010	CD-2/3
nEDM MIE (w/NSF)	\$17.6-19 million	FY 2006	FY 2015	CD-1
PHENIX SVT MIE	\$4.7 million	FY 2007	FY 2010	N/A
HI LHC ALICE MIE	\$13.5 million	FY 2007	FY 2011	CD-2/3
PHENIX FVTX	\$4.9 million	FY 2008	FY 2011	N/A
CUORE (w/NSF)	\$8.7 million	FY 2008	FY 2013	CD-1
STAR HFT	\$11-17 million	FY 2010	FY 2014	CD-0
Rare Isotope Beam (RIB) Science Initiatives	\$2-20 million (multiple MIEs)	FY 2010	FY 2012 - FY 2017	CD-0
<i>Majorana Demonstrator R&D Project</i>	<i>TBD</i>	<i>FY 2010</i>	<i>TBD</i>	<i>CD-0</i>

All projects are reviewed monthly, quarterly, annually



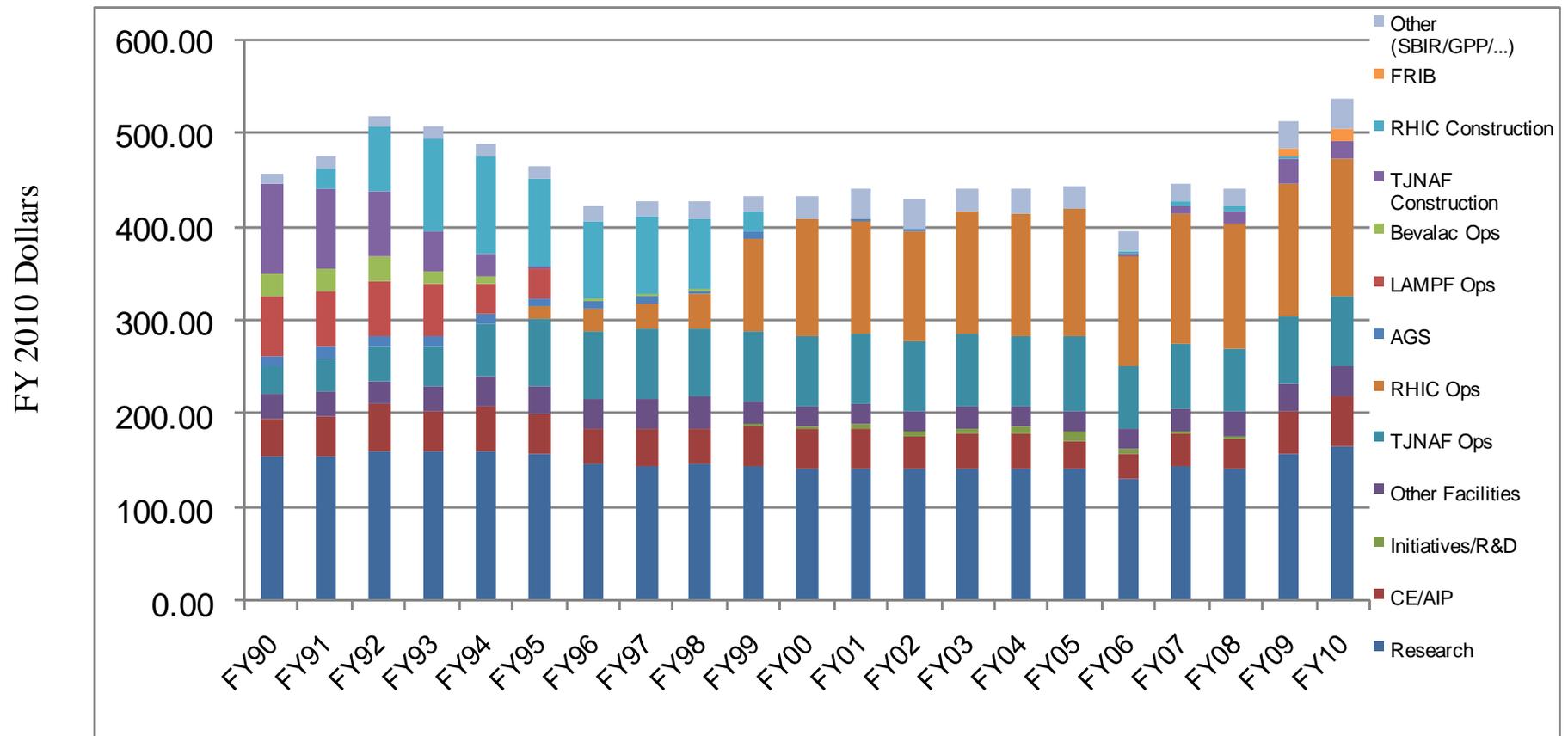
American Recovery and Reinvestment Act Nuclear Physics Projects

<u>Recovery Act Project:</u>	<u>Funding (\$000)</u>
Advance Funding of 12 GeV CEBAF Upgrade	65,000
Advances procurements to create jobs; reduces cost/schedule risk	
Fundamental Neutron Physics Beam-line MIE at the Spallation Neutron Source	600
Two tasks to complete FNBP Project	
PHENIX Silicon Vertex MIE	250
Completes the VTX project	
PHENIX Forward Vertex MIE	2,000
Completes the FVTX project	
Enhanced AIP Funding at NP National User Facilities	25,000
Projects at five nuclear physics facilities	
Enhanced Utilization of Isotope Facilities	10,000
Projects and enhanced production at isotope facilities at five laboratories	
TJNAF Infrastructure Investments	10,000
Five backlogged GPP projects supported	
Nuclear Data Program Initiative	1,944
Workforce succession	
Lattice Quantum ChromoDynamics Computing	4,965
Augment LQCD project with 16 tflops or more of computing	
Nuclear Science Workforce	19,440
Applications of Nuclear Science and Technology relevant to applications (competitive)	
R&D on Alternative Isotope Production Techniques	4,617
Investigate alternative approaches to isotope production (competitive)	
Science Early Career Research Program (first awards in FY 2010)	10,984
Support development of individual research programs of outstanding scientists early in their careers (competitive)	
TOTAL, NP	154,800

Funding History of the Nuclear Physics Program

Beginning in FY 2009, the Isotopes Program became part of the Nuclear Physics program.

The FY 2010 Appropriation is \$535,000,000.



FY 2010 Request and Appropriation

(\$ in thousands)	FY 2008 Approp.	FY 2009 Approp.	FY2009 ARRA	FY 2010			
				Request	Approp.	Approp. vs. Req	Approp. vs. FY09
Nuclear Physics							
Medium Energy Nuclear Physics	111,990	121,784	15,390	131,009	127,337	-3,672	5,553
Heavy Ion Nuclear Physics	186,663	200,253	12,669	219,556	212,253	-7,303	12,000
Low Energy Nuclear Physics	83,623	96,306	29,667	116,816	114,636	-2,180	18,330
Nuclear Theory	34,411	37,776	17,237	43,419	41,574	-1,845	3,798
Isotope Program	0	24,900	14,837	19,200	19,200	0	-5,700
Subtotal, Nuclear Physics	416,687	481,019	89,800	530,000	515,000	-15,000	33,981
Construction	17,539	31,061	65,000	22,000	20,000	-2,000	-11,061
Total, Nuclear Physics	434,226	512,080	154,800	552,000	535,000	-17,000	22,920

* Includes SBIR/STTR in FY 2008-2009 for comparability

The FY 2010 Appropriation enables a program that is optimized by balancing research workforce, facility operations, and investments in advanced technology and capabilities.

- Core research is at COL, but new initiatives pursued including Applications of Nuclear Science and Technology research inherently relevant to a broad suite of applications, and investments in university infrastructure are decreased.
- All facilities were supported at near optimal levels of operation, and investments were made in programmatic infrastructure, facility equipment, and accelerator improvement projects to increase reliability, cost-effectiveness, and productivity, and provide new capabilities to pursue discovery science.
 - RHIC would operate 3,720 hours (91% of optimal)
 - CEBAF would operate 5,110 hours (85% of optimal)
- Funding for instrumentation increased according to planned profiles; 2 new MIEs initiated (STAR HFT and RIB Science)
- Continued construction of 12 GeV CEBAF Upgrade at less than the planned profile, adjusted for Recovery Act funding
- Continued R&D and conceptual design of FRIB per Cooperative Agreement
- Isotope Program is supported at not less than the President's Request



Impacts of FY 2010 Appropriations Compared to the President's Request

- NP reduced by \$17M from President's Request (from \$552M to \$535M, -3%)
- 12 GeV CEBAF Upgrade reduced by \$2M (from \$22M to \$20M)
 - Will try to restore in FY 2011
- FRIB increased by \$3M (from \$9M to \$12M);
- Isotope Program to be funded at not less than the President's Request of \$19.2M
- The net reduction to the remainder of the NP program is \$18M from the President's Request
 - Impact is currently under evaluation
 - New initiatives such as Applications of Nuclear Science and Technology will be reduced
 - Facility operations are reduced somewhat from the Request plan
 - Planned project profiles are preserved
 - Will try to mitigate Reductions-in-Force
- Contributing to the mitigation:
 - Recovery Act funds
 - FY 2009 year-end actions
 - Commitment of some reserves—loss of flexibility

