

Nuclear Physics Program

JLab Users Meeting

June 2006

Dennis Kovar
Associate Director of the Office of Science
for Nuclear Physics

Outline

- FY 2007 Appropriation
- FY 2008 Congressional Budget Request
- Outlook
- Office of Nuclear Physics

FY 2007 Appropriations

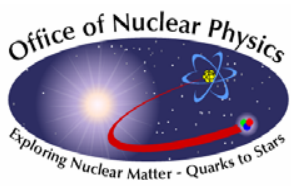
Continuing Resolution (CR) was in effect until February 15th

FY 2007 Appropriations for Office of Science (SC) is \$3,796 Million

- This is +\$200 Million over FY 2006 (including earmarks of \$129 Million)
- This is ~\$305 Million less than the Congressional Budget Request (\$4,101 Million)

FY 2007 Appropriations for Nuclear Physics is \$422.8 Million

- This is +\$55.7 Million over FY 2006 (+15%)
- This is ~\$31 Million less than Congressional Budget Request (\$454.1 Million)



Office of Nuclear Physics

FY 2007 Appropriations

U.S. Department of Energy



Office of Science

	(millions)					
	<u>FY05</u>	<u>FY06</u>	<u>Request</u> <u>FY07</u>	<u>Actual</u> <u>FY07</u>	<u>vs FY06</u>	<u>vs FY05</u>
Research Operating	134.3	125.1	146.5	139.6	+ 12 %	+ 4 %
Research Cap. Equip.	<u>6.2</u>	<u>8.5</u>	<u>14.5</u>	<u>11.7</u>	+ 40 %	+ 92 %
<Research>	140.5	133.6	161.0	-9.7 151.3	+ 13 %	+ 8 %
RHIC	130.6	116.4	143.3	135.7	+ 17 %	+ 4 %
CEBAF	75.1	65.3	77.5	70.4	+ 8 %	- 6 %
HRIBF	11.7	10.9	13.7	12.9	+ 18 %	+ 10 %
ATLAS	10.2	9.0	12.4	11.7	+ 30 %	+ 14 %
88-Inch Cyclotron	3.0	3.0	3.1	3.1	+ 5 %	+ 5 %
MIT/Bates	<u>9.4</u>	<u>2.5</u>	<u>2.0</u>	<u>2.0</u>		
<Facility Operations>	240.0	207.1	252.1	-16.3 235.8	+ 14 %	- 2 %
12 GeV Upgrade R&D/PED	2.3	4.5	9.5	9.5		
EBIS (RHIC)	<u>-</u>	<u>2.0</u>	<u>7.5</u>	<u>5.1</u>		
<Construction>	2.3	6.5	17.0	-2.4 14.6	+125 %	+535%
Other (GPP/SBIR/etc)	<u>22.0*</u>	<u>19.8*</u>	<u>24.0</u>	<u>21.1</u>		
<Stewardship>	22.0	19.8	24.0	-2.9 21.1	+ 7 %	- 4 %
Nuclear Physics Total	404.8	367.0	454.1	-31.3 422.8	+ 15 %	+ 5 %
		-9.3%				

* Includes SBIR/STTR_

Nuclear Physics Program in FY 2007

FY 2007 Appropriations for NP (\$422.8M):

- Restores University & Laboratory research to near FY 2005 level (~2-3% below Request)
 - There is no enhanced funding for Advanced Fuel Cycle (AFC) R&D
 - Reduced funding for SCIDAC
- User Facilities (RHIC, CEBAF, ATLAS and HRIBF) funded for remainder of year
 - RHIC operates for ~ 20 week running schedule (funds redirected to MIEs and EBIS)
 - CEBAF operates for ~ 34 week schedule (funds redirected to 12 GeV Upgrade project)
 - ATLAS and HRIBF ~ 80% of planned running schedule
- Instrumentation projects continued and started (but with some delayed schedules)
 - Detector (STAR and PHENIX) and accelerator (EBIS) upgrades at RHIC (reduced funding and schedule delays)
 - Heavy-ion detector upgrade at LHC/CERN (delayed start)
 - GRETINA (reduced funding and schedule delay)
 - EDM experiment at FNPB (SNS) (delayed start)
- The 12 GeV CEBAF Upgrade Project continues Project Engineering Design (PED)
 - Project Engineering and Design continues as planned (with redirect from JLab ops)
- R&D that address next generation capabilities is supported:
 - Superconducting radio-frequency developments at TJNAF (reduced)
 - Electron cooling at RHIC to reach higher beam luminosities (maintained)
 - RIBF R&D supported (reduced)

FY 2008 Budget Request

FY 2008 Budget Request for Office of Science (SC) is \$4,398 Million

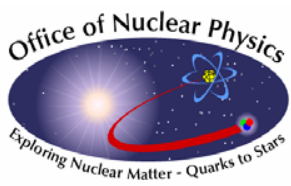
- This is +\$297 Million over FY 2007 Request of \$4,101 M (+7.2%)
- This is +\$602 Million over FY 2007 Appropriations of \$3,796 (+16%)

FY 2008 Request for Nuclear Physics is \$471.3 Million

- This is +\$16.8 Million over FY 2007 Request of \$454.1 M (+3.8%)
- This is ~\$48.5 Million over FY 2007 Appropriations of \$422.8 M (+11%)

House of Representatives Markup provides SC Request plus \$116M

House of Representatives Markup provides NP Request



Office of Science

FY 2008 Congressional Budget Request

U.S. Department of Energy



Office of Science

(B/A in thousands)

	FY 2005 Approp.	FY 2006 Approp.	FY 2007 Request to Congress	FY 2007 vs. † FY 2006	FY 2008 Request to Congress	FY 2008 vs. FY 2007	
Basic Energy Sciences.....	1,083,616	1,110,148	1,420,980	+310,832	+28.0%	1,498,497	+77,517 +5.5%
Advanced Scientific Computing Research.....	226,180	228,382	318,654	+90,272	+39.5%	340,198	+21,544 +6.8%
Biological & Environmental Research							
BER Base Program.....	487,474	435,476	510,263	+74,787	+17.2%	531,897	+21,634 +4.2%
Congressionally-directed projects.....	79,123	128,601	—	-128,601	-100.0%	—	— —
Total, Biological & Environmental Research.....	566,597	564,077	510,263	-53,814	-9.5%	531,897	+21,634 +4.2%
High Energy Physics.....	722,906	698,238	775,099	+76,861	+11.0% ††	782,238	+7,139 +0.9% ††
Nuclear Physics.....	394,549	357,756	454,060	+96,304	+26.9%	471,319	+17,259 +3.8%
Fusion Energy Sciences.....	266,947	280,683	318,950	+38,267	+13.6%	427,850	+108,900 +34.1%
Science Laboratories Infrastructure.....	37,498	41,684	50,888	+9,204	+22.1%	78,956	+28,068 +55.2%
Science Program Direction.....	154,031	159,118	170,877	+11,759	+7.4%	184,934	+14,057 +8.2%
Workforce Development for Teachers & Scientists.....	7,599	7,120	10,952	+3,832	+53.8%	11,000	+48 +0.4%
S&S.....	67,168	68,025	70,987	+2,962	+4.4%	70,987	— —
Use of prior year balances.....	-5,062	—	—	—	—	—	— —
SBIR/STTR (from SC programs).....	77,842	81,160	—	-81,160	-100.0%	—	— —
Subtotal, Science.....	3,599,871	3,596,391	4,101,710	+505,319	+14.1%	4,397,876	+296,166 +7.2%
SBIR/STTR (transferred from other DOE programs).....	35,779	35,653	—	-35,653	-100.0%	—	— —
Total, Science.....	3,635,650	3,632,044	4,101,710	+469,666	+12.9%	4,397,876	+296,166 +7.2%

† The FY 2008 President's Budget Request and the material presented here assume the requested level for FY 2007, as the timing of FY 2007 appropriations did not allow their inclusion.

†† A portion of Stanford Linear Acceleration Center linac operations transfers from High Energy Physics to Basic Energy Sciences in FY 2007 and FY 2008. Excluding the linac operations funding, the remainder of the High Energy Physics budget increases by 12.6% in the FY 2007 request and a further 3.7% in FY 2008.

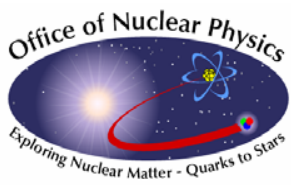
Office of Nuclear Physics

FY 2008 Congressional Budget Request



	(millions)			
			Request	
	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>vs FY07</u>
Research Operating	125.1	139.6	150.4	+ 8 %
Research Cap. Equip.	<u>8.5</u>	<u>11.7</u>	<u>19.2</u>	+ 64 %
<Research>	133.6	151.3	169.6	+ 12 %
 RHIC	116.4	135.7	146.5	+ 8 %
CEBAF	65.3	70.4	78.2	+ 11 %
HRIBF	10.9	12.9	13.9	+ 8 %
ATLAS	9.0	11.7	13.8	+ 17 %
88-Inch Cyclotron	3.0	3.1	3.3	+ 5 %
MIT/Bates	<u>2.5</u>	<u>2.0</u>	<u>2.0</u>	
<Facility Operations>	207.1	235.8	257.7	+ 9 %
 12 GeV Upgrade R&D/PED	4.5	9.5	14.5	
EBIS (RHIC)	<u>2.0</u>	<u>5.1</u>	<u>4.2</u>	
<Construction>	6.5	14.6	18.7	+ 28 %
 Other (GPP/SBIR/etc)	<u>19.8*</u>	<u>21.1</u>	<u>25.3</u>	
<Stewardship>	19.8	21.1	25.3	+ 19 %
 Nuclear Physics Total	367.0	422.8	471.3	+ 11 %

* Includes SBIR/STTR



NP Congressional Budget Request (millions)

U.S. Department of Energy



Office of Science

<u>Subprograms</u>	<u>FY05*</u>	<u>FY06*</u>	<u>FY07</u>	Request <u>FY08</u>	<u>vs FY07</u>
Medium Energy	123.5	107.6	114.3	123.4	+ 8 %
Heavy Ions	174.3	160.2	183.9	203.2	+ 10 %
Low Energy	76.2	68.4	79.3	90.6	+ 15 %
Theory	<u>30.9</u>	<u>28.4</u>	<u>33.2</u>	<u>36.4</u>	+ 9 %
	404.9	364.6	410.7	453.6	
Construction	<u>-</u>	<u>2.4</u>	<u>12.1</u>	<u>17.7</u>	+ 46 %
	404.9	367.0	422.8	471.3	+ 11 %

* Includes SBIR/STTR

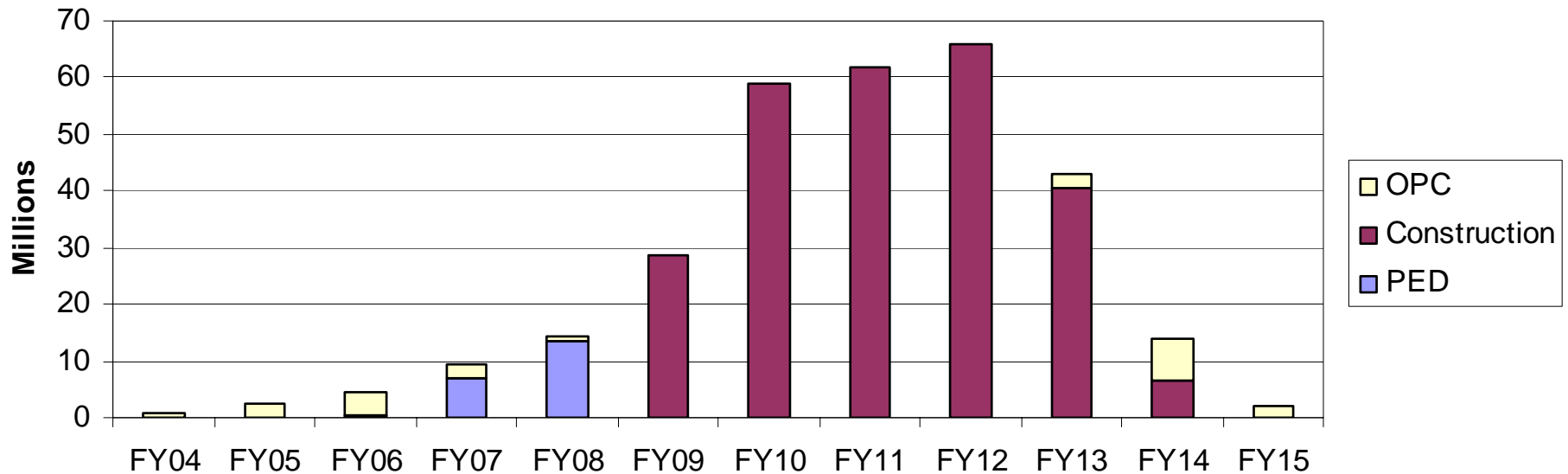
<u>Jefferson Laboratory</u>					
Accelerator/Exp Support Ops	68.1	58.0	63.1	71.3	+ 13 %
CE/AIP/GPP	<u>7.0</u>	<u>6.7</u>	<u>7.1</u>	<u>7.0</u>	
Facility Operations	75.1	64.7	69.3	78.3	+ 13 %
12 GeV Upgrade Project	<u>2.1</u>	<u>4.5</u>	<u>9.5</u>	<u>14.5</u>	
CEBAF Total	77.2	69.2	78.8	92.8	+ 18 %
Research (Experiment)	5.7	5.7	6.3	6.4	
Research (Theory)	3.0	3.0	3.2	3.3	
SciDAC	0.6	0.2	0.3	0.3 ?	
LQCD	<u>-</u>	<u>0.4</u>	<u>0.5</u>	<u>0.5 ?</u>	
Research Total	9.3	9.3	10.3	10.5	+ 3 %
NP JLab Total	86.5	78.5	89.1	103.3	+ 16 %

12 GeV Upgrade Project



Level and Number	Milestone Description	Completion Date
	<u>Level 1</u>	
1-1	CD-0 (Approve Mission Need)	2QFY04 (A)
1-2	CD-1 (Approve Preliminary Baseline Range)	2QFY06 (A)
1-3	CD-2 (Approve Performance Baseline)	4QFY07
1-4	CD-3 (Approve Start of Construction)	4QFY08
1-5	CD-4 (Approve Project Completion and Start of Operations)	3QFY15

CD-2 Planning Profile



Nuclear Physics Program in FY 2008

FY 2008 Budget Request for NP (\$471.3M) allows for effective utilization of the program's scientific facilities and makes important investments for the future

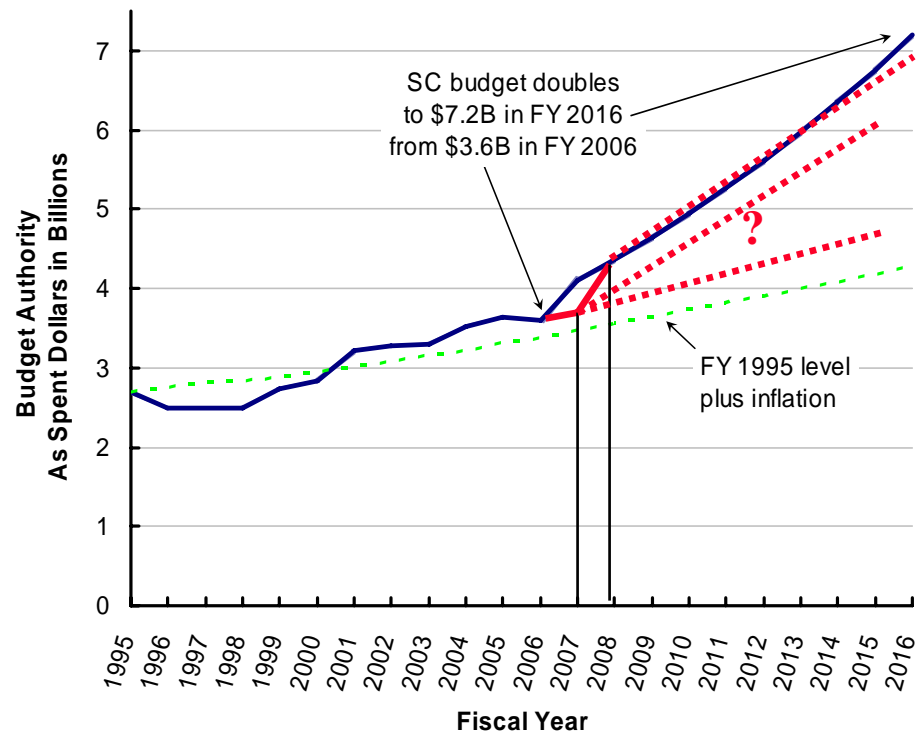
- University and Laboratory research efforts are brought back to FY 2005 levels.
- User Facilities (RHIC, CEBAF, ATLAS and HRIBF) operate at near optimum levels.
- Important instrumentation projects are continued and started.
- The 12 GeV CEBAF Upgrade Project completes Project Engineering Design (PED).
- Solicitation of proposals for design of a rare isotope beam facility is planned for FY 2008.
- R&D that addresses next generation capabilities is supported.

FY 2008 is a very important year (President's American Competitiveness Initiative)

“We must continue to lead the world in human talent and creativity. Our greatest advantage in the world has always been our educated, hardworking, ambitious people - and we're going to keep that edge. Tonight I announce an American Competitiveness Initiative, to encourage innovation throughout our economy, and to give our nation's children a firm grounding in math and science.”

“First, I propose to double the federal commitment to the most critical basic research programs in the physical sciences over the next 10 years. This funding will support the work of America's most creative minds as they explore promising areas such as nanotechnology, supercomputing, and alternative energy sources.”

Office of Science Budget Doubling from FY 2006 to FY 2016



FY 2007-2012 Nuclear Physics Program

SC submitted its FY 2007- 2011 program plan to Congress in FY 2007
- assuming out-year funding of the ACI (doubling in 10 years)

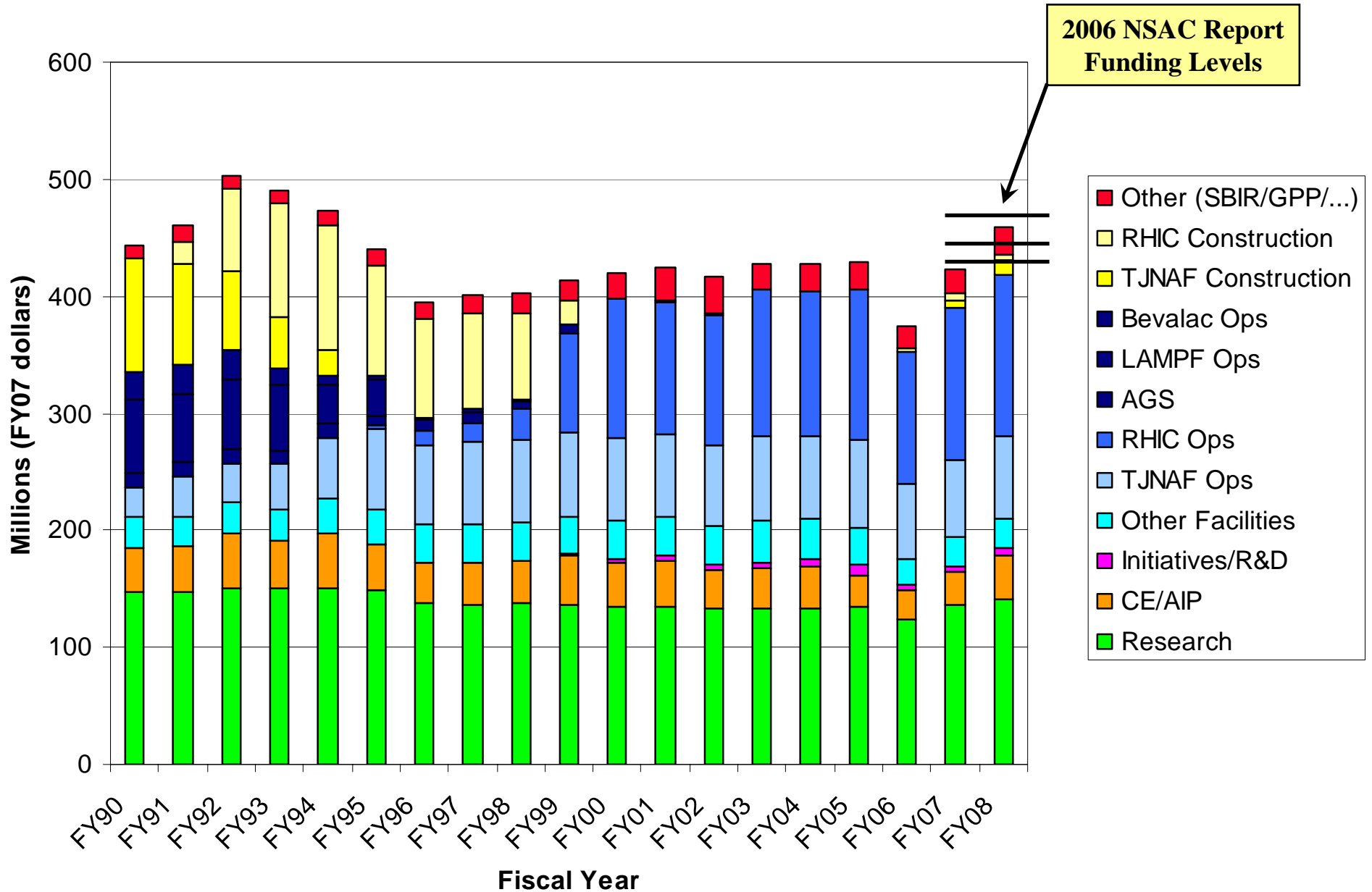
In SC's 10-year plan NP would be able to implement a world-class program:

- Operate and implement the capabilities of the user facilities (RHIC, CEBAF, HRIBF and ALTAS) to achieve their scientific goals
 - **12 GeV CEBAF Upgrade project is completed**
 - Upgrades of RHIC accelerator/detectors and RHIC II starts midway in period
 - At ATLAS, HRIBF and elsewhere research capabilities developed for forefront programs.
 - Proceed with construction of a rare isotope beam facility compatible with available funds
- Pursue promising high impact scientific opportunities
 - Participate in heavy ion studies at the higher energies of LHC
 - Start studies of nuclear structure with GREINA
 - Start measurements of fundamental neutron properties at the FNPB at SNS
 - Participate in neutrinoless Double Beta Decay measurements
 - Utilize leading edge computers to make progress in nuclear physics
 - Accelerator R&D performed for next-generation nuclear physics research capabilities

SC's plan is revisited each year in budget formulation process

- Address changing out-year projections
- Address new projects/programs added/eliminated in that years budget formulation
- Address new high priorities established by SC/DOE/Administration

DOE Nuclear Physics Funding



FY 2007 NP Outstanding Junior Investigators (OJI) announced:

- Prof. Kent Paschke University of Virginia
- Prof. Konstantino Orginos College of William and Mary
- Prof. Derek Teaney Arkansas State University
- Prof. Thomas Papenbrock University of Tennessee

FY 2007 RIB R&D

- Review panel met in December 2006 (32 proposals – requesting \$11.2M)
- Decisions made and applicants informed (\$3.8 Million)

FY 2007 Advanced Fuel Cycle (AFC) R&D

- The proposals submitted will be evaluated and utilized for FY 2008 funding actions

Preparing for FY 2009 Budget Exercise (pre-CRB, CRB, OMB & President)

- NAS RISAC Report and NSAC RIBF Taskforce Report important input to Office
- Looking forward to guidance of NSAC LRP

Changes in Office of Nuclear Physics (NP)

- Program Manager for Instrumentation/LE Detailee in process of being filled
- Unfilled positions expected to be filled in FY 2008
 - Low Energy Research / Major Projects / Facility Operations / and Technical Advisory
- Two unfilled Detailees/IPA positions

Office of Nuclear Physics

Dennis Kovar, Director

Cathy Slaughter, Administrative Specialist

Director's Office Staff

08

Technical Advisor
(vacant)

Program Analyst
Cathy Hanlin

Program Support Specialist
Brenda May

Physics Research Division

Eugene Henry, Director

Christine Izzo, Program Assistant

Medium Energy Nuclear Physics

Brad Tippens

Heavy Ion Nuclear Physics

Gulshan Rai

Low Energy Nuclear Physics

A

Physicist (vacant)

Cyrus Baktash (Detailee) - July

Nuclear Theory & Nuclear Data

Sidney A. Coon

Facilities & Project Management Division

Jehanne Simon-Gillo, Director

Cassie Dukes, Program Support Specialist

Nuclear Physics Facilities

08

Physicist (vacant)

Wlodek Guryn (Detailee)

Nuclear Physics Instrumentation

Helmut Marsiske - July

Laboratory Operations

James Hawkins

Advanced Technology R & D

Manouchehr Farkhondeh

Nuclear Physics Major Projects

08

General Engineer (vacant)

A

On-going

08

Planned for FY 2008



Backup

FY 2008 Budget Request Research



	millions			
	<u>FY06</u>	<u>FY07</u>	<u>Request FY08</u>	<u>vs FY07</u>
<u>Research</u>				
Universities	55.3	62.7	65.6	+ 5 %
Laboratories	64.1	70.4	75.2	+ 7 %
SciDAC & LQCD	2.0	2.7	3.1	+ 15 %
Rare Isotope R&D	4.0	3.8	4.0	+ 5 %
Enhanced R&D for NE	-	-	2.5	
Operating Subtotal	125.4	139.6	150.4	+ 8 %
 <u>Research Capital Equipment</u>				
GRETINA	3.0	3.7	4.4	
FNPB	1.9	1.5	1.5	
STAR TOF	2.4	2.4	-	
PHENIX Silicon VTX	-	1.0	2.0	
PHENIX Forward Vertex Detector	-	-	1.0	
PHNIX Nose Cone Calorimeter	-	-	1.4	
HI LHC	-	1.0	2.0	
nEDM	-	0.8	3.0	
CUORE	-	-	0.5	
University CE	0.8	1.0	0.9	
Laboratory CE	0.4	0.3	2.5	
Capital Equip Subtotal	8.5	11.7	19.2	+ 64 %
Research Subtotal	133.9	151.3	169.6	+ 12 %