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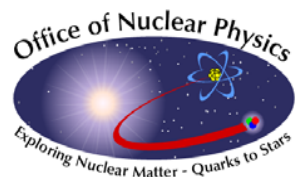
Office of Science

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# Nuclear Physics Program

## Nuclear Science Advisory Committee

**Jehanne Simon-Gillo**  
**Acting Associate Director of the Office of Science**  
**for Nuclear Physics**  
**August 21, 2008**



## Outline

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- FY 2008 Budget
- FY 2009 Congressional Budget Request
- Office Activities
- Office of Nuclear Physics



## FY 2008 Appropriation

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### **FY 2008 Appropriations for Nuclear Physics is \$432.7 Million**

- This is **+\$10 Million over** FY 2007 (+2.4%)
- This is **~\$39 Million less** than Congressional Budget Request (\$471.3 Million)

### **Impacts:**

- Stretch out of EBIS construction project, RHIC MIE's, GRETINA and nEDM (DOE/NSF), Accelerator Improvement Projects
  - Able to partially restore GRETINA later in FY2008
- NP research programs nearly flat funded with FY 2007. Planned increases in research efforts that support ongoing initiatives, such as FNPB and LHC, are reduced
  - Still able to meet our LHC commitments
- Generic R&D related to rare isotope beam capabilities reduced
  - 16 out of 29 proposals supported
- Operations at all four National User Facilities reduced
  - RHIC operated 19 weeks; CEBAF 24 weeks. All four facilities operated reliably.
- Increased support for the Advanced Fuel Cycle initiative and theoretical topical collaboration is deferred
  - Not able to identify funds throughout FY. AFCI proposals declined.
- Efforts throughout the year to mitigate RIFS throughout the program.



## FY 2008 Supplemental Funds

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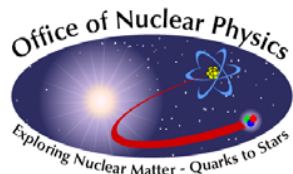
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### **FY 2008 Supplemental funding:**

- Allocation of \$62,500,000 FY 2008 Emergency Supplemental Funding to DOE Office of Science
- \$1,500,000 over a prior FY 2008 appropriation of \$432,726,000, for a revised total of \$434,226,000)
- Support directed towards RHIC to mitigate potential of any RIF's and ensure minimum 19 week run in FY 2009



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## FY 2009 Congressional Budget Request

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#### FY 2009 Budget Request to Congress

(dollars in thousands)

	FY 2007 Approp.	FY 2008 Request	FY 2008 Approp.	FY 2009 Request to Congress	FY 2009 Request to Congress vs. FY 2008 Approp.	
Basic Energy Sciences.....	1,221,380	1,498,497	1,269,902	1,568,160	+298,258	+23.5%
Advanced Scientific Computing Research.....	275,734	340,198	351,173	368,820	+17,647	+5.0%
Biological and Environmental Research.....	480,104	531,897	544,397	568,540	+24,143	+4.4%
High Energy Physics.....	732,434	782,238	689,331	804,960	+115,629	+16.8%
Nuclear Physics.....	412,330	471,319	432,726	510,080	+77,354	+17.9%
Fusion Energy Sciences.....	311,664	427,850	286,548	493,050	+206,502	+72.1%
Science Laboratories Infrastructure.....	41,986	78,956	66,861	110,260	+43,399	+64.9%
Science Program Direction.....	166,469	184,934	177,779	203,913	+26,134	+14.7%
Workforce Dev. for Teachers & Scientists.....	7,952	11,000	8,044	13,583	+5,539	+68.9%
Safeguards and Security (gross).....	75,830	76,592	75,946	80,603	+4,657	+6.1%
SBIR/STTR (SC funding).....	86,936	—	—	—	—	—
Subtotal, Office of Science.....	3,812,819	4,403,481	3,902,707	4,721,969	+819,262	+21.0%
Adjustments*.....	23,794	-5,605	70,435	—	-70,435	—
Total, Office of Science.....	3,836,613	4,397,876	3,973,142	4,721,969	+748,827	+18.8%

\* Adjustments include SBIR/STTR funding transferred from other DOE offices (FY 2007 only), a charge to reimbursable customers for their share of safeguards and security costs (FY 2007 and FY 2008), Congressionally-directed projects and a rescission of a prior year Congressionally-directed project (FY 2008 only), and offsets for the use of prior year balances to fund current year activities (FY 2007 and FY 2008).



## Nuclear Physics Program in FY 2009

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FY 2009 Budget Request for NP (\$510.0M) allows for effective utilization of the program's scientific facilities and makes important investments for the future

- University and Laboratory research efforts are strengthened to effectively support and implement the nuclear physics program.
- User Facilities (RHIC, CEBAF, ATLAS and HRIBF) operations are increased.
  - RHIC is at 25 weeks
  - CEBAF is at 34 weeks
- Important instrumentation projects are continued.
- The 12 GeV CEBAF Upgrade Project initiates construction.
- Conceptual design and R&D for a facility for rare isotope beams is requested for FY 2009.
- Support is increased for advanced fuel cycle initiatives and theoretical topical collaborations.
- Isotope Production Program is transferred to Office of Nuclear Physics.
- Continuing Resolution will impact all of the above

## NP is at a Crossroad

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- NP is at a crossroads
  - Last year of possibly implementing the President’s American Competitive Initiative
  - No one knows what the position of the new Administration will be
  - FY 2006 was a dismal year for NP
  - FY 2007 and FY 2008 Appropriations were also difficult
    - Despite verbal support from Congress
    - Despite positive House and Senate markups of budget
- Dr. Ray Orbach to NSAC in March 2008:

**“The scientific community is critically important: The community needs to make the case for the science, and its benefits to the Nation, to Congress and the public. Funding is not an entitlement.”**

## FY 2009 House Mark

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- The Committee recommendation for nuclear physics is \$517,080,000, an increase of \$7,000,000 over the budget request. The requested funding will support operations of the TJNAF and RHIC. An additional \$7,000,000 above the budget request is provided to initiate and accelerate construction of the 12 GeV upgrade to CEBAF at TJNAF.
  - This would reduce project risks and mitigate cost growths and schedule delays incurred from Continuing Resolution.
- The request also includes funding for the isotope production program, which has been transferred to the Nuclear Physics account from the Nuclear Energy program. The Committee is encouraged to note that the request includes \$3,090,000 for research isotope development and production, an area identified by the National Academies as vital for the future of this program, and one of the motivations for the transfer of this program.
  - All indications are that the program will be transferred.



- The Committee provides \$510,080,000 for Nuclear Physics, the same as the budget request. Within the available funds, the Committee recommends \$24,900,000 for the Isotope Production and Applications program. The Committee recommends \$5,000,000 within the available funds for the Research Isotope Development and Production Subprogram to develop and implement a research and production strategy consistent with the National Academy of Science study entitled “State of the Science of Nuclear Medicine.”
  - Recommended level of support for the Isotope Program is \$5,000,000 above President’s Request, which gets absorbed by NP program. Assuming flat 6 month CR and then PR
    - AFCI initiative reduced from \$6.6 to 2.6 million (~40-60 researchers)
    - Lab and university research reduced \$1million (~10-15 researchers)
  - Recommended level of support for the research isotopes is \$2,000,000 above President’s Request, and other \$3,000,000 can be distributed within Isotope Program.
- The Committee directs the Office of Science to complete a study on the feasibility of expanding the capability of the University of Missouri Research Reactor to supply up to half the United States demand for feedstock medical imaging compounds in the form of molybdenum-99 and technetium-99. The Committee also requests that the Department outline options for preserving U.S. production of californium-252.
  - Bottom-up costing exercise at ORNL on Cf production completed.
  - Meeting with 17 representatives from Cf suppliers and oil industries on August 14<sup>th</sup>.

## FY 2009 Continuing Resolution

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- Expect lengthy Continuing Resolution, in the form of several CR's. Internally planning for 6 month CR.
- DOE SC Guidance is that we will assume ~ flat funding from FY 2008.
  - Working closely with the labs to mitigate RIFs. (6-10 FTE across program estimated)
  - Operations of National User facilities decreased (RHIC 19 weeks; CEBAF 26 weeks)
  - JLab will receive \$1.5million additional funds in FY 2009 initial FIN plan to mitigate potential RIFS due to unanticipated power rate increases
  - Attempt to optimize MIE funding within available funds
  - Throughout the program, there are hiring freezes, lack of promotions, restrictions on salary increases, and an inability to support new postdocs and graduate students. Researchers experience restrictions on travel, including travel to support experimental programs at user facilities.
  - New research programs that had been identified to start or increase in FY 2009 are on hold. This includes increases in research relevant to the design of next generation nuclear reactors, the establishment of theoretical topical centers that will target advances necessary to interpret experimental results, and the initiation of a program to develop and produce research isotopes.
- The initiation of construction of the 12 GeV Upgrade Project cannot commence during a Continuing Resolution without appropriate language (\$3million and one quarter minimum impact).
- Isotope Program will not transfer from NE to NP until there is an Appropriation



## NP and Isotopes Program

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- **The FY 2009 President's Request proposes to transfer the Isotope Production Program from the Office of Nuclear Energy to the Office of Science: Office of Nuclear Physics.**
  - The program is renamed the *Isotope Production and Applications Program*
  - Includes Isotope Production Infrastructure and a new initiative entitled Research Isotope Development and Production – priorities will be defined by NSAC and peer review
  
- **NP program has the expertise and experience in operating facilities and developing technologies that are relevant to the production of stable and radioactive isotopes. Transfer will allow the strengthening of synergy between the two communities and opportunities for new collaborations.**
  
- **Ultimate responsibility of the Isotope Program resides with NE until there is an Appropriation, but indications the program will transfer are positive.**
  
- **NP is working closely with NE and isotope stakeholders in anticipation of the transfer.**
  
- **NP has played the lead in setting up a federal DOE/NIH working Group to address issues of mutual concern and interest. (DOE BER, DOE NP and NIH)**
  
- **Workshop will be held – August 5-7, 2008.**
  - The Nation's Needs for Isotopes: Present and Future
  - Will assemble representative stakeholders- federal, research, industrial

## Isotopes Workshop: August 5-7

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- Establish/strengthen communication with stakeholders in isotope production (research, federal, industrial)
- Assemble broad representation of stakeholders to discuss current and projected isotope needs
- Plenary Session to give broad introduction into how isotopes are used by various disciplines
  - Program communicate those isotopes which are predicted to not meet the known needs
- Three Working Groups (Second and Third days):
  - Stable and Enriched (both research and applied)
    - Professor Lee Riedinger (University of Tennessee) and Mr. Jack Faught (Spectra Gas)
  - Radioisotopes for Research and Development
    - Professor Robert Tribble (Texas A&M University) and Dr. Robert Atcher (LANL)
  - Radioisotopes for Applications
    - Dr. Jeff Norenberg (University of New Mexico) and Dr. Parrish Staples (DOE NNSA)
  - All include broad federal, research and industrial representation
  - Size of Working Groups kept purposefully “small”
- Poster Session
  - Additional details
  - Background for Working Groups
- Dinner

## Goals of the Workshop

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- **Workshop Goals:**
  - Who uses isotopes and why?
  - Who produces them and where?
  - What is the status of the supply and what is missing?
  - What are the needs today and in the future?
  - What are the options for increasing availability and associated technical hurdles?
- **The deliverable** will be a report which articulates the Nation's needs for isotopes across the various disciplines, the challenges in meeting those needs and options for improving the capabilities for meeting the demands.
  - First step towards development of comprehensive and prioritized strategic plan
  - NSAC will use this input (and others) to develop a long range plan

## Institutions



- **Federal**
  - National Institute of Health
  - Department of Homeland Security
  - Department of Agriculture
  - Nuclear Regulatory Commission
  - DOE Nuclear Energy
  - DOE Basic Energy Sciences
  - DOE Nuclear Physics
  - DOE Biological and Environmental Research
  - DOE Chicago
  - DOE CFO
  - Office of Scientific and Technological Policy
  - National Nuclear Security Administration
  - National Institute of Science and Technology
  - National Institute of Child Health and Human Development
  - Department of State
  - Federal Bureau of Investigation
  - Environmental Protection Agency
  - National Science Foundation
  - Office of Naval Research
  - Armed Forces Radiobiology Research Institute
- **National Laboratories**
  - Argonne National Laboratory
  - Brookhaven National Laboratory
  - Lawrence Berkeley National Laboratory
  - Los Alamos National Laboratory
  - Oak Ridge National Laboratory
  - Pacific Northwest National Laboratory
  - Idaho National Laboratory
  - Lawrence Livermore National Laboratory
  - TRIUMF
- International Atomic Energy Agency
- **Universities**
  - Michigan State University
  - University of Washington
  - University of Missouri
  - Texas A&M University
  - Duke University
  - Washington University
  - University of California/Davis
  - Georgetown University Hospital
  - University of Buffalo
  - University of British Columbia
  - Caltech
  - University of Tennessee
  - Research Triangle Institute
  - North Carolina State University
  - University of Connecticut
  - University of San Francisco
  - Memorial-Sloan Kettering
  - American College of Radiology
- **Industrial**
  - Nidnano
  - GE Energy Reuter Stokes
  - Spectra Gases
  - Trace Life Sciences, Inc.
  - Association of Energy Services
  - SABIA, Inc.
  - Council of Radionuclides and Radiopharmaceuticals
  - General Atomics
  - Techsource, Inc.
  - Halliburton
  - Advance Medical Isotope
  - JUPITER Corp.
  - Raytheon
  - NorthStar Medical Radioisotopes
  - TRIGA Reactor Systems
- The National Academies

# Nuclear Physics Office Reviews

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## FY 2008 Reviews (not including Grant Reviews)

## Dates

- PHENIX FWD VTX October 15-16, 2007
- RIB Accelerator R&D December 5-7, 2007
- HIGS Upgrade Review December 11-12, 2007
- SBIR Panel Review December 17-19, 2007
- California Rare Ion Beam Upgrade Review January 24-25, 2008
- LQCD II Proposal review January 31, 2008
- STAR HFT Science Review February 25-26, 2008
- Fundamental Neutron Physics Beam-line Review February 11-12, 2008
- NP Office Retreat March 12-14, 2008
- Injector for Radioactive Ion Species 2 April 15-16, 2008
- Heavy Ion Laboratory Research Review May 13-15, 2008
- Outstanding Junior Investigator Proposal Panel Review April 1
- HRIBF Science and Technology Review June 2-3, 2008
- KATRIN Annual Review June 16-17, 2008
- TJNAF Science and Technology Review June 30-July 2
- RHIC Science and Technology Review July 7-9
- 12 GeV Independent Project Review July 22-24
- Isotope Workshop August 5-7, 2008
- nEDM Annual Review August 20, 2008

## Status of NP Projects



Project	TPC	Start	Complete	Status
GRETINA MIE	\$18.8 million	FY 2004	FY 2011	CD2b/3b
FNPB MIE	\$9.3 million	FY 2004	FY 2010	CD3 (CD4a FY08)
STAR TOF	\$4.8 million	FY 2006	FY 2009	NA
nEDM MIE (NSF)	\$17-19 million	FY 2007	FY 2015	CD1
PHENIX SVT MIE	\$4.7 million	FY 2007	FY 2010	NA
HI LHC ALICE MIE	\$13.5 million	FY 2007	FY 2012	CD2/3
PHENIX FVTX	\$4.95 million	FY 2008	FY 2011	NA
PHENIX NCC	\$4.7 million	NA		
CUORE (NSF)	\$8-10 million	FY 2008	FY 2012	CD1
EBIS (NASA)	\$14.8 million	FY 2006	FY 2010	CD2/CD3
12 GeV Upgrade	\$310 million	FY 2004	FY 2015	CD2 (CD3 FY 08)

All projects are reviewed monthly, quarterly, annually

PHENIX NCC will not be moved forward based on scientific merit, feasibility in the context of budget constraints. BNL Lab is exploring alternatives.





## FY 2008 Solicitations

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### **FY 2008 Solicitations**

### **Deadlines**

- |  |                  |
|--|------------------|
| • Annual new/normal University Grant Solicitation                        | November/anytime |
| • Outstanding Junior Investigators (OJI)                                 | Closed           |
| • Proposals for Generic Rare Isotope Beam (RIB) R&D                      | Closed           |
| • Notice of interest in DUSEL R&D in cooperation with NSF/HEP            | Closed           |
| • Proposals for theoretical topical collaborations                       | Deferred         |
| • Proposals for design/site of Facility for Rare Isotope Beams (FRIB)    | Closed           |
| • Pre-proposals for rare isotope beam investments for forefront research | Closed           |

### **Decisions on Advanced Fuel Cycle (AFC) R&D in FY 2008**

- Proposals declined

### **New initiatives in FY 2009**

- Solicitation for AFCI for 2009 funding will await an FY 2009 Appropriation
- Solicitation for topical theory centers will await an FY 2009 Appropriation
- Research isotopes will await an FY 2009 Appropriation

## Rare Isotope Beam (RIB) Experiments

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- Initiative to allow U.S. researchers to participate in forefront rare isotope beam studies while FRIB is being constructed. (~\$50M over ~ 8 years)

### **NP issued a solicitation for pre-proposals in FY 2008**

- Formal applications will be accepted only from pre-applicants encouraged to submit a formal application
- Criteria will be based on traditional considerations plus whether:
  - There is some particular outstanding scientific opportunity afforded by facility and U.S. investments
  - There is the opportunity for significant role by U.S. participants
  - The activity has relevance/impact on the planned U.S. FRIB facility and program
- The facilities with existing or planned forefront rare isotope beam capabilities include (but not limited to):
  - RIBF/RIKEN (Japan), ISAC/TRIUMF (Canada), FAIR/GSI (Germany), SPIRAL II/GANIL (France), etc.
  - As well as facilities in the U.S., such as the NSCL/MSU (NSF), HRIBF and ATLAS.

**31 proposals received; request for formal applications in progress**



## Solicitation for Facility for Rare Isotope Beams

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- Draft Funding Opportunity Announcement for U.S. Facility for Rare Isotope Beams released for public comment – closed April 15, 2008.
- Final FOA released proposals due July 21, 2008. Can access from the NP website.
- Follows overall approach of the successful FOA for the GTL BioCenters tailored to the needs of the scope associated with the establishment of a facility.
- There is no FY 2008 funding associated with the award - identifies a site that can proceed with facility establishment. Future funding depends on Appropriation. FY 2009 Budget requests Conceptual Design support and R&D.
- Anticipate making a single award in calendar year 2008 for the establishment of an FRIB not to exceed \$550,000,000
- Formation of Merit Review Panel almost complete.
- Peer Review process poised to commence.

## 2008 OJI Awards



- 16 applications were submitted that included nuclear structure, nuclear astrophysics, nucleon spin, heavy ions, neutrinos and fundamental symmetries
- A 6 member committee evaluated the applications and prioritized the top eight with an emphasis on
  - the candidates' demonstration of creativity and potential leadership and
  - the significance of their scientific contribution to the proposed research.
- From these eight applications, our office selected the following three for OJI Awards:
  - **Karsten Heeger** (University of Wisconsin) “Measurement of Neutrino Properties Using Bolometric Detectors” - for development of the critical low temperature calibration of the CUORE bolometers
  - **Brad Plaster** (University of Kentucky) “Fundamental & Hadronic Physics Studies of the Neutron” - for development of the magnetic shield for nEDM
  - **Alexandra Gade** (Michigan State University) “Study of Correlation Effects in Nuclei at the Limit of Stability” - for her studies of nucleon-nucleon correlations through transfer reaction and Coulomb excitation
- Note that the PECASE solicitation for 2008 candidates should be out shortly – expect a quick turnaround with due date in October

- NP continues to jointly support DUSEL R&D with NSF and DOE HEP
- NP has been engaged with NSF and DOE HEP regarding discussions of program of nuclear and particle physics experiments at DUSEL
- Memorandum of Understanding between NSF and DOE is in final stages
  - Purpose is to establish a relationship between the NSF and DOE enabling programmatic coordination and monitoring of the planning, construction, and scientific exploitation of DUSEL NPP Experiments.
  - Involved program offices: DOE Office of High Energy Physics, Office of Nuclear Physics, and Division of Physics within the NSF Directorate of Mathematical and Physical Sciences.
  - Joint Oversight Group will be formed with 3-way co-chair
  - DUSEL Physics Program Office will include federal program managers with oversight of NPP experiments
- NP has not committed to siting an experiment at DUSEL
- However, NP community has clear interest in double beta decay, of which DUSEL is a potential site.
- Both agencies (and the community) will benefit from increased communication/coordination on the development of the suite of experiments at DUSEL.



## NP Staff

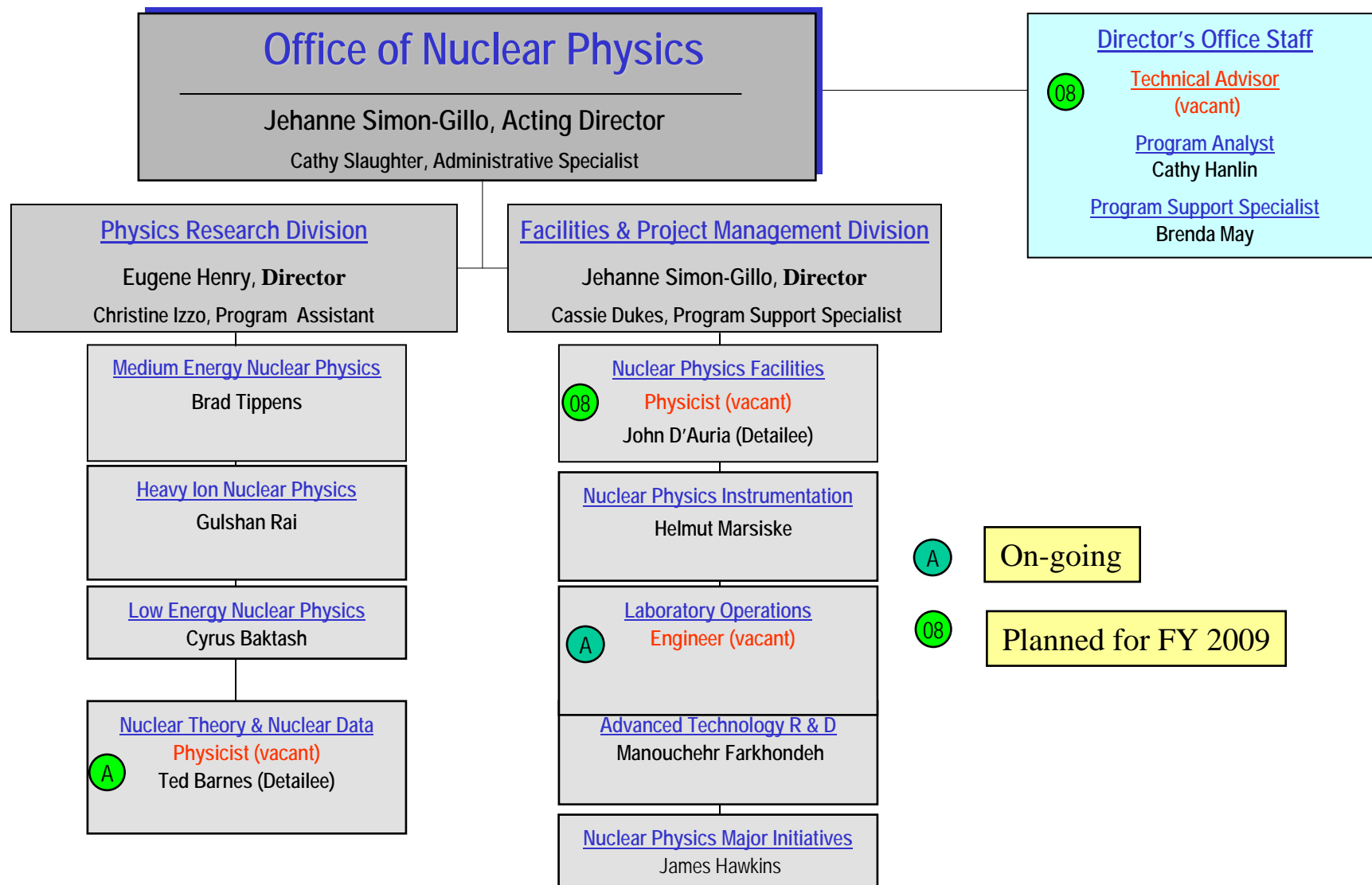
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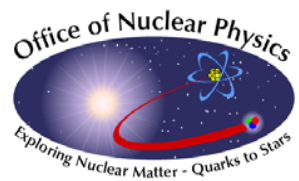
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- Program Manager Positions:
  - Low Energy Program Manager – Cyrus Baktash
  - Nuclear Physics Major Initiatives – James Hawkins
  - Theory Program Manager position being advertised
- Other positions “on hold”
  - Program Manager for Nuclear Physics Facilities
  - Technical Advisor
- Detailee/IPA positions
  - Most recent detailee: Facility Operations Detailee – John D’Auria (ORNL / Simon-Frasier University)
  - We do have openings – please contact myself or Gene Henry





# *New Charges*

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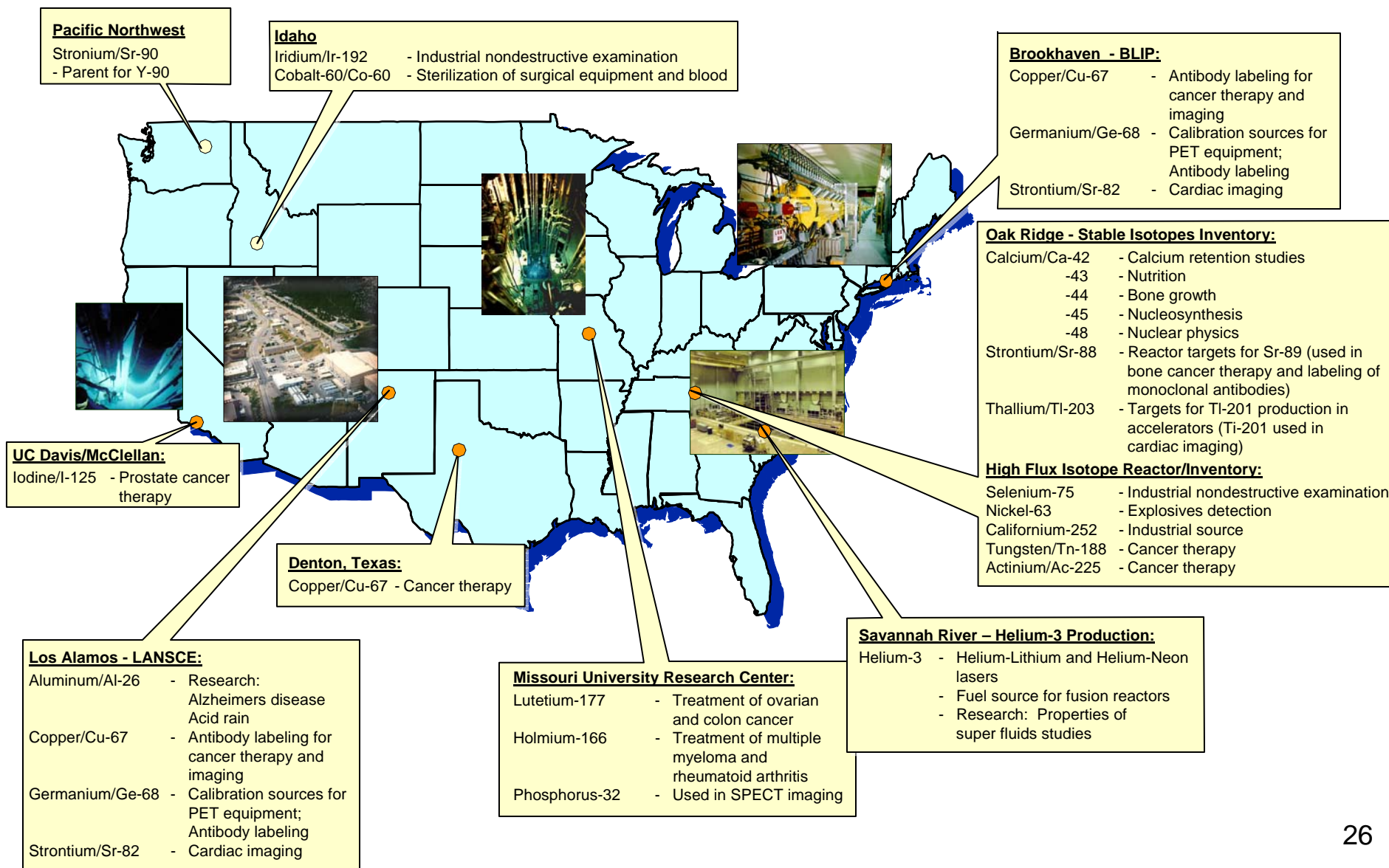


## Isotope Program in FY 2009

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- Funding for physical sciences, Office of Science and Nuclear Physics has been basically constant (eroded by inflation) over last number of years. Appropriations have fallen substantially less than requested amounts.
- Obtaining funding at the FY 2009 Budget Request is extremely important for implementing a world-class nuclear physics program. Appropriations at less than the President's Request level will impact research at universities and national laboratories, and facility operations and health.
- FY2009 President's Request includes \$16.7 million for the Isotope Production program
  - Facilities and capabilities for production of isotopes where there is no U.S. private sector capability or capability is insufficient to meet U.S. needs
  - Scientific and technical staff associated with general isotope development and production
  - Commercial isotope production is on a full-cost recovery basis.
  - Operations of the program are supplemented by additional funds from sales which are collected in a treasury revolving fund
- FY 2009 President's Request includes \$3.2 million for research and development and production of research isotopes.
- The funding available in the Isotope Production and Applications Program is constrained and will not meet the current demands of the Nation in isotope production.

# Production Locations supported by Program



## Challenges

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- Transfer of the Isotope Program is an exciting opportunity
- Build synergy between basic research programs and isotope production and development
  - dedicated research isotope production and development program
- Define new and effective mechanisms of communication between Program and stakeholders
  
- Program is strained and underfunded
  - Cannot meet growing demands
  - Facilities require investment for robust operations
  - Staffing levels are inadequate
  
- Setting priorities is a necessity
- Developing a strategic plan in the context of broad needs vs those specific to a particular interest group is a necessity; must consider available funds
- Optimum use of existing resources is a necessity
- Exploring partnerships with other federal agencies and commercial entities to leverage investments

## NSAC charge

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- DOE NP requests that the Nuclear Science Advisory Committee (NSAC) establish a standing committee, the NSAC Isotope (NSACI) sub-committee, to advise NP on specific questions concerning the National Isotope Production and Applications (NIPA) Program.
- NSACI will be constituted for a period of two years as a subcommittee of NSAC.
- It will report to the DOE through NSAC who will consider its recommendations for approval and transmittal to the DOE.
- First two goals:
  - Provide guidance on the priority of research isotope production and development
  - Formation of a strategic plan for the NIPA Program
- <http://www.sc.doe.gov/np/program/Isotope%20Production.html>

## NSAC Charge #1

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### Charge 1:

- As part of the NIPA Program, the FY 2009 President's Request includes \$3,090,000 for the technical development and production of critical isotopes needed by the broad U.S. community for research purposes.
- NSACI is requested to consider broad community input regarding how research isotopes are used and to identify compelling research opportunities using isotopes.
- The subcommittee's response to this charge should include the identification and prioritization of the research opportunities; identification of the stable and radioactive isotopes that are needed to realize these opportunities, including estimated quantity and purity; technical options for producing each isotope; and the research and development efforts associated with the production of the isotope. Timely recommendations from NSACI will be important in order to initiate this program in FY 2009; for this reason an interim report is requested by January 31, 2009, and a final report by April 1, 2009.

## NSAC Charge #2

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- NSACI is requested to conduct a study of the opportunities and priorities for ensuring a robust national program in isotope production and development, and to recommend a long-term strategic plan that will provide a framework for a coordinated implementation of the NIPA Program over the next decade.
- The strategic plan should articulate the scope, the current status and impact of the NIPA Program on the isotope needs of the Nation, and scientific and technical challenges of isotope production today in meeting the projected national needs. It should identify and prioritize the most compelling opportunities for the U.S. program to pursue over the next decade, and articulate their impact.
- A coordinated national strategy for the use of existing and planned capabilities, both domestic and international, and the rationale and priority for new investments should be articulated under a constant level of effort budget, and then an optimal budget. To be most helpful, the plan should indicate what resources would be required, including construction of new facilities, to sustain a domestic supply of critical isotopes for the United States, and review the impacts and associated priorities if the funding available is at a constant level of effort (FY 2009 President's Request Budget) into the out-years (FY 2009 – FY 2018). Investments in new capabilities dedicated for commercial isotope production should be considered, identified and prioritized, but should be kept separate from the strategic exercises focused on the remainder of the NIPA Program.
- An important aspect of the plan should be the consideration of the robustness of current isotope production operations within the NIPA program, in terms of technical capabilities and infrastructure, research and development of production techniques of research and commercial isotopes, support for production of research isotopes, and current levels of scientific and technical staff supported by the NIPA Program. We request that you submit an interim report containing the essential components of NSACI's recommendation to the DOE by April 1, 2009, and followed by a final report by July 31, 2009.



# *Backups*

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## Budget History

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Funding for physical sciences, Office of Science and Nuclear Physics has been basically constant (eroded by inflation) over last number of years.

For FY 2006 the Nuclear Physics program experienced a -9.4% reduction (Office of Science had a -4.4% reduction) compared to FY 2005. This resulted in significant reductions in NP user facility operations and reductions in researchers and graduate/undergraduate students.

In FY 2007 the Administration announced its plan to double the funding in ten years for the physical sciences (DOE SC, NSF and NIST). The Office of Science's plan for this 10-year period includes the major elements of NP's plan which was included in FY 2007 and FY 2008 Requests.

The FY 2007 Appropriations provided a significant increase for Nuclear Physics, although it fell short of the President's Budget Request.

The FY 2008 Appropriations for Nuclear Physics was \$432.7 Million, \$10 Million above FY 2007 and \$39 Million less than the Congressional Budget Request (\$471.3 Million). Majority of increase for planned project profiles.

Obtaining funding at the FY 2009 Budget Request is extremely important for implementing a world-class nuclear physics program.





## Office of Nuclear Physics FY 2009 Congressional Budget Request

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	(millions)			
	FY07	FY08	Request FY09	vs FY08
Research Operating	139.0	143.2	161.5	+ 13%
Research Cap. Equip.	12.8	14.0	18.0	+ 28%
<Research>	151.8	157.2	179.5	+ 14%
RHIC	135.5	137.0	148.6	+ 9%
CEBAF	70.4	70.7	77.8	+ 10%
HRIBF	12.9	13.1	14.6	+ 11%
ATLAS	11.7	12.4	13.7	+ 10%
88-Inch Cyclotron	3.1	3.2	3.7	+ 16%
MIT/Bates	2.0	2.0	0	
<Facility Operations>	235.6	238.4	258.4	+ 8%
12 GeV Upgrade R&D/PED	9.5	14.4	28.6	
EBIS (RHIC)	5.1	4.1	2.4	
FRIB R&D	0	0	7.0	
<Construction (TPE)>	14.6	18.5	38.3	+107%
Other (GPP/SBIR/etc)	21.0*	20.1	33.8**	
<Stewardship>	21.0	20.1	33.8	+ 68%
<b>Nuclear Physics Total</b>	<b>422.8</b>	<b>434.2</b>	<b>510.0</b>	<b>+ 17%</b>

\* Includes SBIR/STTR      \*\*Includes Isotope Program



## FY 2009 Budget Request Research

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	millions			
<u>Research</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>vs FY08</u>
Universities	62.3	63.2	67.7	+ 7%
Laboratories	70.2	73.4	84.0	+ 14%
SciDAC & LQCD	2.7	2.8	3.2	+ 14%
Rare Isotope R&D	3.8	3.8	0	
Enhanced R&D for AFC	-	-	6.6	
Operating Subtotal	139.0	143.2	161.5	+ 13%
 <u>Research Capital Equipment (TEC)</u>				
GRETINA	3.9	4.2	2.0	
FNPB	1.5	1.5	1.5	
STAR TOF	2.4	0	0	
PHENIX Silicon VTX	1.3	2.0	1.2	
PHENIX Forward Vertex Detector	0	0.7	2.4	
PHENIX Nose Cone Calorimeter	0	0.2	1.2	
HI LHC	1.0	2.0	4.0	
nEDM	0.8	2.2	1.1	
CUORE	-	0.4	2.0	
University CE	0.9	0.5	1.0	
Laboratory CE	1.0	0.3	1.6	
Capital Equip Subtotal	12.8	14.0	18.0	+ 28%
Research Subtotal	151.8	157.2	179.5	+ 14%



## Transfer Isotope Program from NE to SC

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### Planning for transition to Nuclear Physics has begun

- Isotope staff (2 FTE) will transfer from NE to NP
- Assets such as facilities, inventories, and account receivables
- Commitments, Memorandum of Agreement/Understanding (e.g. NNSA for He-3) and isotope supply contracts
- Re-consider isotope pricing policy, especially for research isotopes
- Communicate with federal agencies involved in isotope production
- Develop a strategic plan for program – involve stake holders and community; Workshop is being organized for the summer
- Identify what role NP facilities and researchers can play in development and production of isotopes – strengthen lines of communication
- Establish peer review mechanisms for facilities in Isotope Program
- SBIR/STTR
- Establish peer review mechanism for research isotopes – anticipate that NSAC will play a role – NuSAG model is being considered
- Establish Working Group with NIH to address NAS study recommendations



## Advancing Nuclear Medicine Through Innovation NAS Report September 20, 2007

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### Some NAS Committee Report Findings and Recommendations

- **The DOE-NE Isotope Program is not meeting the needs of the research community because the effort is not adequately coordinated with NIH activities or with the DOE-BER).**
- **Public Law 101-101 (requiring full cost recovery) – is an impediment to radioisotope availability. (P.L.101-101 was modified by Public Law 103-316)**
- **There is inadequate domestic supply of most medical radionuclides for routine use in nuclear medicine practice, and no domestic source for some.**
- **Deteriorating infrastructure and loss of federal research support are jeopardizing the advancement of nuclear medicine.**
- **There is no short- or long term programmatic commitment by any agency to funding basic science (chemistry, physics and engineering) research and associated high-technology infrastructure (accelerators, instrumentation and imaging physics), which are at the heart of nuclear medicine technology R&D.**