



Nuclear Science Advisory Committee Meeting: NSF/MPS FY 2011 Budget Request and Updates

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Budget Context

- The budget climate is complex
 - President, OSTP, congress recognize basic research and NSF's role
 - Still, need to make this case!
 - Discretionary spending frozen
 - Science still priority
 - Assume doubling over “next years”
- Priority areas of climate, energy prominent in Holdren-Orszag memos will be reflected in budgets
 - MPS is fundamental to advances

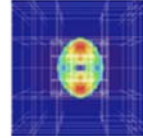




MPS FY 2011 Budget Request

MPS request: \$1.41B
+ 4.3% (+ \$58.07M)

- NSF overall budget request for FY 2011
 - \$7.4B, 8.0% increase (+ \$552M)
- MPS Budget Request Reflects NSF Priorities:
 - Support innovation in healthy core programs
 - Advance a strong scientific and technical workforce (CAREER, Postdoc, GRF, REU)
 - Invest in research addressing national needs
 - Support center activity
 - Invest in facilities



Current Status: Senate and House appropriations out, final budgets not settled yet.





MPS activities since last meeting

- Division Directors
 - AST: Jim Ulvestad, NRAO
 - CHE: Matt Platz, OSU
 - DMS: Sastry Pantula, NC State
 - DMR: search underway
- AD search concluded
- MPS AC has been very active in helping us move forward





Celebrating
60
of Discovery

MPS/MPSAC Working Groups

- Fundamental Science
- Climate
- Energy
- Broadening Participation
- Computation
 - Data Enabled Science
 - Computational Science
- Life Sciences
- SEBML/QIS
- Matter by Design



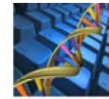
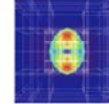
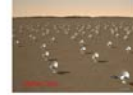
White papers generated for all these activities; helping MPS plan future.





CF21: Cyberinfrastructure Framework for 21st Century Science & Engineering

- High-end computation, data, visualization for transformative science; *sustainability, extensibility*
- MREFCs and collaborations including large-scale NSF collaborative facilities, international partners
- Software, tools, science applications, and VOs critical to science, integrally connected to hardware
- Campuses fundamentally linked; grids, clouds, loosely coupled campus services, policy to support
- People. Comprehensive approach workforce development for 21st century science and engineering





Emerging CF21 Concepts

- CF21 HPC program to replace Track 2
 - Sustainability, hubs of innovation + experimental
- CF21 Software Institutes and Innovators
 - Transform innovation into sustainable software
 - Significant multiscale, long-term program
 - Connected institutes, teams, investigators
 - Integrated into CF21 framework w/Directorates
- CF21 Fellowships for Transformative Computational Science
 - Goal: People!
 - *Use* CI to make revolutionary advances in their disciplines
 - *Research and develop* CI for innovation in any discipline





Science, Engineering and Education for Sustainability (SEES)

MPS is partnering with other NSF Directorates to invest in climate and energy research

- Energy
 - Energy Storage
 - New battery materials could “charge in seconds”
 - SOLAR program
 - Novel earth-abundant materials for solar energy harvesting, creating efficient solar cells
 - Efficient materials for direct conversion of photons into hydrogen via water electrolysis
- Climate
 - New algorithms improve atmospheric and ocean simulations with parameterized uncertainties in physical processes, which typically hamper climate change predictions

SEES request:
\$110.50 M

Would like to see more PHY research in these areas...





MPS Funding for Facilities

	FY 2011 Request
<i>Adv. Tech. Solar Telescope (ATST)</i>	\$2.00
<i>Atacama Large Millimeter Array (ALMA)</i>	23.50
<i>Cornell High Energy Synchr. Source (CHESS)/ Cornell Electron Storage Ring (CESR)</i>	13.45
<i>GEMINI Observatory</i>	19.58
<i>IceCube Neutrino Observatory</i>	2.50
<i>Large Hadron Collider (LHC)</i>	18.00
<i>Laser Interfer. Grav. Wave Observatory (LIGO)</i>	30.30
<i>Nat'l Astronomy and Ionosphere Ctr. (NAIC)</i>	6.00
<i>Nat'l High Magnetic Field Laboratory (NHMFL)</i>	34.00
<i>Nat'l Nanotechnology Infra. Network (NNIN)</i>	3.38
<i>Nat'l Optical Astronomy Observatory (NOAO)</i>	33.3
<i>Nat'l Radio Astronomy Observatory (NRAO)</i>	44.3
<i>National Solar Observatory (NSO)</i>	9.51
<i>Nat'l Superconducting Cyclotron Lab (NSCL)</i>	21.50
<i>Other MPS Facilities</i>	7.65
	\$269.07



LIGO



NSCL

2011 request: + \$0.5M over 2010





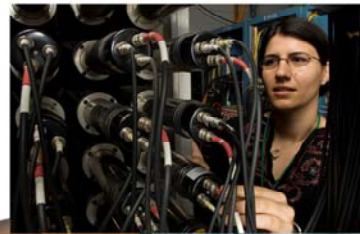
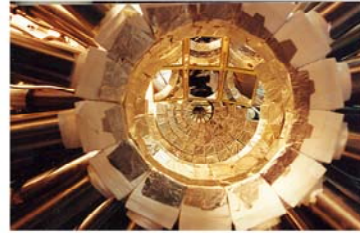
NSCL Science Goals & Capabilities

National Facility for Rare Isotope Research and Education at Michigan State

- 700 users, 10% US PhDs
- Facility construction follows NSAC, community priorities

Questions:

- Properties of extreme p/n nuclei ratios
 - Limits of existence, Structure
- Origin of the elements of the cosmos
 - novae, supernovae, stellar burning
- Properties of neutron-rich nuclear matter
 - structure and dynamics of neutron stars





Status and Vision

- Current Operations Award ends September 2011
- Renewal for another five years will be proposed
- FRIB was highly recommended by NSAC as the next generation rare isotope facility
- FRIB would be sponsored by DOE and located at MSU using much of the detector instrumentation developed at NSCL
- An FRIB Joint Oversight Group has been established by DOE and NSF to coordinate the transition
- A very nice example of joint stewardship





DUSEL: Status Overview

- Majority of Geotechnical Investigations complete
- Integrated Safety Management plan being developed
- EIS planning underway
- Design and development of potential DUSEL experiments underway
 - 9 awards in MPS/Physics over 3 dozen institutions and 5 labs
 - 7 awards in GEO and BIO
- Funding for preliminary design (through PDR) awarded to U.C. Berkeley
 - Initial deliverables from contractors received
 - Initial basis of estimate for design of DUSEL laboratory
 - Reports of final assessment of existing underground and surface infrastructure
 - Integration into overall design initiated
- **Bridge Funding to cover the interval between PDR and a go/no-go decision has been proposed and is well along in the process.**
- Independent review of DUSEL by National Academy initiated
 - Report requested February 2011 as input to NSB MREFC portfolio review
- Ph.D.-granting program in physics established in South Dakota





NSF/DOE Cooperation

- NSF/DOE agreed to establish DUSEL Physics Joint Oversight Group (JOG) immediately after release of P5 report.
- Will jointly coordinate & oversee DUSEL experimental physics program.
- JOG meeting monthly.
- Both agencies closely collaborating in defining and realizing the DUSEL physics program.
- **Agencies have agreed on DUSEL stewardship roles & core research program**

Program Element	Steward	Contributing Partners
Neutrino-less double-beta decay	DOE ONP	NSF
Long baseline neutrino studies	DOE OHEP	NSF
Proton decay	DOE OHEP	NSF
Direct dark matter detection	NSF	DOE OHEP
DUSEL facility and infrastructure	NSF	N/A
Smaller physics experiments	NSF	TBD

Excellent cooperation with DOE!

Interagency MOU planned for end of FY 2010.





DUSEL: NSF Reviews of Project

- September 23-25, 2009
 - Focus on cost, schedule, management
 - Safety walkthrough of mine
- December 17, 2009
 - Assessment of progress against plan for development of preliminary design
 - Satisfactory progress has been made
 - Additional staff have been added
 - Design development moving forward
- January 18-22, 2010
 - Large Cavity Advisory Board (including independent review of large cavity plans and facility infrastructure)
 - Confirmed initial finding that rock is appropriate
 - Other possible additions to design tasks under consideration
- February 9-11, 2010
 - Focus on technical design basis and plan for activities
- April 12-14, 2010, South Dakota School of Mines & Technology
 - Full project review
- Summer 2010, progress review of S4 physics award proposals
- December 2010 – Preliminary Design Review (may extend to Q2 CY2011)

This will be the most important step to determine future of DUSEL.





Thank You

