

NSF-PHY News

**Joe Dehmer
Division of Physics, NSF**

**HEPAP
March 11, 2010**

Division of Physics

**AMOP
Physics**

**Elementary
Particle Physics**

**Part. & Nucl.
Astrophysics**

**Physics Front.
Centers**

**Theoretical
Physics**

**Nuclear
Physics**

**Physics of Living
Systems**

**Physics @
Inform. Front.**

**Gravitational
Physics**

**Education &
Interdisc. Res.**

**Accelerator Phy.
& Phy. Instrum.**

Astroparticle Physics Projects

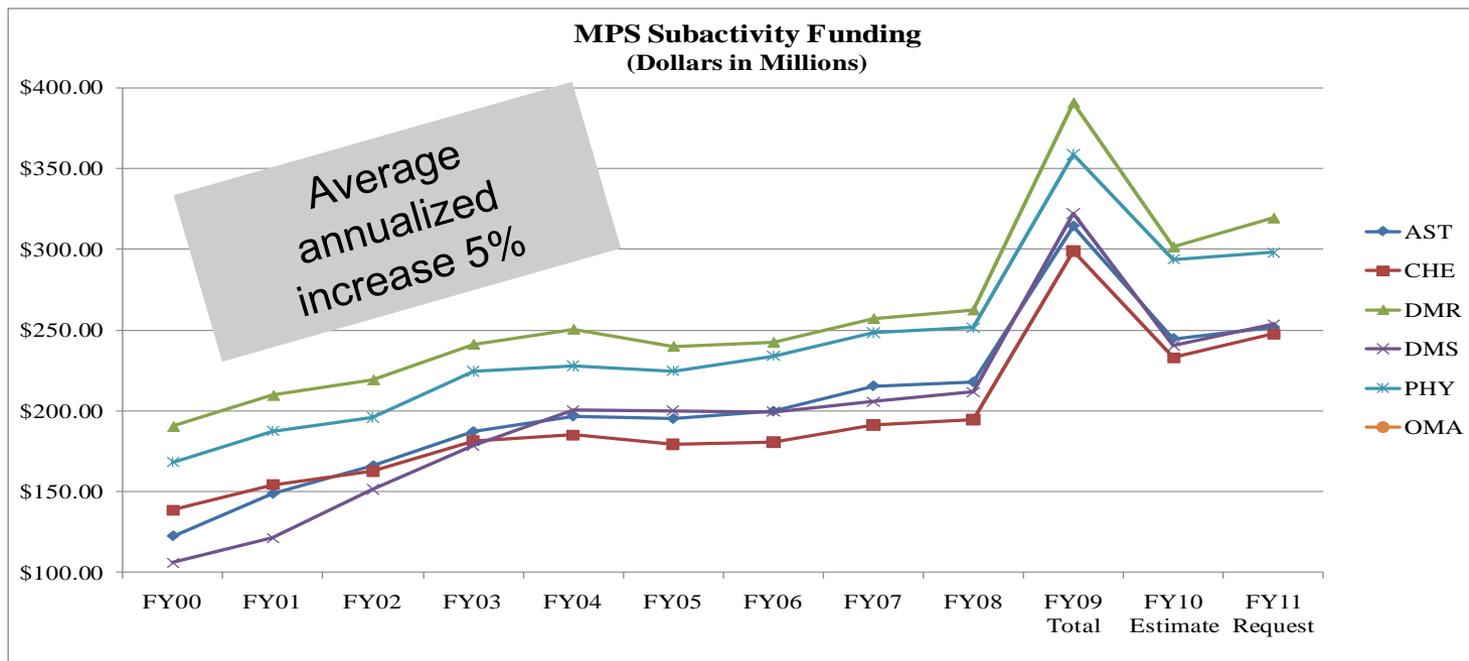
- **Gravitational Waves: LIGO/AdvLIGO** (GEO, VIRGO, TAMA, 11 countries)
- **Cosmological Neutrinos: IceCube** (NSF-OPP, Germany, Sweden, Belgium)
- **Underground Physics: DUSEL** (DOE-HEP, NP)
- **Dark Matter: CDMS, XENON, WARP, ZEPLIN, LUX, DRIFT, COUPP** (NSF-AST, DOE-HEP, INFN, PPARC, Germany, Poland)
- **Cosmic Rays: AUGER, HiRes, TA, Veritas, Milagro** (NSF-AST, DOE-HEP, Japan, Korea, Canada, Ireland, Smithsonian, 17 more countries)
- **Neutrinos: Borexino, Double Chooz, CUORE** (DOE-NP, INFN, France, Germany, Brazil, Japan, Russia, Spain, UK)
- **Structure of the Universe: ACT, SPT** (NSF-AST, OPP)
- **B-Mode Polarization of CMB: QUIET** (NSF-AST)
- **Origin of the Elements: NSCL** (DOE-NP)

MPS FY 2011 Budget Request

Discovery
+6.7%

(Dollars in Millions)

	FY 2009 Omnibus Actual	FY 2009 ARRA Actual	FY 2010 Estimate	FY 2011 Request	Change Over FY 2010 Estimate	
					Amount	Percent
					Astronomical Sciences	\$228.67
Chemistry	211.67	87.36	233.73	247.56	13.83	5.9%
Materials Research	282.52	108.17	302.67	319.37	16.70	5.5%
Mathematical Sciences	224.84	97.34	241.38	253.46	12.08	5.0%
Physics	262.47	96.30	290.04	298.19	8.15	2.8%
OMA	33.70	-	38.33	39.56	1.23	3.2%
Total, MPS	\$1,243.88	\$474.97	\$1,351.84	\$1,409.91	\$58.07	4.3%



MREFC FY 2011 Budget Request

MREFC Account Funding, by Project

(Dollars in Millions)

	FY 2009 Omnibus Actual	FY 2009 ARRA Actual	FY 2010 Estimate	FY 2011 Request	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	FY 2016 Estimate
AdvLIGO	\$51.43	-	\$46.30	\$23.58	\$20.96	\$15.17	\$14.92	-	-
ATST ¹			13.00	17.00	20.00	20.00	20.00	20.00	20.00
ARRV	14.13	148.07	-	-	-	-	-	-	-
ALMA	82.25	-	42.76	13.91	3.00	-	-	-	-
IceCube	11.85	-	0.95	-	-	-	-	-	-
NEON	-	-	-	20.00	87.92	101.07	103.43	86.23	32.07
OOI	-	105.93	14.28	90.70	102.80	46.80	20.00	-	-
SPSM	1.10	-	-	-	-	-	-	-	-
MREFC Account Tot	\$160.76	\$254.00	\$117.29	\$165.19	\$234.68	\$183.04	\$158.35	\$106.23	\$52.07

Totals may not add due to rounding.

¹Funds appropriated for ATST through ARRA in FY 2009, totalling \$146.0 million, were obligated in January 2010.



Particle Physics **FY 10** Budget Information

- EPP Program
 - 38.6% to \$26M
- EPP Theory
 - 9.6% to \$12M
- Astro/Cosmo Theory
 - 5.0% to \$1.25M
- Particle and Nuclear Astrophysics
 - 5.0% (non-DUSEL) to \$21M
 - 31.8% (DUSEL) to \$29M

N.B.: All PI programs received 5% and other priorities included QIS, Physics of Living Systems, Plasma Physics, LIGO Research, Educational programs, and Mid-scale Instrumentation

Other Opportunities of Note

Major Research Instrumentation

- NSF 10-529
- Deadline is April 21, 2010
- Maximum request is \$4M
- Total available is \$90M

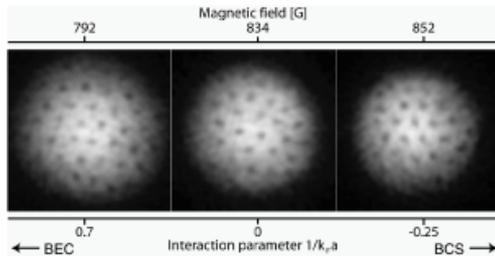
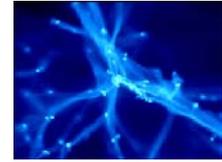
Physics Frontiers Centers

- Covers all fields of physics supported by PHY
- Competition in FY 11
- Pre-proposals in August, 2010
- Funding range 1 – 5.5M
- Five year awards, renewable via competition

NSF Priorities

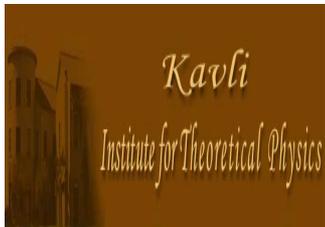
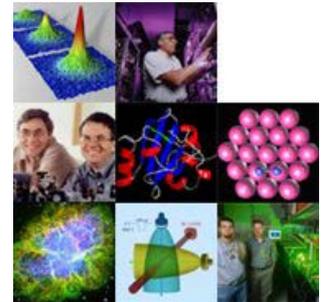
Physics Frontiers Centers

Kavli Institute for Cosmological Physics – Chicago - Meyer



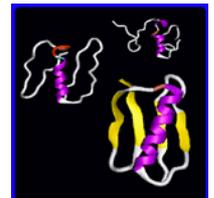
Center for Ultracold Atoms – MIT/Harvard
- Ketterle

JILA – Colorado – Cornell



Kavli Institute for Theoretical Physics – UCSB – Gross

Center for Theoretical Biological Physics – UCSD – Onuchic
(Joint NSF/PHY/DMR and BIO)

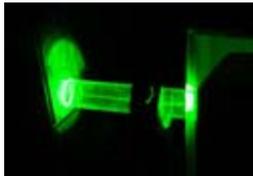


Physics Frontiers Centers (Cont'd)



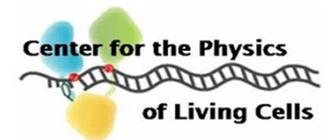
Joint Institute for Nuclear Astrophysics – Notre Dame - Wiescher

Center for Magnetic Self-Organization in Laboratory
and Astrophysical Plasmas – Wisconsin – Zweibel
(Joint NSF/DOE)



Joint Quantum Institute – Maryland/NIST – Phillips

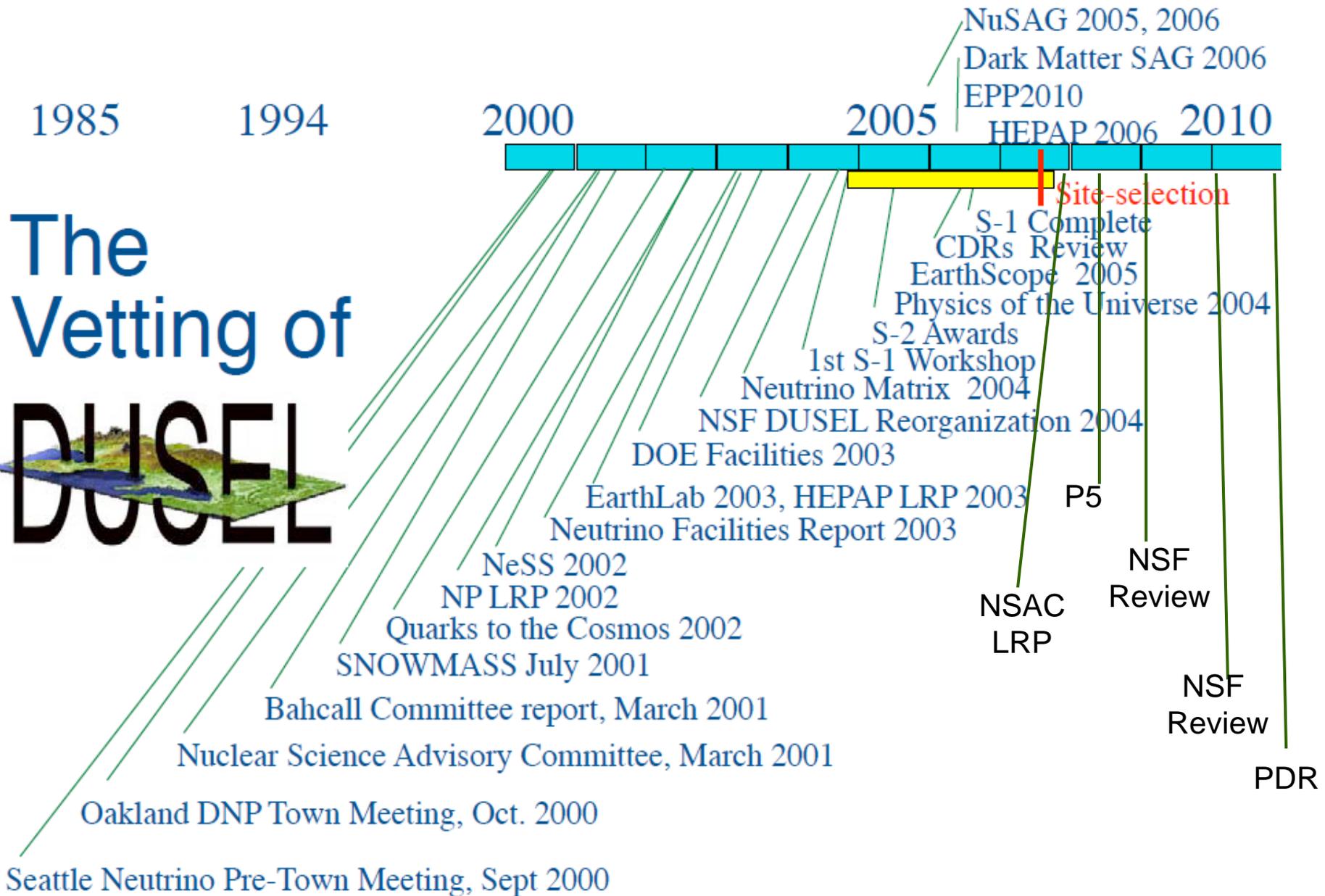
Center for the Physics of Living Cells – U Illinois – Ha
(Joint NSF/PHY/CHE/DMR and BIO)



DUSEL UPDATE



The Vetting of DUSEL



P5 Recommendations

- Report approved by HEPAP at their May 2008 meeting in Washington.
- From Executive Summary:

“The panel recommends a world-class neutrino program as a core component of the US program, with the long-term vision of a large detector in the proposed DUSEL laboratory and a high-intensity neutrino source at Fermilab.”

“The panel endorses the importance of a deep underground laboratory to particle physics and urges NSF to make this facility a reality as rapidly as possible. Furthermore the panel recommends that DOE and NSF work together to realize the experimental particle physics program at DUSEL.”

- Fermilab/DUSEL program recommended by P5 constitutes the primary element of the on-shore U.S. particle physics program during the coming decade.

NSB Resolution

- **Signed September 24, 2009 by NSB Chair:**

RESOLVED, that the National Science Board authorized the Director, at his discretion, to make an award to the University of California at Berkeley for preliminary design of the Deep Underground Science and Engineering Laboratory (DUSEL) for an amount not to exceed \$29,092,000 for 24 months.

Furthermore, the Board shall receive a status report twice per year on the preliminary design from NSF management during the lifetime of the award. The first report is expected at the February 2010 Board meeting. DUSEL will be included in the NSF large facilities portfolio review at the May 2010 National Science Board meeting. National Science Board approval shall be requested by the Director for any DUSEL planning and design awards subsequent to this award.

Furthermore, the Board directs NSF management to undertake a broad independent review of DUSEL to establish its priority so that it can inform the May 2011 portfolio review.

NSF Reviews of Project

- **September 23-25, 2009, Sanford Lab.**
 - Mini-review, focus on cost, schedule, management
 - Included safety walkthrough of mine
- **December 17, 2009, U.C. Berkeley, NSF site visit**
 - Examination of project plan with upper management
- **January 18-22, 2010, Safety Panel + Large Cavity Advisory Board, Sanford Lab.**
 - Technical design & development, mine walkthrough
- **February 9-11, 2010, U.C. Berkeley**
 - Preparatory mini-review

- **April 12-14, 2010 South Dakota School of Mines & Technology**
 - Full project review
- **July 13-15, progress review of S4 physics awardees.**
- **December 2010 – Preliminary Design Review (target)**

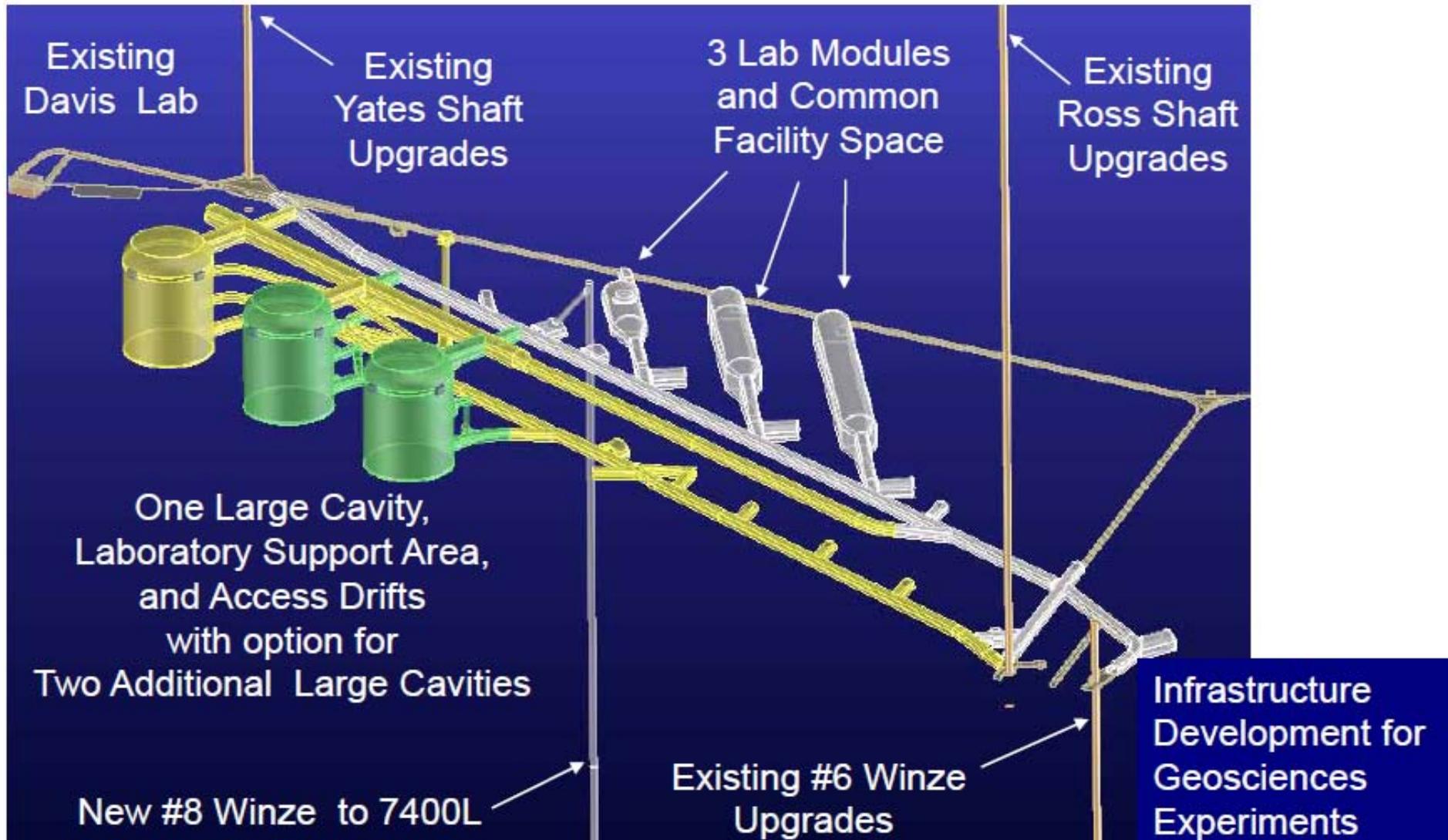
NSF/DOE Cooperation

- 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:**

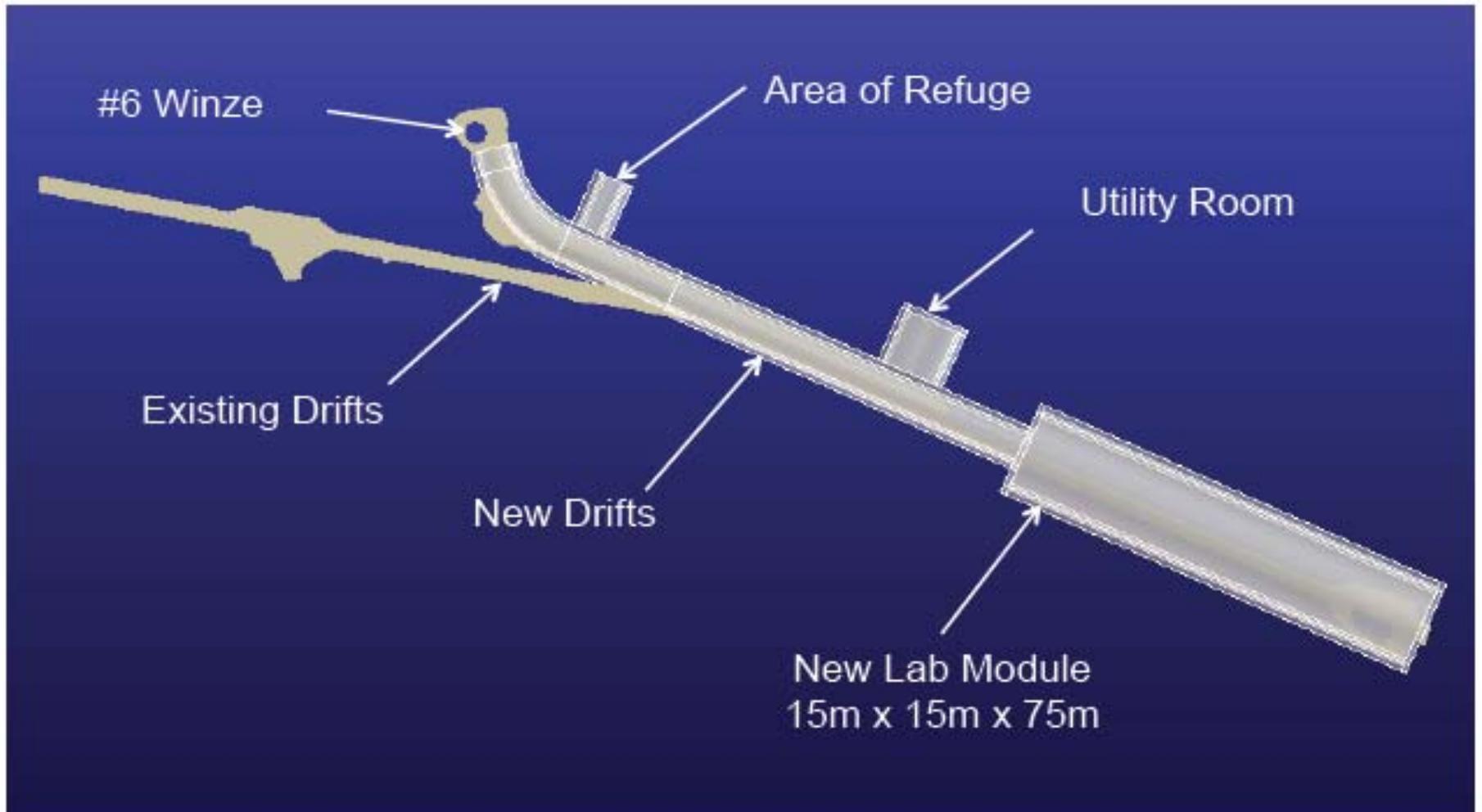
Program Element	Steward
DUSEL facility	NSF
Dark matter	NSF
Neutrino-less double-beta decay	DOE ONP
Long baseline neutrinos	DOE OHEP
Proton decay	
Other disciplines (Bio, Geo, Eng)	NSF

Interagency MOU planned for end of 2010.

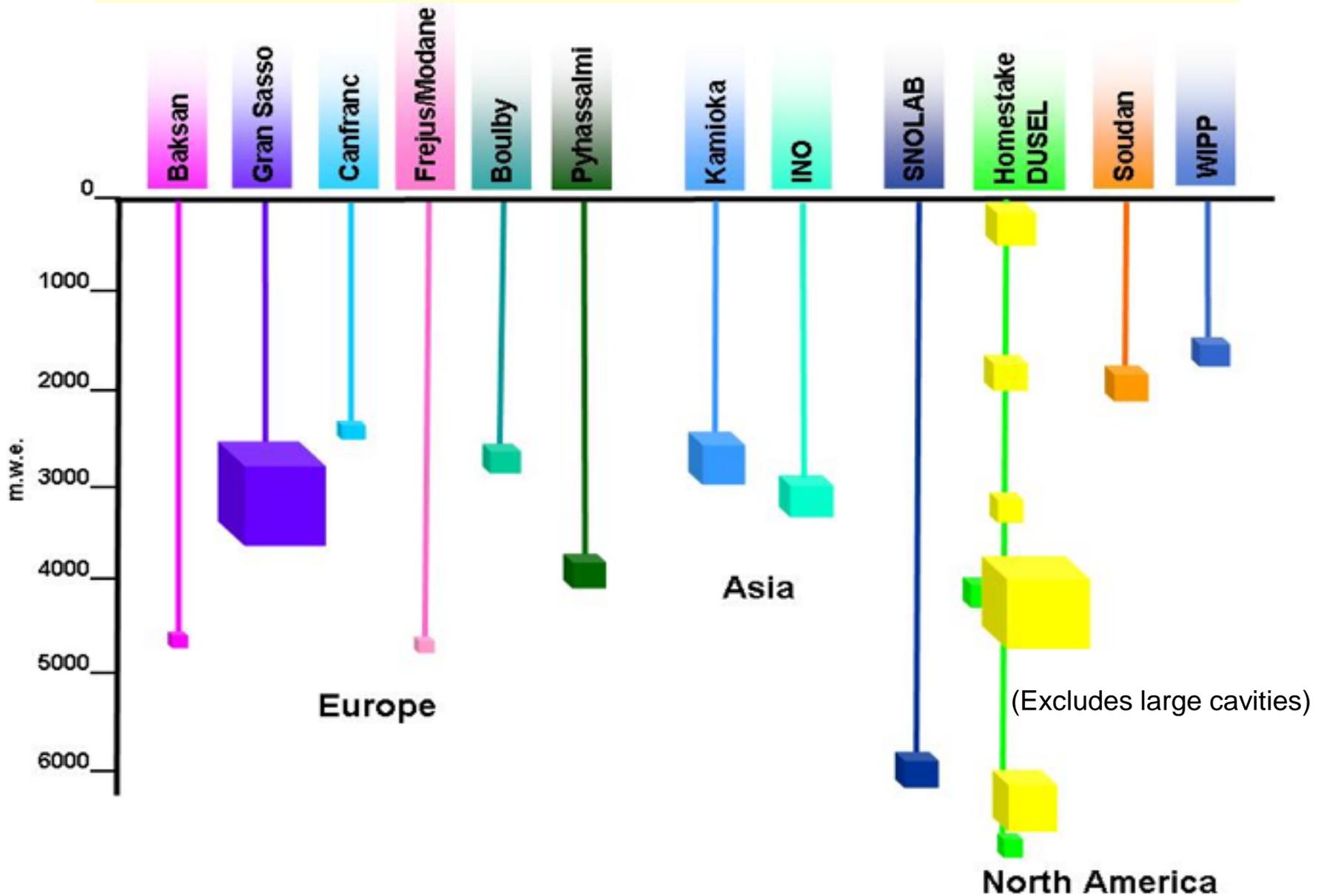
Mid Level Campus at 4850

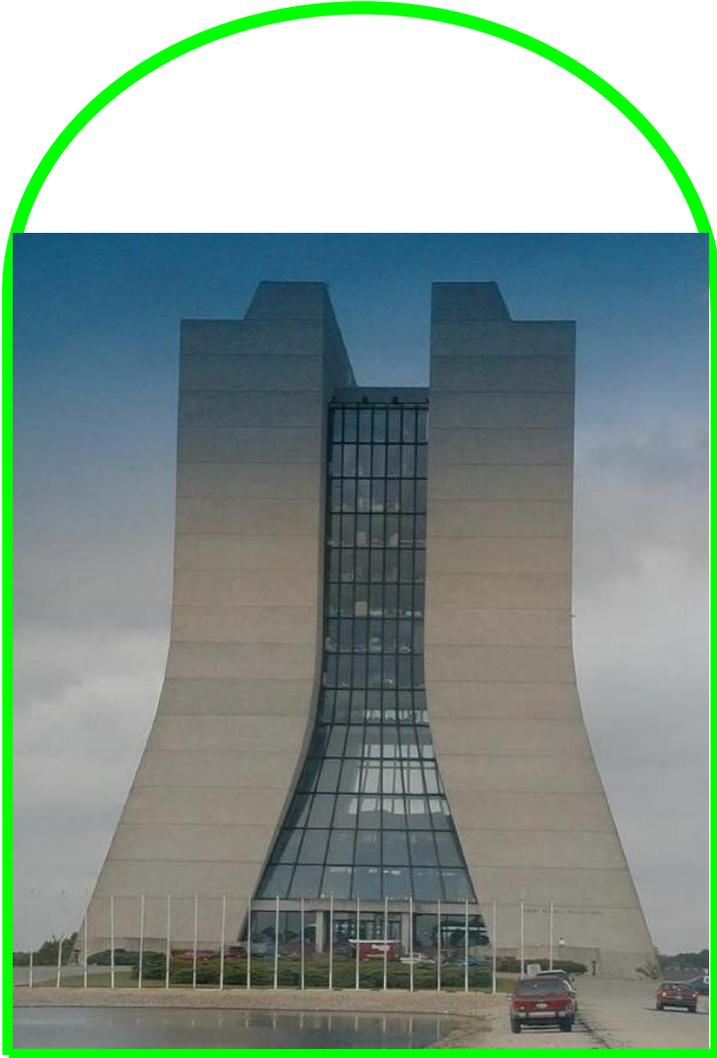


7400 Laboratory Level



Worldwide Underground Research





DUSEL Funding Plan after Project Review

(February 2010)

	2007	2008	2009	2010	2011 Req	2012 Plan	2013 Plan	2014 Plan	2015 Plan	2016 Plan	2017 Plan	2018 Plan
DUSEL COSTS (Orig Plan)												
Design	4	6	28	32	32	30	15	10	4	2	0	0
R&D	3	6	4	4	4	7	7	5	4	6	6	4
O&M	0	0	0	0	0	0	15	25	35	40	45	50
Research	0	0	0	0	2	7	13	16	19	20	20	20
SUBTOTAL	7	12	32	36	38	44	50	56	62	68	71	74
ADDITIONAL COSTS RELATED TO SAFETY RECOMMENDED DURING PROJECT REVIEW												
Enhanced Safety	0	0	0	0	0	0	5	5	5	5	5	5
Underground Access	0	0	0	0	9	10	5	0	0	0	0	0
Shaft/Safety	0	0	0	0	12	17	20	0	0	0	0	0
GRAND TOTAL	7	12	32	36	59	71	80	61	67	73	76	79
APPROPRIATED/REQUESTED FUNDING												
Appropriation/Request	7	12	32	36	19							
DELTA	0	0	0	0	-40							

