



The View from NSF

LSC – Hanford 16th - 19th August 2004

Tom Lucatorto

- **Changes in NSF leadership**
- **Funding**
- **Interagency Working Group response to Q2C**
- **Outreach**
 - **New \$5M Program centered at LLO**
 - **Update on LIGO video**

LIGO-G040392-00-M



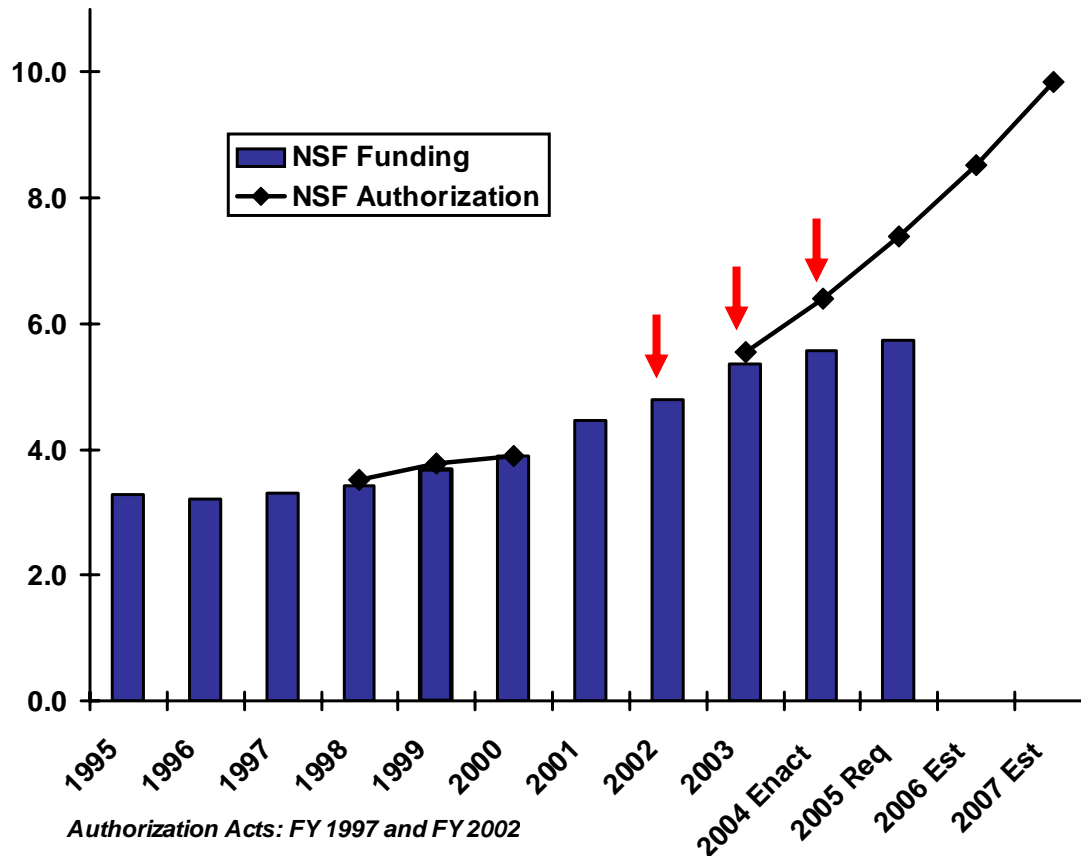
New Administration

- Rita Colwell left in Feb 2004 to go to Canon USA Lifesciences;
- Arden Bement (Director of NIST) became Acting Director
 - Engineer with industrial (TRW), academic (Purdue, MIT), and national-lab (NIST) experience
 - Knows NSF culture (former NSB member); eager to know more about LIGO (visit next week)
 - Statutory term limit of 210 days; new nominee?
- Colwell presided over a budget increase of 70% over six-year term



NSF Funding Profile

NSF Funding and Authorizations FY 1995- 2007 Estimates





Final Budget FY 2003

(\$M)

	NSF	MPS	PHY	Gravity
FY2002	4789	922	195.9	38.5
FY2003	5310	1041	224.5	44.5
Δ	10.9%	12.9%	14.6%	15.6%



Gravity in Detail for FY 2003

(\$M)

	PHY GP	LIGO Lab	LSC + Other (Core PI)
FY2002	38.47	28.00	10.47
FY2003	44.47	33.00	11.47
$\Delta\%$	15.6%	17.8%	9.6%



Final Budget FY 2004

(\$M)

	NSF	MPS	PHY	Gravity
FY2003	5369	1041	225	44.5
FY2004	5578	1092	228	44.0
Δ	3.9%	4.9%	1.4%	-1.1%



Gravity in Detail for FY 2004

(\$M)

	PHY GP	LIGO Lab	LSC + Other (Core PI)
FY2003	44.47	33.00	11.47
FY2004	44.00	33.00	11.00
Δ	-1.1%	0%	-4.1%

Other NSF programs funded GW research in FY 2004:

PFC: Center for Gravitational Wave Physics

ITR: 4 GW source simulation projects

ITR: 3 Grid research for LIGO data

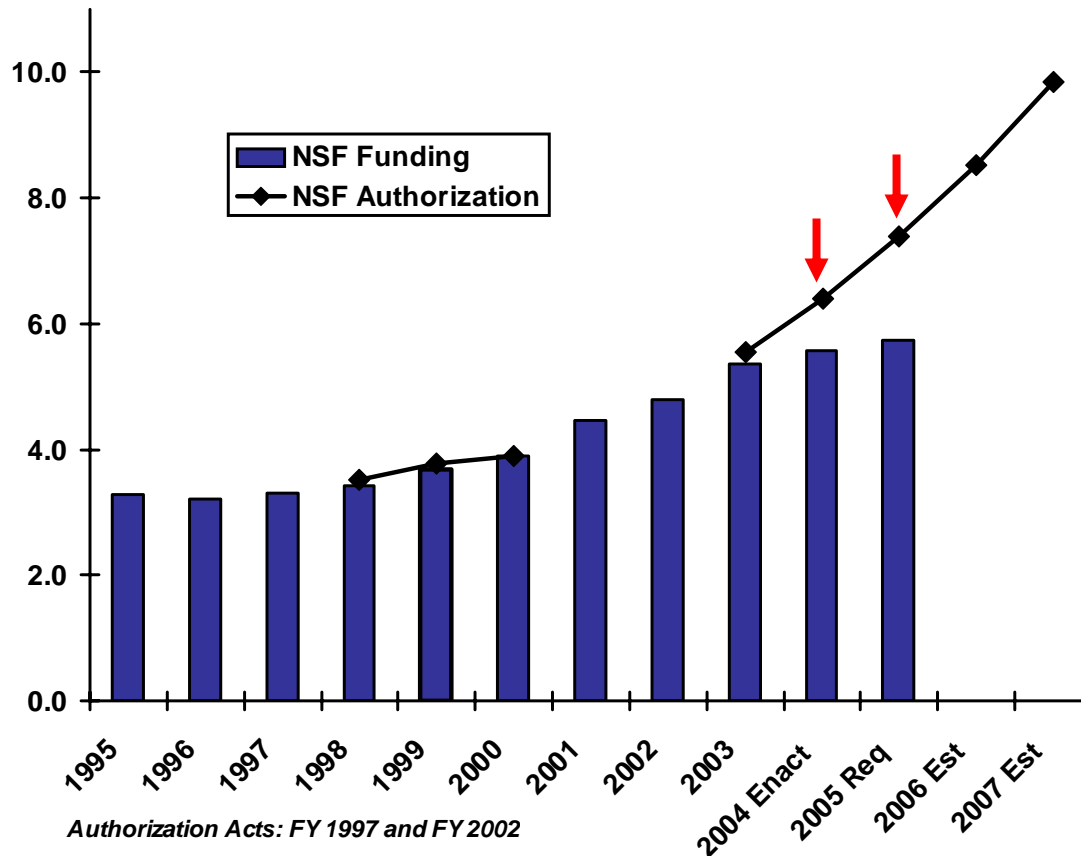
MRI: 1 new for LSC (2 total)

MSPA: 2 new for GP Theory



NSF Funding Profile

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FY 2005 - Status

	NSF	MPS	PHY
FY2004	\$5578M	\$1092M	\$227.7 M
FY2005 Pres. Request	\$5745M (3.0%)	\$1116M (2.2%)	\$235.8M (3.6%)

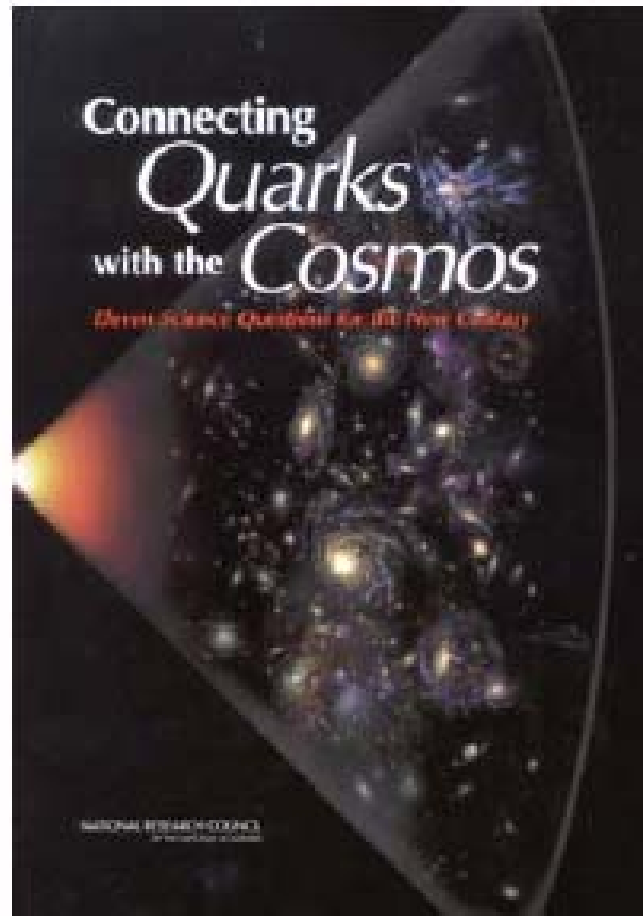
NIH +2.6%

DOE Office of Science -1%

NASA Space Science +1%



Q2C: Eleven Questions





Q2C: Eleven Questions

1. What is dark matter?
2. What is the nature of dark energy?
3. How did the universe begin?
4. **Did Einstein have the last word on gravity?**
5. What are the masses of the neutrinos and how have they shaped the evolution of the universe?
6. How do cosmic accelerators work and what are they accelerating?
7. Are protons unstable?
8. Are there new states of matter at exceedingly high density and temperature?
9. Are there additional spacetime dimensions?
10. How were the elements from iron to uranium made?
11. Is a new theory of light and matter needed at the highest energies?

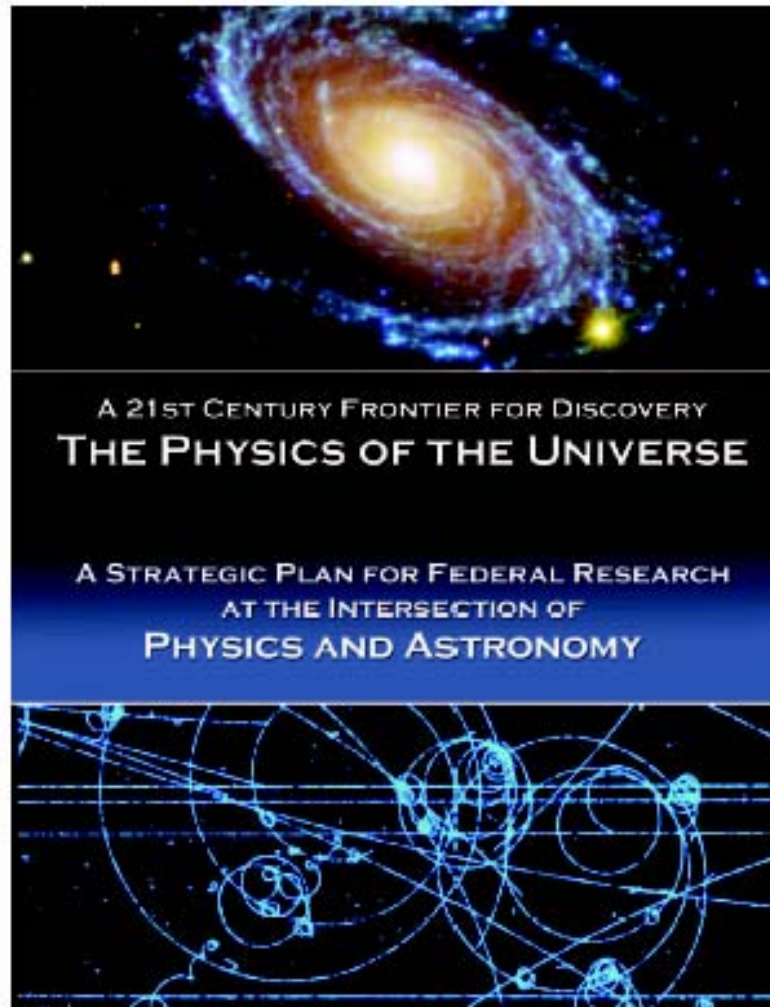


NSF/NASA/DOE/OSTP/OMB Interagency Working Group (IWG)

- **Chartered by the National Science and Technology Council's Committee on Science**
- **Task: “Examine investments required” and “develop priorities for further action” to implement the recommendations of the Q2C**
- **IWG guided by goal of improving coordination amongst agencies to achieve most beneficial results from investments**



IWG Report February 2004



http://www.ostp.gov/nstc/html/NSTC_Home.html



IWG Recommendations

Ready for immediate investment:

Theme 1: Dark Energy [2] (LSST)

Theme 2: Dark matter [1], neutrinos [5], and proton decay [7]
(underground lab)

Theme 3: Gravity [4] – recommendations:

- “NSF, NASA, and DOE will strengthen numerical relativity research in order to more accurately simulate the sources of gravitational waves.”
- “The timely upgrade of LIGO and the execution of LISA are necessary to open this powerful new window on the universe and create the new field of GW astronomy.”



Funding Opportunities

- GP in PHY Division – target date September 29, 2004
 - NSF response “Physics of the Universe” report - \$12M earmarked for relevant research in PHY & AST
 - Major Research Instrumentation (MRI) Program
 - Undergraduate institutions: RUI and ROA Programs
[\[http://www.ehr.nsf.gov/crssprgm/rui/start.shtm\]](http://www.ehr.nsf.gov/crssprgm/rui/start.shtm)
 - Innovations in the Mathematical Sciences for the Physical Sciences and Engineering Program (MSPA)
 - Math and statistical challenges posed by large data sets;
 - Modeling complex non-linear systems;
 - Managing and modeling uncertainty
- [PHY Contact: Beverly Berger]



LIGO — Local Educational Outreach Partnership

To use the excitement of LIGO science as the focus for science teaching and learning in Louisiana: an LLO Center filled with Exploratorium exhibits, tied to SUBR teacher education, and made available to LA students and teachers through the activities of LASIP.

**SOUTHERN UNIVERSITY
AND A&M COLLEGE**
BATON ROUGE, LA



CALTECH





Outlook

- *Physics of the Universe* supports increased coordinated effort for GW source simulation and deems AdvLIGO ready for immediate investment
- Major new outreach program underway at LLO
- Good progress on LIGO video; filming underway - completion early '05
- Overall funding prospects not too positive; ten-year trend not expected to continue