



# The View from NSF

LSC – Hanford, WA 11th November 2003

**Beverly K. Berger and Tom Lucatorto**

- **Funding: FY 03 (actual) & FY 04 (prospects)**
- **Funding Opportunities for GP Research**
- **Some Developments of Special Interest**

LIGO-G030624-00-M



# Actual Budget FY 2003

(\$M)

	NSF	MPS	PHY	Gravity
FY2002	4789	922	195.9	38.5
FY2003	5310	1041	220.8	44.5
$\Delta$	10.9%	12.9%	12.7%	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
$\Delta$	6.00	5.00	1.00

Other NSF programs funded GW research in FY 2003:

**PFC:** Center for Gravitational Wave Physics

**ITR:** 4 GW source simulation projects (2 new)

**ITR:** 3 Grid research for LIGO data (1 new)

**MRI:** 1 new for LSC



## FY 2004 - Status

	NSF	MPS	PHY
FY2003	5310 M	1041 M	220.8 M
Presidential Request	5481 M (3.2%)	1061 M (1.9%)	217.5 M (-1.5%)
House Mark up - passed	5639 M (6.2%)	1108 M (6.4%)	—
Senate Mark up – in comm.	5586 M (5.2%)	1086 M (4.3%)	—

Note: NSF funding is part of VA/HUD Bill. Major sticking point: adding veteran's medical care at \$1.3 B (out of \$90 B).



## Relevant NSF Program Changes

- ITR program is in its final year. Differences from previous year are described in new solicitation coming momentarily.
- Physics at the Information Frontier (PIF). Started in FY 04 by PHY to follow on to ITR.  
([nsf.gov/mps/vgn\\_bah/output/program\\_page/1,3120,1007,00.html](http://nsf.gov/mps/vgn_bah/output/program_page/1,3120,1007,00.html))
- NSF-wide MSPA - Innovations in the Mathematical Sciences for the Physical Sciences and Engineering.
  - [Math and statistical challenges posed by large data sets;](#)
  - [Modeling complex non-linear systems;](#)
  - [Managing and modeling uncertainty](#)



## Additional Funding Opportunities

- Information Technology Research (ITR) Program  
See new solicitation when available. Letter of intent by ~ Jan 15<sup>th</sup>.  
Deadline ~ Feb. 15<sup>th</sup>. MPS contact – Beverly Berger.
- Physics at the Information Frontier (PIF) Program  
PHY contacts – Barry Schneider and Marv Goldberg
- Innovations in the Mathematical Sciences for the  
Physical Sciences and Engineering Program  
See new solicitation when available. Contact Beverly Berger.
- Major Research Instrumentation (MRI) Program
- Undergraduate institutions: RUI and ROA Programs  
(<http://www.ehr.nsf.gov/crssprgm/rui/start.shtm>)

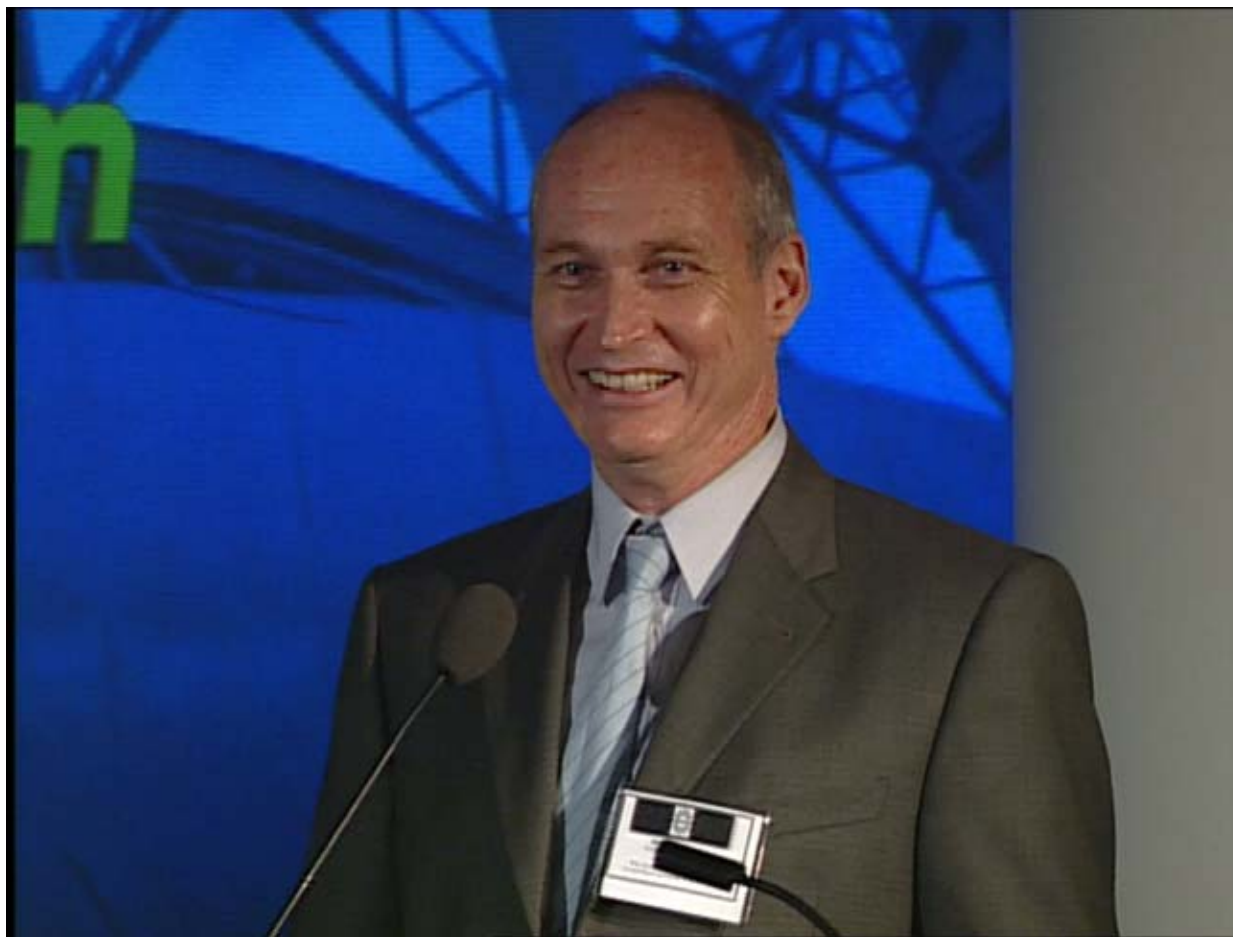


# Progress on the LIGO Video

- Production to be overseen by OLPA, PHY, OMA, & OIE
- Primary version ~ 25 minutes. Modularized to allow other versions and purposes
- Intended audiences
  - Outreach: visitors to the sites; general public; students and teachers in high schools and colleges
  - Congressional staff
  - Media
  - Modules as source for broadcasters



# New MPS Assistant Director Michael Turner







## Connecting Quarks with the Cosmos (Q2C)

The Q2C Report (by the NRC Committee on the Physics of the Universe) posed eleven questions that convey the unique prospects for scientific advancement of this era

Message: This is a golden age for cosmology, astronomy, and particle physics that presents exciting opportunities for fundamental advances in our understanding of the universe

“The agencies [DOE, NASA, NSF] should proceed with an advanced technology program to develop instruments capable of detecting gravitational waves from the early universe.”



## Q2C: Eleven Questions

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



## NSF/NASA/DOE Interagency Working Group

- Response to Q2C
- Has been chartered for one year
- Major attention on astrophysics and GW astronomy
- AdvLIGO and LISA are important issues
- Report to be issued before end of year to be used to inform future budgets



# Outlook

- Appropriations for FY 04 still under consideration; significant increase over FY 03 not expected
- Michael Turner new AD of MPS Directorate is a strong advocate for programs related to themes in Q2C, including GW astronomy and AdvLIGO
- Work continues on expanding multiagency approaches to projects related to AdvLIGO and LISA

“The committee recommends establishment of an interagency initiative on the physics of the universe, with participation of DOE, NASA, and NSF”

“DOE, NASA, and NSF are all deeply interested in the science at this intersection, and each brings unique expertise to the enterprise. Only by working together can they take full advantage of the opportunities at this special time.”

“More than ever before, astronomical discoveries are driving the frontiers of physics, and more than ever before our knowledge of physics is driving understanding of the universe and its contents.”