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# The Next Stages

# Timeline

- Community establishes science case (1980-2002)
  - Workshops (... , NESS2002, EarthLab), Reports (Bahcall Cmte 2000, NRC: Neutrinos and Beyond, Quarks to the Cosmos), National Strategy (IWGPOU)
- Planning and Development by Community
  - Solicitation 1: Planning grant(s) to define science and infrastructure requirements for science modules
  - Solicitation 2: Site development grants
- Down-select to 1 or 2 sites
  - Solicitation 3: Planning grant to develop full proposal including suite of initial experiments
- Review and decision to proceed through the Major Research Equipment Facility Construction (MREFC) process\*

Done

In Process

FY05

FY06

\*Projects that exceed 10% of the Directorate's budget (100M\$ for MPS) must proceed via the MREFC process

# Solicitation 2

## Site Development and Conceptual Design

- Solicitation to be issued in early May
- Key proposal elements include
  - Plans for
    - Obtaining and developing needed information on the site to verify existing and potential capabilities
    - Ascertain potential risks and obstacles to development of the site and possible means of mitigation including permitting and safety, environmental concerns
    - Development and operations of the infrastructure, including realizing the potential for broader impacts
  - Site that connects to infrastructure requirements of underground science and engineering as identified by community
- Award planning
  - 1-3 awards of up to \$500,00 for six months

# Solicitation 3 (as currently envisioned)

## Detailed Infrastructure Plan for Underground Science and Engineering

- Solicitation will incorporate information gained from awards made under Solicitations 1 and 2 to invite detailed plans for 1 or 2 sites
- Site dependent design of laboratory facilities in the context of the science modules
- Preliminary baseline, including suite of initial experiments and future plans
- Parallels continuing development of experiments within the community

# S1 Report

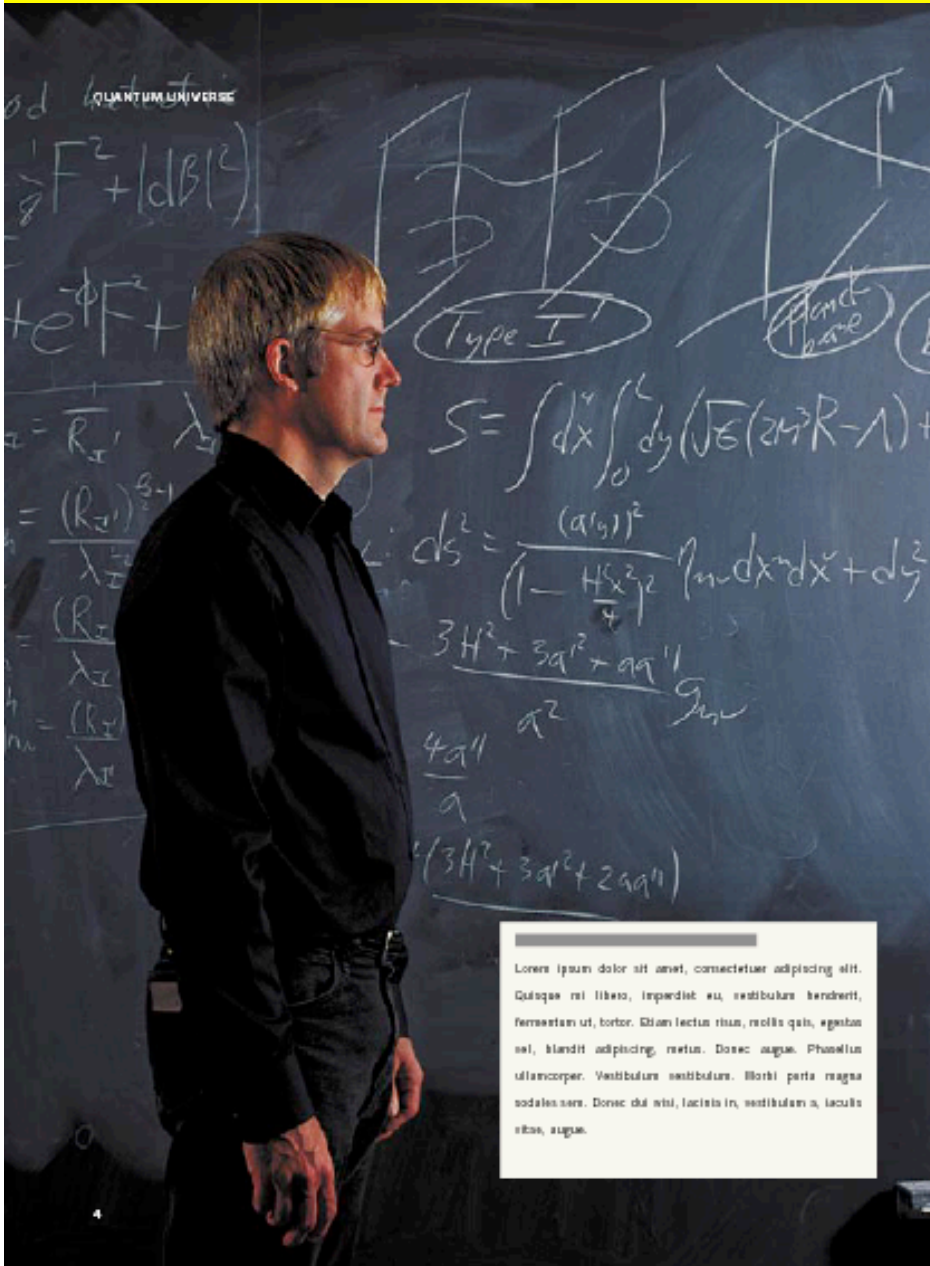
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- A glossy report with about 15-20 pages of very tuned text and some attractive figures. Total 30 - 40 pages. Modeled after Quantum Universe.
- Due by end of CY 2005 (Dec. 8)
- Audience:
  - Legislative staff, OMB, OSTP, NSTC
  - Agency representatives
  - Scientists in many disciplines (our colleagues)
  - Science writers, journalists
  - University presidents, provosts
  - Educated lay readers

# QUANTUM UNIVERSE

THE REVOLUTION IN 21<sup>ST</sup> CENTURY PARTICLE PHYSICS

DOE / NSF  
HIGH ENERGY PHYSICS ADVISORY PANEL  
QUANTUM UNIVERSE COMMITTEE



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- 1 ARE THERE UNDISCOVERED PRINCIPLES OF NATURE, NEW SYMMETRIES, NEW PHYSICAL LAWS?
- 2 HOW CAN WE SOLVE THE MYSTERY OF DARK ENERGY?
- 3 ARE THERE EXTRA DIMENSIONS OF SPACE?
- 4 DO ALL THE FORCES BECOME ONE?

## EINSTEIN'S DREAM OF UNIFIED FORCES

Since Einstein, physicists have sought a unified theory to explain all the fundamental forces and particles in the universe. The result is a stunningly successful theory that reduces the complexity of microscopic physics to a set of concise laws. But these same quantum ideas fail when applied to cosmic physics. Some fundamental piece is missing; gravity, dark matter and dark energy must have quantum explanations. A new theoretical vision is required, one that embraces the Standard Model and general relativity, while resolving the mystery of dark energy. Particle accelerators provide the means to reach a unified theoretical perspective in experiments characterized by four well-defined intellectual thrusts.

# Writing Committee

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## **Writing Committee:**

**Gene Beier**

**Charles Fairhurst**

**Judy Jackson\***

**Hitoshi Murayama\***

**TC Onstott**

**Hamish Robertson**

**Bernard Sadoulet**

**Jim Tiedje**

**\* not confirmed**

# Report Schedule

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- Initial draft: Sept. 28
  - Final draft: Dec. 8
  - Working group reports initial drafts: Sept. 28
  - Final reports on web: Dec. 8
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- Title: “Underground Space”  
“The Underground Frontier”  
“Underground Space: The Final Frontier” ;=)

# S2 & S3 Processes

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- Any dangers?
  - Al Mann's warning -- we could lose it. If there is a sense that [even] the scientists and engineers do not agree about either the science or the process, then it can die.
  - Uncontrolled cost growth, escalation [SSC effect].
  - Loss of key science components
    - Site
    - Timeline
    - Foreign competition
  - Challenges from other science agendas.
  - Without interagency coordination, a problem.

## What we need to do

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- NSF's process is closely held. No analog of DOE Lehman review (semipublic). S1 PI's therefore urge the S2 downselectees to make available their detailed cost analyses (before S2 submission) and to invite scrutiny and suggestions. Same for final S3 site. "Trust but verify."
  - Community reassured
  - All have a stake, and a shared responsibility
- Develop clearer picture of timelines, experiments
- Encourage earth sciences to seek NSF support for exploratory experiments.