

Report of the Committee of Visitors for the NSF Division of Physics www.nsf.gov/mps/advisory.jsp

- Panel of 35 met on February 4-6, 2009
- Sub-panel reviewed each sub-field in the light of the charge

Integrity and efficiency of the program's processes and management:

- Quality and effectiveness of merit review process
- Selection of reviewers
- Resulting portfolio of awards
- Management of the program

Results of NSF Investments:

- Discovery
- Learning
- Research Infrastructure
- Nuclear physics subpanel:
Gail Dodge, Richard Milner (Chair), Brad Sherrill

Physics Division Portfolio

- Atomic Molecular and Optical Physics (AMOP)
- Elementary Particle Physics (EPP)
- Nuclear Physics (NP)
- Particle and Nuclear Astrophysics (PNA)
- Theoretical Physics (TP)
- Education and Interdisciplinary Research (EIR)
- Gravitational Physics (GP)
- Physics of Living Systems (PoLS)
- Physics at the Information Frontier (PIF)
- Physics Frontier Centers (PFC)

PHY COV 09 Members

- Thomas Baumgarte (Bowdoin College) GP
- Daniella Bortoletto (Purdue U.) EPP
- Patricia Burchat (Stanford U.) PNA
- Beth Cunningham (Illinois Wesleyan U.) EIR
- **Gail Dodge (Old Dominion U.) NP**
- Mark Edwards (Georgia Southern U.) TP
- **Charlotte Elster (Ohio U.) TP**
- Eanna Flanagan (Cornell U.) GP
- John Friedman (U. Wisconsin-Milwaukee) GP
- Angel Garcia (RPI) PoLS
- Barbara Gentz (U. Bielefeld, Germany) TP
- Larry Gladney (U. Pennsylvania) PFC
- Uwe Greife (Colorado School of Mines) PNA
- Randall Hulet (Rice U.) AMOP

PHY COV 09 Members (contd.)

- Truell Hyde (Baylor U.) EIR
- Gordon Kane (U. of Michigan) TP
- Janos Kirz (Stony Brook U.) PFC
- **Laird Kramer (Florida International U.) EIR**
- Peter Littlewood (Cambridge U., U.K.) PoLS
- John Marko (Northwestern U.) PoLS
- **Richard Milner (MIT) NP**
- Ann Nelson (U. of Washington) TP
- **Angela Olinto (U. of Chicago) PNA**
- **Jorge Piekarewicz (Florida State U.) TP**
- John Preskill (Caltech) PIF
- Natalie Roe (LBNL) EPP
- Marianna Safronova (U. of Delaware) TP
- Terry Schalk (U.C. Santa Cruz) PIF

PHY COV 09 Members (contd.)

- Michael Shaevitz (Columbia U.) PNA
- **Bradley Sherrill (Michigan State U.) NP**
- Dan Stamper-Kurn (U.C. Berkeley) AMOP
- Uwe Thumm (Kansas State U.) PIF
- Henrik Weerts (Argonne National Lab) EPP
- Sidney Wolff (Natl. Optical Astr. Observ.) **CHAIR**
- Min Xiao (U. of Arkansas) AMOP

Findings: Review Process

- The process was found to be excellent
- The summary reviews by program officers are outstanding
- The success rate is decreasing => many excellent proposals unfunded
- The use of both written and panel reviews was strongly endorsed

Findings: Program Balance

- NSF supports frontier research with investments at all scales
- Maintain the present balance: more than 50% of funding goes to individual investigators
- The remainder goes to support large facilities and PFCs

Instrumentation and Equipment

- As highlighted in previous COV reports, more funding and flexibility is needed to support instrumentation and equipment.
- Clear need for funding research in Accelerator Physics and Instrumentation.

Large Projects

- Management over total life cycle (design, construction, operation) must be high quality
- Total life cycle costs must be clearly and accurately established before construction is authorized
- DUSEL will require a commitment from the Foundation as a whole
- These will require partnership between NSF and other agencies, and other countries
- Community engagement is essential for success – LIGO offers an interesting model

Report from Nuclear Physics subcommittee

Gail Dodge, Richard Milner (Chair), and Brad Sherrill

- The committee read the 19 jackets identified by the office as well as another 9 jackets.
- The National Superconducting Cyclotron Laboratory (NSCL) review was read.
- Sample proposals on the borderline (both + and -) over the last three years were reviewed carefully.
- The complete list of reviewers over the last three years was reviewed.
- The 2006 COV report was read and considered.

Findings

- Quality of process is outstanding
 - Merit review criteria addressed
 - Rationale for decisions well documented
 - Consistently good judgment applied to funding decisions
 - High quality reviewers
 - Timely process - under 6 months in 2008
- Decisions are well aligned with NSF strategic plan and national scientific priorities
- Portfolio is well balanced (risks, subfields, new PI's)
- Broader impacts
 - Education and training
 - Diversity and outreach
 - Strong intellectual connections to other fields
 - Substantial societal benefit: medicine, energy, security

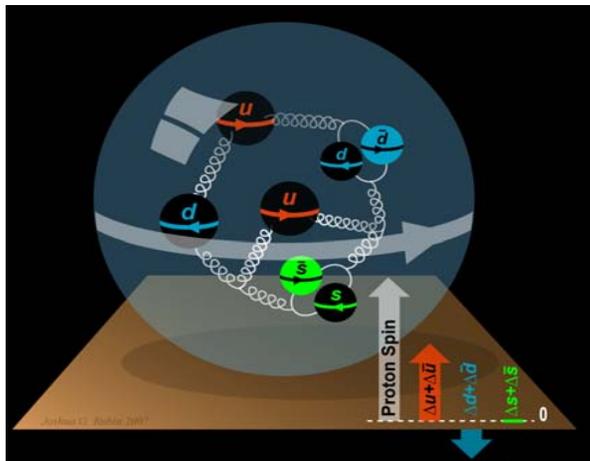
Nuclear Physics Highlights

1. Probing the limits of stability at NSCL

- Neutron-rich nuclei more stable than expected *Nature* **449**, 1022 (2007)

2. Where is the spin of the proton?

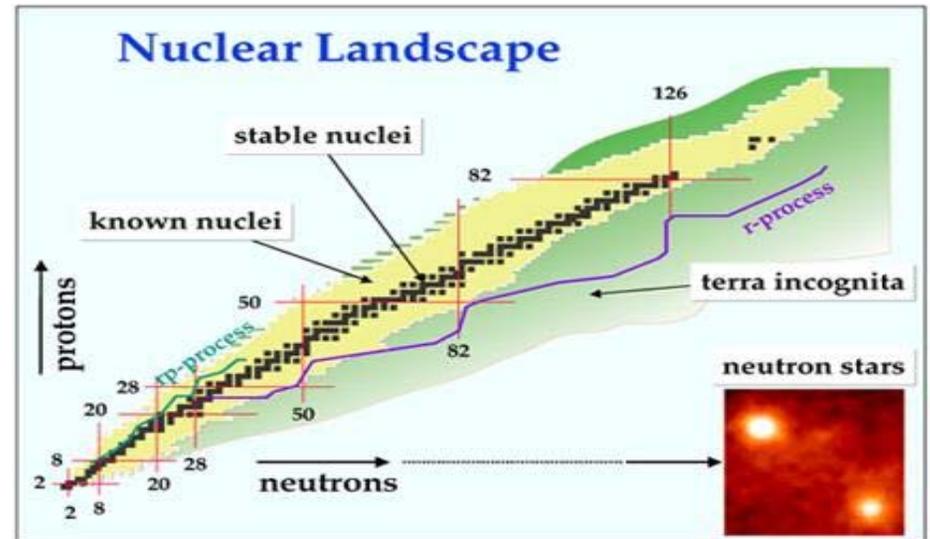
- Gluons contribute of order half the mass and momentum of the proton
- Recent results indicate that the gluon contribution to proton spin is small *Phys. Rev. Lett.* **101**, 072001 (2008)



3. The 10th anniversary of the Conference Experience for Undergraduates (CEU)

~ 700 undergraduate students have participated

Richard Milner
NSAC meeting July 27, 2009



CEU 2007 attendees.