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NATIONAL ACADEMY OF SCIENCES

NATIONAL RESEARCH COUNCIL

DIVISION FOR ENGINEERING AND PHYSICAL SCIENCES

Board on Physics and Astronomy

FINAL TECHNICAL REPORT

to DOE

DOE Patent Clearance Granted

MPDvorscak

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Date

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Office of Intellectual Property Law

DOE Chicago Operations Office

I. Project Identification

Project Title: Physics Survey Overview
 Agency Award No.: DE-FG02-98ER41069

II. Summary

The Board on Physics and Astronomy (BPA) has conducted a new decadal survey of physics entitled *Physics in a New Era*. The survey includes assessments of the main branches of physics as well as certain selected emerging areas. The various elements of the survey were prepared by separately-appointed National Research Council (NRC) committees. The BPA formed the Physics Survey Overview Committee (PSOVC) to complete the survey by preparing an overview of the field of physics to summarize and synthesize the results of the various assessments and to address cross-cutting issues that concern physics as a whole.

The membership of the PSOVC was drawn from universities and industry. Thomas Appelquist of Yale University chaired the committee. Members of the PSOVC represented the following areas of physics: gravitational physics; industrial materials research; biophysics; astrophysics and cosmology; atomic, molecular, and optical science; education; condensed-matter physics; plasma physics; elementary-particle physics; nuclear physics; computational physics; and the history of philosophy of science.

III. Technical Information

Volumes of the decadal survey of physics that have been completed include:

- *Research Briefing on Contemporary Problems in Plasma Science and Research Briefing on Selected Opportunities in Atomic, Molecular, and Optical Sciences* (National Academy Press, 1991)
- *Atomic, Molecular, and Optical Science: An Investment in the Future* (National Academy Press, 1994)
- *Neutrino Astrophysics: A Research Briefing* (Nature, Vol. 375, No. 6526, 4 May 1995, p. 29)
- *Cosmic Rays: Physics and Astrophysics* (National Academy Press, 1995)
- *Cosmology: A Research Briefing* (National Academy Press, 1995)
- *Plasma Science: From Fundamental Research to Technological Applications* (National Academy Press, 1995)
- *Elementary-Particle Physics: Revealing the Secrets of Energy and Matter*. Report of the Committee on Elementary Particle Physics (National Academy Press, 1998)
- *Condensed-Matter and Materials Physics: Basic Research and Tomorrow's Technology* (National Academy Press, 1999)

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- *Nuclear Physics: The Core of Matter, The Fuel of Stars*, (National Academy Press, 1999)
- *Gravitational Physics: Exploring the Structure of Space and Time*. Report of the Committee on Gravitational Physics (National Academy Press, 1999)

Copies of these reports are available upon request from the BPA.

IV. Activities During the Project

- The committee met for four times over the course of the project. The meeting dates and synopsis of each meeting are as follows:
 - February 6-7, 1999, Washington, DC. The committee discussed the scope of the study and heard presentations from chairs of previous BPA studies in the *Physics in a New Era* series. They also heard presentations from the OSTP, NSF, and DOE.
 - March 21-27, 1999, Atlanta, Georgia. Committee members gave presentations at the March Meeting of the American Physical Society outlining the scope of the study and soliciting feedback from the physics community.
 - May 29-30, 1999, Washington, DC. The committee discussed the initial write-ups and made plans to complete them. The outline was discussed further. Plans were made to complete first drafts of the various sections of the first outline.
 - October 27-28, 1999, Rosemont, IL. The committee reviewed the first drafts of the sections and planned its work on the cross cutting issues and ways to indicate priorities for physics.
 - June 11-12, 2000, Washington, DC. The committee met for the last time to discuss the final draft chapters of the report. It finalized the recommendations and continued discussion on the cross cutting issues critical to the field.
- The report completed NRC's report review process in December of 2000.
- A pre-publication version of the report was released to the public and a copy of the report was sent to the funding agencies on March 9, 2001.
- The final report was published on June 11th and delivered to the agencies.
- Dissemination activities:
 - Thomas Appelquist, chair of the committee, was invited to make a presentation to the Swedish Royal Academy on March 14th on the findings and recommendations of the study.
 - A mini-symposium was held at the NAS Georgetown facility announcing the release of the report to the media.
 - The American Physical Society, the BPA and Rep. Vernon J. Ehlers organized a luncheon discussion at the Rayburn House Office Building on July 25, 2001.
 - 1020 copies of the final report were ordered by the BPA. Over 1000 copies were mailed out to the following groups:
 - Staff on House and Senate committees
 - Program people at federal agencies who fund science,
 - Chairmen of physics departments at the top 100 research universities,
 - Provosts and vice presidents for research at the top 50 research universities,
 - Members of the National Science Board,
 - Vice presidents for research and development, and chief technology officers at major companies.

Attachments

- (1) Membership Roster of the Physics Survey Overview Committee

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