CHARTING THE COURSE FOR ELEMENTARY PARTICLE PHYSICS*

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Over the past 18 months I have been engaged in a very stimulating—and rewarding—intellectual adventure. I chaired the National Academies' Committee on Elementary Particle Physics in the 21st Century that was convened in response to an informal request from DOE and NSF. The committee was charged to identify the compelling science questions that currently define the elementary particle physics scientific agenda and to recommend a 15-year implementation plan with realistic, ordered priorities to address them. The committee that was assembled included quite a few individuals from outside the field of particle physics; in fact, half the committee members were not experts in particle physics, and yet each one had an important perspective to contribute. As an economist with a long-time interest in science policy and as a former university president, I undertook this challenge seriously but with a commitment to ensure that our recommendations would represent responsible stewardship of public resources.

The final report of the committee, *Revealing the Hidden Nature of Space and Time*, was publicly released on April 26, 2006. The committee strongly recommended an aggressive, direct exploration of the physics of the Terascale, where "tera" refers to the trillions of electron-volts that the world's most powerful accelerators can impart to fundamental particles. The strong attraction of Terascale physics is underscored by the convergence of interests from distinct scientific areas. From cosmology, there is growing interest in dark matter and dark energy. From particle physics, there is great interest in supersymmetry, in the origins of mass, and in Einstein's dream that all the forces can be unified. This convergence is what makes the Terascale so persuasive. The intersection of scientific interests is often a signal that major new discoveries are on the horizon, and thus, the committee felt that explorations of the Terascale have enormous scientific potential.

Let me assume for the moment some general familiarity with the report (please see the excellent discussion in last month's *APS News* for details), and use this space to briefly expand on three themes: (1) the role of particle physics in the physical sciences (as seen by an outsider), (2) leadership in an international arena, and (3) the medium-term challenge facing US particle physics.

In the committee's judgment, the US program in particle physics, despite a long tradition of distinction, is now at a decisive crossroads. Not only has this program (like many others in the physical sciences) experienced a decade of stagnating support when programs elsewhere in the world were expanding, but also the most important experiments at SLAC and Fermilab are reaching the end of their useful scientific lives without a clear follow-on strategy in place. As a result, the intellectual center of gravity is moving abroad just when the scientific agenda is especially promising. In these circumstances it was the committee's view that a failure to adopt a refreshed and compelling strategic vision and associated set of priorities would imply a decision to forgo leadership and commit ourselves to a much smaller effort in this critical scientific arena.

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