

Ballistic missile defense systems under scrutiny

Near the end of a televised speech on 23 March 1983 describing his arms budget, President Reagan called on the nation's scientists—in particular "those who gave us nuclear weapons"—to devise a ballistic-missile defense that could eliminate the threat of nuclear attack on populations of the US and its European allies by the turn of the century. Since then, studies of the technical, military and political aspects of the President's Strategic Defense Initiative, usually called "Star Wars" by both friends and foes of the concept, have proliferated. Two days after his Star Wars speech, Reagan initiated the first studies by signing National Security Study Directive 6-83. Under it, the Pentagon formed a Defensive Technologies Study Team led by James C. Fletcher, who headed NASA during most of the 1970s and now is back to teaching at the University of Pittsburgh, and a parallel effort called the Future Security Strategy Study headed by Fred S. Hoffman of Pan Heuristics in Marina del Rey, California. In Congress, the Senate Foreign Relations Committee and House Armed Services Committee directed the Office of Technology Assessment to examine the feasibility, effectiveness and probable cost of a comprehensive space defense system using directed-energy devices and the likely

implications for arms control and the future of the Western alliance.

Meanwhile, the Union of Concerned Scientists has completed a fairly comprehensive study of the subject. Other assessments have appeared in publications of the Federation of American Scientists, and a group of military analysts working under the auspices of the Brookings Institution and MIT produced a collection of papers bearing the title *Ballistic Missile Defense* (Brookings, 1984). More recently, the American Academy of Arts and Sciences has agreed to review the military and political policy issues of SDI with Soviet scientists and scholars.

APS study. Now, possibly the deepest inquiry so far into the science and technology of directed-energy weapons is being undertaken by the American Physical Society. Although the study was authorized by the APS Council on 20 November 1983, it was unveiled at the Society's spring meeting in Washington, D.C., 23-27 April. In the interim, the focus of the study was fixed on the scientific, technical and systems aspects of SDI. While APS intends to issue an unclassified report by the fall of 1985, it is intent on heading off criticism that the study group did not know about classified R&D for directed-energy weapons by gaining wide access for the committee to Defense Department laboratories and documents. Supporting this is a letter dated 12 December to L. Charles Hebel of Xerox (then vice-chairman of the APS Panel on Public Affairs) from Richard D. DeLauer, Undersecretary of Defense for Research and Engineering, offering "full cooperation." DeLauer also stated: "I believe that an independent and impartial study conducted by a prestigious professional organization such as The American Physical Society could be highly beneficial in coalescing scientific opinion and creating informed public opinion in fulfillment of the President's aims."

Encouragement for the study also has come from NSF Director Edward A. Knapp. Leaders of the OTA examination of "Star Wars" for Congress have indicated they will rely heavily on the

findings of the APS study. That's not surprising, considering the group that APS is assembling for the job. Its co-chairmen are Nicolaas Bloembergen of Harvard and Kumar Patel of AT&T Bell Laboratories. When fully formed, the study committee will have at least 15 members. It will operate on a budget estimated at \$660 000, which is being sought from both government and foundation sources to avoid the accusation "He who pays the piper calls the tune."

Bloembergen and Arthur Schawlow shared half the 1981 Nobel prize in physics "for their contribution to the development of laser spectroscopy." Bloembergen's research has been in nuclear and electron paramagnetic resonance, solid-state masers and nonlinear optics. He received a BA in 1941 and an MA in physics from the University of Utrecht. In 1946 he went to Harvard, where he wrote his thesis with Edward Purcell. His PhD was awarded in 1948 by the University of Leiden. From 1949 to 1951 he was a junior fellow in the Society of Fellows at Harvard, where he has been ever since, except for visiting professorships. In 1957 he was appointed Gordon McKay Professor of Applied Physics and since 1980 he has been Gerhard Gade University Professor.

Patel's research has been on gas

BLOEMBERGEN



PATEL



lasers, molecular lasers in the infrared, high-power lasers (including invention of the carbon-dioxide laser), nonlinear optics, tunable lasers in the infrared, high-resolution spectroscopy, and pollution detection. He received a BE from the University of Poona in 1958, an MS in 1959 and PhD in 1961 from Stanford University. He joined Bell Labs in 1961 and has been there ever since. In 1967 he became head of the Infrared Physics and Electronics Research Department, in 1970 Director of the Electronics Research Laboratory, in 1976 Director of the Physical Research Lab, and since 1981 he has been Executive Director, Research, Physics Division.

While APS has performed studies of such scientific subjects as nuclear-reactor safety and photovoltaic energy conversion, this is the first time it has delved into the complex issues of weapons systems and their consequences for arms control. Because of the nature of the topic, members of the committee are not all likely to be physicists. —IG

Presidential awards for young investigators in physics

The White House Office of Science and Technology Policy named on 17 February the first throng of 200 scientists and engineers from 74 universities in 35 states as recipients of the Presidential Young Investigators Awards. Each award winner may receive as much as \$100 000 per year for five years in a combination of Federal and matching private funds. The awards are meant to help US universities attract and retain outstanding PhDs early in their careers so that they are not lured away from classroom teaching and academic research by the incentive of higher pay elsewhere.

Of the first 200 awards, more than three-fourths go to young PhDs in the physical sciences and engineering, the fields suffering the most acute shortages of university faculty. After the competition was announced in 1982, a total of 232 PhD-granting institutions submitted 1549 nominations for the 200 awards. A panel of scientists and engineers appointed by the National Science Foundation, which administers the program, culled through the nominees and recommended the winners.

The awards carry an annual base grant from NSF of \$25 000. NSF will provide up to \$37 000 per year to match contributions raised by individual universities from industrial or other private sources. Under the program, NSF has \$6 million in its current fiscal 1984 budget to cover the initial awards, but it may have to ante up another \$12

million to offset the matching money obtained by university fund-raisers. The additional sums, NSF officials admit, will come from the agency's research directorates, meaning that Peter will be robbed to pay Paul.

OSTP and NSF expect another 200 young PhDs will be named each year, so that at the end of five years there will be 1000 well-paid faculty members in the program. Anticipating the next group of 200, NSF already has requested \$23.8 million for the program in its budget for fiscal 1985.

Among the physicists named: Michael F. Paulaitis, University of Delaware; Chang-Tai Chiang, University of Illinois; Thomas F. Rosenbaum, University of Chicago; Asit K. Rau, University of Kentucky; Chris H. Greene, Louisiana State University; Theodore R. Kirkpatrick, University of Maryland; Ellen D. Williams, University of Maryland; Alexander Vilenkin, Tufts; Paul F. Barbara, University of Minnesota; Serge Rudaz, University of Minnesota.

Hoi-Sing Kwok, State University of New York, Buffalo; Clifford R. Pollock, Cornell; Wesley Smith, Columbia; Jon Orloff, Oregon Graduate Center; Eric D. Feigelson, Pennsylvania State University; Paul A. Heiney, University of Pennsylvania; David A. Tirrell, Carnegie-Mellon University; James M. Gaile, Clemson; Harry J. Kimble, University of Texas, Austin.

A. Gordon Emslie, University of Alabama; Simon D. White, University of Arizona; John K. Eaton, Stanford Uni-

versity; Roger W. Falcone, University of California, Berkeley; Reingard L. Genzel, University of California, Berkeley; Robert D. McKeown, Caltech; John P. Preskill, Caltech; Thomas A. Prince, Caltech; Alex Zettl, University of California, Berkeley; Mitchell C. Begelman, University of Colorado; Joseph A. Fisher, Yale University; Marshall B. Long, Yale University; Gregory Baker, University of Arizona; Charles S. Campbell, University of Southern California; Daniel M. Nosenchuck, Princeton University.

Peter B. Armentrout, University of California, Berkeley; Supriyo Datta, Purdue University; Ronald M. Gilgenbach, University of Michigan; James B. Grotberg, Northwestern University; James M. Haile, Clemson University; Jonathan J. Higdon, University of Illinois; Antoine Kahn, Princeton University; Wyn D. Laidig, North Carolina State University; Stephen A. Lyon, Princeton University; Robert R. Lucchese, Texas A&M; G. Paul Neitzel, Arizona State University; Mark A. Prelas, University of Missouri; Robert K. Prud'Homme, Princeton University; Helen L. Reed, Stanford University; L. Rafael Reif, MIT; Peter J. Rossky, University of Texas, Austin; David Rutledge, Caltech; Richard J. Saykally, University of California at Berkeley; James C. Seferis, University of Washington; Terrence J. Sejnowski, Johns Hopkins University; Michael O. Thompson, Cornell University; Nancy S. True, University of California, Davis. —IG □



The new 4-mile ring of superconducting magnets designed to increase the maximum energy of the Fermilab proton accelerator to 1000 GeV (1 TeV, hence the new name "Tevatron"), was ceremonially dedicated on 28 April. Illinois Senator Charles Percy is flanked at the celebration by Fermilab director Leon Lederman (right) and director-emeritus Robert Wilson. The superconducting ring, which doubles the beam energy of the twelve-year-old accelerator, lies directly below the original ring of conventional magnets. Test runs have thus far achieved 80% of the design energy. Eventually the Tevatron will accommodate countercirculating beams of protons and antiprotons, making the Fermilab machine a colliding-beam accelerator with a collision energy of 2 TeV (see PHYSICS TODAY, March, page 17).