

Key decision nears on proposed Argonne photon source

Even as plans advance for the European Synchrotron Radiation Facility (PHYSICS TODAY, December, page 65), a proposal for a similar but somewhat more energetic light source at Argonne National Laboratory is gathering steam in the United States. The Federal budget for 1986-87 contains about \$3 million in R&D money for an "advanced photon source," and in mid-November a large meeting of synchrotron users took place at Argonne to discuss synchrotron research and desirable specifications for the new machine.

Speaking at the meeting of some 300 university, industry and laboratory scientists from the United States and abroad, US public officials were unusually outspoken about the merits of the project, considering that it still awaits final approval at the Department of Energy and still must go to Congress for authorization.

"This project is going to provide a brand new source of x rays of a very high quality that will enable experiments to be done that have never been done before," said Louis Ianniello, DOE deputy associate director for basic energy sciences.

Background. A committee established by the Department of Energy to review synchrotron radiation sources recommended in late 1983 that a 6-GeV ring be built, starting in 1987, at a national facility. The following year the National Research Council's Seitz-Eastman committee on major facilities in materials research recommended as its first priority the construction of a 6-GeV synchrotron radiation facility equipped with new insertion devices and capable of producing maximum brightness in the 10-keV region.

In late 1985 DOE's Energy Research Advisory Board reviewed and endorsed the Seitz-Eastman recommendations, whereupon DOE established an Advanced Photon Source Steering Committee under the chairmanship of Peter Eisenberger of Exxon Research and Engineering Company to do a design study for the proposed facility. The

committee sponsored a workshop on machine design, which was run by Robert Siemann of Cornell University and Herman Winick of the Stanford Synchrotron Research Laboratory, and formed a panel under the joint chairmanship of Jules Godel of Brookhaven National Laboratory and James M. Paterson of SLAC to do a site-independent schedule and cost study for the proposed facility. By the time this panel had completed its work, DOE had settled on Argonne as the site for the proposed facility, and an Argonne group headed by Kenneth Klier (now at Purdue) had finished a conceptual design report. This report was subjected to a standard detailed DOE review and approved with minor changes in March.

For planning purposes, DOE by this time had packaged the advanced photon source into a "Scientific Facilities Initiative" with three other major projects: an advanced light source for Lawrence Berkeley Laboratory, a relativistic heavy-ion collider for Brookhaven National Laboratory and a neutron source for Oak Ridge National Laboratory.

The first construction money for the 1-2-GeV Berkeley synchrotron light source was included in the 1987 budget, and the Brookhaven relativistic heavy-ion collider may be eligible for construction funds in the 1989 budget. Eisenberger is hopeful that DOE might

include construction money for the Argonne advanced photon source in its budget request for fiscal 1988. "I can think of no other proposal in materials science that has been so thoroughly reviewed," he says. At the same time, Eisenberger is taking nothing for granted, given Washington's current deficit-consciousness.

Energy upgrade. Current plans anticipate that major construction might start in 1988, and the machine could be finished 4½ or 5 years later if there is no slippage in the schedule. Given that schedule, it is anticipated that the machine would cost about \$375 million. The estimate includes funds for facilities such as an auditorium and 15 beam lines.

Thomas H. Fields, the acting director of the Argonne design group, says that the latest design is for a 7-GeV rather than a 6-GeV machine. The higher energy would provide much more tunability, and the new design was endorsed at the recent synchrotron users' meeting at Argonne.

David Moncton of Exxon R&E, Eisenberger's successor as head of the synchrotron users' steering committee, strongly supports the higher energy. Moncton believes that the best tunability of the undulators can be achieved at 7 GeV, and he thinks the Europeans would do well to reconsider their proposed energy of 5-6 GeV for ESRF.

—WILLIAM SWEET

Marchuk is president of Soviet Academy

Guri I. Marchuk, a mathematician and leading science administrator, is the new president of the Soviet Academy of Sciences. According to the Soviet press agency Tass, he was elected in a secret ballot at a general membership meeting of the academy last October. Tass said that Marchuk was known for his "efficiency, high sense of responsibility and tremendous capacity for work" and characterized him as "sociable, accessible, mobile and always willing to heed

the opinions of other people."

Marchuk's research has ranged freely over large areas of computer science and applied science, including the modeling of nuclear reactions, the atmosphere and the oceans. In the last 10 or 15 years he has taken an especially strong interest in mathematical modeling of the human immune system, and he is well known to US scientists who have worked in that area. Charles DeLisi, director of health and environ-

mental research at the Department of Energy, says that Marchuk is a "very broad fellow and a first-rate mathematician." George Bell, head of the theory division at Los Alamos National Laboratory, describes him as "a very impressive person"—articulate, able to grasp technical detail readily, aware of everything going on around him and very gregarious. Ronald Mohler of the University of Oregon, who has collaborated with Marchuk for about 12 years, describes him as "a very outstanding and sincere person" and as "more liberal" than many of his colleagues.

Since 1980 Marchuk has been a deputy prime minister and head of the State Committee for Science and Technology, which coordinates applied research and development in the Soviet Union. He remains head of the state committee, and it is Mohler's impression that the committee may be folded into the academy and abolished as a separate entity. Mohler is inclined to view the Marchuk appointment as evidence of the Soviet leadership's efforts to streamline the economy and emphasize openness.

Career. Before 1980 Marchuk was director of the Siberian division of the Academy of Sciences at Novosibirsk. Loren Graham, a science historian and expert on the Soviet Union at MIT and Harvard University, notes that Novosibirsk was known in the 1950s and 1960s as a relatively free-wheeling intellectual center. Because of its distance from Moscow and because of Mikhail Lavrentiev's dynamic leadership, it was a place where, for example, modern biology was fostered. Andrei Budker's Nuclear Physics Center in Novosibirsk pioneered colliders and was a center for fusion research (see *PHYSICS TODAY*, August 1969, page 62).

To attract top talent to Novosibirsk, some scientists were offered special privileges such as individual houses, and so entrepreneurial types tended to take up residence.

That said, Graham thinks that Novosibirsk may have lost some of its élan in recent years and that Marchuk's tenure was associated with some tightening of political control. Graham is certain that Marchuk was the Communist Party's candidate for the top academy post. A majority of the academy's members and all members of its presidium are now party members, enabling the party to strongly influence or even dominate the choice of president, Graham says.

Setback to Velikhov. Evgeny P. Velikhov, vice president for physical and mathematical sciences in the Soviet Academy, had been widely expected to be elected the academy's president, and because he has frequent contacts with



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scientists outside the Soviet bloc and is well known to be an advocate of science exchanges and arms control, his defeat tended to be interpreted as a victory for party hard-liners and a setback to détente.

Marchuk has been primarily involved in Soviet exchanges with Eastern Europe and is reported to have publicly condemned Andrei Sakharov. But DeLisi, Bell and Mohler all would be skeptical about any attempt to portray him as a hard-liner or an enemy of exchanges with the West. All three of them have been invited by Marchuk to the Soviet Union on numerous occasions.

Graham would be inclined to interpret the party's choice of Marchuk as "an attempt to find a person who is good at getting fundamental science connected to industrial production and closing that gap, which is the historic weakness of the Soviet Union in science and technology, and a person who is very familiar with working with the government bureaucracy toward tying science to economic planning goals."

—WILLIAM SWEET

Cornell unit surveys some US Academy members on SDI

The Science and Engineering Committee for a Secure World, an organization established last spring to muster support for President Reagan's Strategic Defense Initiative (*PHYSICS TODAY*, June, page 81), has been quick to denounce the latest poll of eminent scientists on SDI as irrelevant and insignificant.

In the poll of members of the National Academy of Sciences in the physical sciences, mathematics and engineering, 78% of the respondents said that the prospects were "poor" or "extremely poor" that a survivable and effective missile defense system could be built in

the next 25 years, while just 4% considered the odds of success as better than even. The results of the survey, which was conducted by a social science research unit at Cornell University, were released in late October.

On 10 November, the pro-SDI committee issued a press release assailing the poll on the grounds that the respondents lacked the "understanding and experience" to make such judgments. Frederick Seitz of Rockefeller University, the head of the committee, was quoted in the release as saying, "One wonders to what extent most of these scientists who disapprove of SDI have actually participated in the research program, or appreciate the degree of seriousness which the Soviet Union devotes to its own continuing efforts in this field."

Peter Stein, an experimental particle physicist at Cornell University who conceived of the academy poll with two other Cornell physicists (astronomer Steven Soter and George Lewis, a postdoc in applied physics), concedes that the survey did not inquire specifically into knowledge or opinions about Soviet missile defense programs. But he says the survey did ask about the relative US and Soviet positions in technologies pertinent to the Strategic Defense Initiative and found that the consensus overwhelmingly favored the United States. As to Seitz's second point, Stein says that "it is very common to ask distinguished scientists their general opinion of an effort that they themselves are not directly involved with."

Poll method. Earlier last year, when Stein, Soter and Lewis conceived of the academy poll, they were unaware that Harvard physicist William A. Shurcliff already had conducted a private survey of the entire academy on Star Wars (*PHYSICS TODAY*, June, page 81). When they learned of Shurcliff's poll, which found members skeptical about the SDI program by a margin of 20:1, they wondered whether they should proceed. They decided a more rigorous poll still would be useful and managed to raise \$8000 to have the Cornell Institute for Social and Economic Research do the job.

The Cornell pollsters went for as high a response rate as possible, using what is called an "all-out" sequence of mailings. Robert McGinnis, director of the Cornell research unit that did the poll, says that they sent out an initial mailing of the polling instrument with neutral cover letters, sent a follow-up card a week later, tracked the returns, sent a second copy of the instrument to non-respondents three weeks later, again tracked the returns and, finally, sent a third copy by certified mail to