searchers occupy while waiting for professorial slots to open. "For junior people, it's lousy," says Peter Chen, a physical-organic chemist at the Swiss Federal Institute of Technology in Zürich, which like its sister institute in Lausanne is one of the few with a tenure-track system. Bright young Swiss researchers can save 10 years and become independent earlier, Chen says, by starting their careers in the United States.

The seven-member Federal Council views the recommendations as grist for an action plan on R&D and education funding for the 2004–07 period that it will present to parliament in November. Two council members have publicly avowed support for a 6.5% increase in the R&D budget—a figure that's short of what SSTC is pressing for but far more robust than recent budgets. They have also warned against sacrificing long-term research for the sake of the more politically expedient targeted research programs. SSTC president Gottfried Schatz and his colleagues will be making appearances before the relevant parliamentary commissions to build on this support. Says Schatz, "I do nothing else these days." **–GISELLE WEISS**

Giselle Weiss is a writer in Allschwil, Switzerland.

MATERIALS SCIENCE

Lighting Initiative Flickers to Life

An alliance of industry, academic, and U.S. government scientists is getting closer to flipping the switch on a 10-year, $500 million initiative to revolutionize lighting. Researchers met in New Mexico last week to map out priorities for the proposed Next Generation Lighting Initiative (NGLI) embedded in a broader energy bill moving through Congress. The project is designed to help the United States stay ahead of competitors in Japan, Europe, and Korea for global leadership in the $40 billion lighting industry. "We've lost [the lead in] other technologies to other countries; hopefully, we can keep this one," says Arpad Bergh, head of the Optoelectronics Industry Development Association in Washington, D.C., which helped draft the initiative.

Over the past decade, researchers have developed new light-emitting diodes and organic thin films that could form the basis of solid-state lights that would be more versatile and efficient than current vacuum-tube bulbs. Analysts say the new lights, if adopted widely, could cut global electricity consumption by 10% or more, reducing environmental problems and spurring economic growth. But technical obstacles, including problems with making brighter and more rugged materials at lower costs, have slowed progress.

To clear those hurdles, researchers at the Department of Energy's (DOE's) Sandia National Laboratories in Albuquerque, New Mexico, and Hewlett-Packard Co. in Palo Alto, California, proposed 2 years ago that DOE, leading lighting companies, and academia pool their skills. A research road map hammered out last year (lighting.sandia.gov/Xlightingoverview.htm) caught the eye of Senator Jeff Bingaman (D–NM), who helped insert language creating NGLI into energy bills that have passed the House and the Senate.

Although differences over nuclear power and other issues might block a final agreement on the energy bill, NGLI is a good bet to survive. Dozens of lawmakers have already asked Senate and House appropriators to provide $30 million for the fiscal year that begins 1 October, with a boost to $50 million annually in subsequent years.

Lighting up. New public-private effort aims to give U.S. companies the edge in developing new lighting devices, such as these light-emitting diodes.

CREDIT: LUMILEDS LIGHTING

Bush Administration officials have been quietly supportive. "It's looking increasingly likely that something is going to happen," says Jerry Simmons, who runs a lighting research program at Sandia.

The initiative's backers project that industry-led consortia would receive about two-thirds of any government funding through a competition, with the remainder going directly to universities and government laboratories. Companies that want to participate would have to match the government's contribution to applied studies, whereas federal funds would finance the riskier basic research. That arrangement gives industry "an incentive to support additional research," says Bergh.

Academic researchers are also upbeat about the initiative, saying it will connect their work to important practical applications. "A concentrated effort to reach super-high-efficiency lighting … is good for consumers and the environment," says materials scientist Steven DenBaars of the University of California, Santa Barbara.

Some DOE-funded scientists have already begun to prepare for the initiative. Sandia, for instance, plans to invest nearly $6 million by the end of 2003 in solid-state lighting studies. The work includes modeling potential materials on a supercomputer—precisely the sort of research that's beyond the reach of most companies. **–DAVID MALAKOFF**

PARTICLE PHYSICS

Dark-Matter 'Sighting' Returns to Shadows

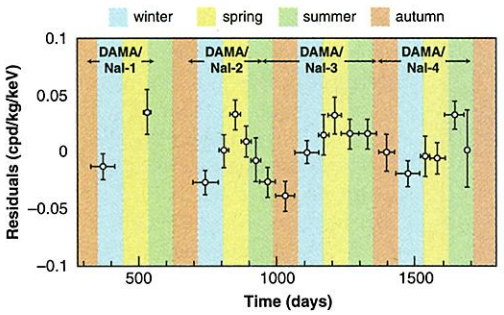
MUNICH, GERMANY—Dark matter is, officially, still dark. Results presented at a meeting here last week* have convinced most physicists who have seen them that a controversial "discovery" of dark matter is in error.

The original claims stemmed from an experiment performed in 1998 deep underneath the Italian Alps. A sensitive detector at the heart of the DAMA (for *Da*rk *Ma*tter) experiment at Gran Sasso National Laboratory showed a yearly increase and decrease in the number of particles it encountered. Although each individual "detection" had a high probability of being background noise in the instrument, the DAMA team concluded that the yearly cycle might be the signature of dark matter, the mysterious material that vastly outweighs the ordinary matter that makes up the visible universe. As Earth orbits the sun, the scientists proposed, it zooms toward and away from a "wind" of dark matter that blows through the solar system, and the shifts in orientation cause the number of dark-matter particles striking the detector to wax and wane (*Science*, 1 January 1999, p. 13; 3 March 2000, p. 1570). From this conclusion, the team calculated some properties of the dark-matter candidates, such as their energy. Although the claim was met with skepticism, the scientific community took it seriously—until now.

The challenge comes from a French experiment called EDELWEISS (for *E*xpérience pour *D*etecter *l*es *W*imps *e*n *S*ite *S*outerrain). Like DAMA, EDELWEISS centers on a particle detector buried under tons of alpine rock to shield it from cosmic rays. For 3 months, EDELWEISS tried to sense DAMA's dark matter candidates. It failed.

"There is no event" that could correspond to DAMA-type dark matter, says Gilles Gerbier of the French Center for Atomic Energy (CEA) in Saclay, a member of the EDELWEISS team. During its run, EDELWEISS saw only one possible dark matter candidate—much too energetic to be DAMA-type dark matter and probably just experimental noise.

* 20th International Conference on Neutrino Physics and Astrophysics, 25–30 May.



Blown away. Seasonal ups and downs in particle detections were not due to a dark-matter "wind," a new study shows.

Rita Bernabei of the University of Rome, a physicist with the DAMA collaboration, says differences in the two detectors make a direct comparison between the results misleading. But other researchers say EDELWEISS has all but put the matter to rest. "For the first time, you exclude this DAMA positive evidence for dark matter," says Michel Spiro, also at CEA Saclay. "I'd prefer that it was confirmed than excluded, but this is important physics."

Yorck Ramachers of Oxford University suspects that DAMA's seasonal variation is a systematic error. The cumulative effects of annual cycles of temperature, humidity, and other factors might explain the "detection," he says. In any case, he says, several other dark-matter searches are likely to release data this year, so those who were rooting for the DAMA result might soon have fresh puzzles to console them. **–CHARLES SEIFE**

INFECTIOUS DISEASE

Cholera Strengthened By Trip Through Gut

Poor sanitation promotes the spread of cholera, but that's not the only way humans foster the deadly diarrheal disease. Microbiologists have discovered that the human gut seems to prime the bacteria responsible. Before *Vibrio cholerae* exit the body in watery stools, something about the intestinal environment causes them to rev up the activity of certain genes. These genes, in turn, seem to prepare them for ever more effective colonization of their next victims, possibly fueling epidemics, says Andrew Camilli, a microbiologist at Tufts University School of Medicine in Boston.

"The hypothesis that passage through the host enhances infectivity is quite provocative," comments Matthew Waldor, a microbiologist at Tufts–New England Medical Center in Boston. Adds Vic DiRita, a microbiologist at the University of Michigan, Ann Arbor: "It's really amazing. It may explain the rapid and explosive nature of these epidemics."

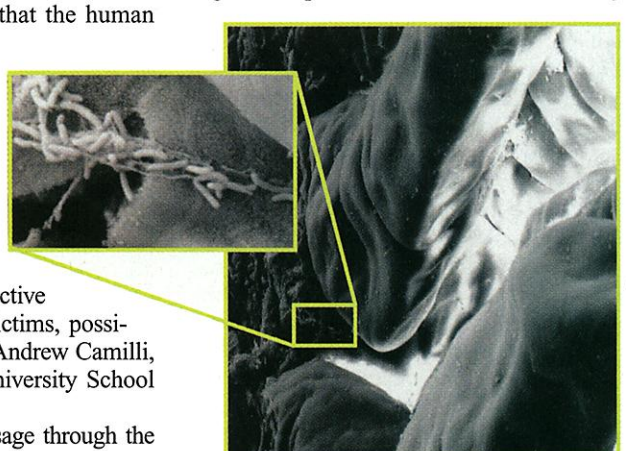
A thwarted experiment put Camilli and his colleagues on the trail of this so-called hyperinfectivity. He and others had long wondered why cholera epidemics become rampant as quickly as they do. Camilli thought the microbes residing in the human gut might develop defenses against the gut's acid environment. As a result, more of the excreted, acid-tolerant bacteria would survive in subsequent hosts. But when the researchers went to Dhaka, Bangladesh, to get fresh *Vibrio* to test this idea, technical difficulties foiled the experiment.

Instead, graduate students Susan Butler and D. Scott Merrell, who is now at Stanford University School of Medicine, made a peculiar observation. While in Bangladesh, they injected mice with a mixture of bacteria grown in the lab and isolated from human stools. The stool-derived bacteria greatly outcompeted the lab-derived bacteria, the researchers found, calculating that the former were up to 700 times more infectious than the latter.

This increased infectivity lasted at least 5 hours in bacteria living in pond water—long enough for someone to drink the infected water, says Camilli. However, the hyperinfectivity disappeared when the microbes were grown more than 18 hours in the lab, the team reports in the 6 June issue of *Nature*.

To understand what made excreted *Vibrio* different from their laboratory counterparts, Camilli and Stanford microbiologist Gary Schoolnik looked for changes in gene expression. They exposed a microarray made with pieces of *Vibrio*'s genes to *Vibrio* RNA isolated from fresh stools or lab strains. Some 3120 of the 3357 genes studied were equally active. But in the stool-derived sample, 44 genes were more active and 193 were less active.

When the researchers looked at the most logical suspects for increased infectivity,

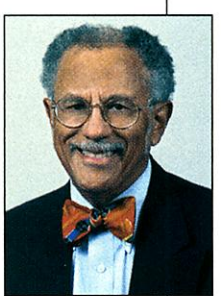


Pathogenic squatters. In this mouse small intestine, *Vibrio cholerae* bacteria (*inset*) have latched onto cells lining the gut.

CREDITS: (TOP TO BOTTOM) ADAPTED FROM BERNABEI *ET AL.*; UCAR; MICHAEL ANGELICHIO AND A. CAMILLI

ScienceScope

Prying Open the Board Federal legislators are urging the governing board of the National Science Foundation (NSF) to conduct more of its business in public—or else. The U.S. House of Representatives this week was expected to pass an NSF authorization bill that calls on the agency's in-house watchdog, the inspector general (IG), to ensure that the board is complying with all relevant federal statutes pertaining to open meetings.



The House vote follows a Senate hearing last month at which Senator Kit Bond (R–MO) told atmospheric scientist Warren Washington (right), newly installed as chair of the National Science Board, "to avoid the heartburn and take care of the matter before it becomes a problem." Washington replied that he was "philosophically" in favor of "doing as much business as possible in the open" but that he needed to check with NSF officials before giving a fuller answer. IG Tina Boesz says that her office has started to look into the matter in anticipation of a formal request from Congress.

Let the Race Begin This week, at a meeting in France, the partners in the $4 billion International Thermonuclear Experimental Reactor (ITER) were to formally submit their candidate sites to host the mammoth fusion experiment. Japan, the favorite, last week announced its choice of Rokkasho, a village in Aomori Prefecture about 540 kilometers north of Tokyo that is already home to a controversial nuclear fuel reprocessing plant. The European Union was expected to offer two candidates: Vandellos, near Barcelona, the site of a shuttered nuclear plant; and Cadarache, near Aix-en-Provence, next to France's main nuclear power research facility. A private Canadian group is pushing a site in Clarington, near Toronto.

The winner, to be chosen by the end of the year, is supposed to be the best site within the country willing to pick up the largest share of the tab. Each potential host has a huge financial stake in the decision. The Aomori provincial government, for example, expects to reap some $10 billion in economic benefits over the expected 30-year lifetime of the project.

Contributors: Philipp Weiss, Gretchen Vogel, Jeffrey Mervis, Dennis Normile and Xavier Bosch