

as “nuclear probing of dense plasmas” at MIT, and “measurement of fission neutron multiplicities and energy spectra for actinide nuclei” at Oregon State University. According to the NNSA the grants are also intended to strengthen the agency’s relationship with university scientists. —JLD

UCSC adaptive optics lab. The cutting edge of adaptive optics R&D is where the University of California, Santa Cruz, hopes to land with the help of a new laboratory for adaptive optics. The lab will be established with the largest private gift the university has ever received—\$9.1 million from the Gordon and Betty Moore Foundation.

The lab’s main research thrusts will be extreme adaptive optics and multiconjugate adaptive optics. “Extreme adaptive optics does very, very high precision corrections of turbulence in the atmosphere,” says the lab’s chief scientist, UCSC astronomer Claire Max. “The scientific aim is focused on directly imaging planets around nearby stars—it optimizes the imaging of something faint that is close to something that is bright. You could also look at brown dwarf companions to bright stars, disks beginning to form into planets, or disks accompanying star formation.” Multiconjugate adaptive optics uses multiple deformable mirrors to compensate for the turbulence from different layers of the atmosphere. It is being developed for use with the new generation of 30- to 100-meter ground-based telescopes, says Max.

The lab will augment the campus’s Lick Observatory and multi-institutional NSF Center for Adaptive Optics, which focuses on adaptive optics for both astronomy and the human eye, says Max. “This lab will let us test ideas that people come up with before we decide whether they are ready to go on a telescope,” she adds. —TF

HESS gamma-ray telescope. One eye has opened in the High Energy Stereoscopic System (HESS) on the Khomas Highland, 100 km southwest of Namibia’s capital of Windhoek. In September, the first of four 12-meter gamma-ray telescopes that make up the European–African array began searching the skies for Čerenkov showers initiated by gamma rays hitting the atmosphere. The full array is slated to be up and running by late next year. The HESS team hopes to eventually increase the sensitivity by either quadrupling the array or adding a few larger telescopes.



The thrust of HESS and a handful of similar telescopes under construction around the world is to learn what powers violent celestial phenomena such as supernova remnants, pulsars, and active galactic nuclei (see *PHYSICS TODAY*, June 2000, page 50). “Equally important,” says Riaan Steenkamp of the University of Namibia, “we want to find evidence for cosmic-ray acceleration in our own galaxy. We have a theory that works beautifully, but precious little experimental evidence.”

As part of its bid to attract astrophysics students, the university has set up exchange programs with HESS partner institutions in South Africa, France, and Germany. —TF

Atomic plans return to Japan. Fifty-seven years after they were believed to have been destroyed, papers describing plans for a Japanese nuclear bomb have been returned to the Institute of Physical and Chemical Research (RIKEN) outside Tokyo. At the close of World War II, and despite orders to destroy it, the 23-page document was secretly entrusted to Kazuo Kuroda, a research assistant who worked on the project with Yoshio Nishina, the scientist who headed the atomic bomb development team. The papers, written by a military officer who interviewed Nishina, include



KURODA

details and diagrams of a weak atomic bomb. In 1949, Kuroda emigrated to the US and eventually became a professor at the University of Arkansas. After his death in April last year, RIKEN personnel asked his widow to return the papers.

This is not the first time fresh evidence has come to light about Japan’s nuclear weapons program. In 1997, newly declassified documents revealed that, in 1945, a German sub-

marine bound for Japan was captured carrying two Japanese officers and 1200 pounds of uranium oxide, an ingredient for an atomic bomb. But there was “no chance” that the Japanese could develop a bomb in time to stop their defeat, says Herbert York, a nuclear weapons expert in San Diego, California. “I believe that, at the close of the project, Nishina said that not even the US could develop an atomic bomb during this war,” says York. Kuroda’s documents will be made available to historians through RIKEN’s archives. —PKG

Cuba to sign nuclear treaties. Cuba will sign the nuclear nonproliferation treaty (NPT) after 34 years of refusal. That leaves only three countries—India, Israel, and Pakistan—all of which are believed to have substantial nuclear weapon programs, outside the treaty.

Cuba’s willingness to sign was announced in September by Cuban foreign minister Felipe Perez Roque during a speech to the United Nations General Assembly in New York City. Roque said that Cuba had not signed the NPT before because the major nuclear powers—China, France, Russia, the UK, and the US—had not attempted to meet their disarmament commitments under the treaty. Cuba’s decision, says Roque, was motivated by “its commitment to an effective disarmament process that guarantees world peace.” The surprise announcement was welcomed by the international community. “With Cuba’s intention to become party to the NPT, we have come a step closer to a universal nuclear non-proliferation regime,” says Mohamed ElBaradei, the director-general of the International Atomic Energy Agency.

Roque also announced that Cuba will ratify the 1967 Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean, also known as the Treaty of Tlatelolco, which prohibits signatories from developing and acquiring nuclear weapons and establishes a nuclear-weapon-free zone in the two regions. Cuba, which signed the treaty in 1995, is the last country in the Caribbean to ratify it. —PKG

Muon spin society. The use of muons to probe the internal magnetic fields of materials is what unites the condensed matter physicists, chemists, and other scientists who, this summer, founded the International Society for μ SR Spectroscopy (ISMS). “We felt it was important to formally organize ourselves to take advantage of the growing worldwide develop-

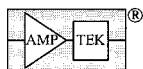
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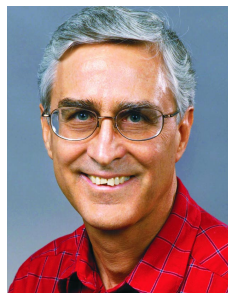
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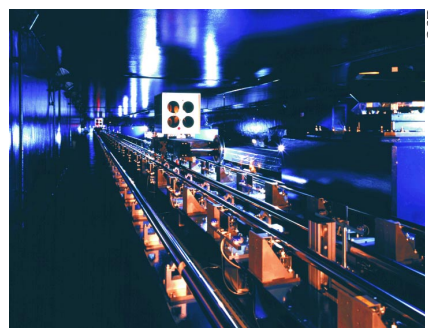
Heffner of Los Alamos National Laboratory in New Mexico. ISMS has branches in Asia, Europe, and North America. Topping the agenda in North America, Heffner adds, are upgrading the muon source at TRIUMF, Canada's particle accelerator in Vancouver, and exploring the feasibility of adding a muon facility to the Spallation Neutron Source under construction at Oak Ridge National Laboratory in Tennessee. —TF

New PACS®. A new edition of the Physics and Astronomy Classification Scheme® is now available from the American Institute of Physics. Introduced in the 1970s by AIP and updated every two years, PACS is used to categorize physics and astronomy literature—from AIP, the American Physical Society, and many other publishers—for journal subject indexes, catalogs, and online bibliographic databases. In the new PACS, for example, papers related to Bose-Einstein condensates, which were previously lumped to-

gether, are subdivided into six categories. This change, says Safia Hameed, who manages AIP's physics classification section, reflects the needs of a growing area of research. Since PACS was put on the Web a few years ago, she adds, the number of publications using it has swelled. The 2003 PACS can be accessed online at <http://www.aip.org/pacs/>. Print copies may be obtained free of charge by sending a request to shameed@aip.org. —TF

ment of accelerator-based science facilities at which future muon sources could be built, as well as to better coordinate the capabilities of existing muon sources," says ISMS President Robert

VLT reaches milestone. Light beams from the four 8.2-meter primary telescopes that make up the European Southern Observatory's Very Large Telescope (VLT) at the Paranal Observatory in Atacama, Chile, have been successfully combined in pairs to create interferometric fringes. Three 1.8-meter "outrigger" telescopes will be added to



A LIGHT-FUNNELING PIPE for the VLT.

the VLT by 2005. Next year, the first adaptive optics will be installed and will increase the sensitivity by a factor of almost 100. —PKG ■

WEB WATCH

<http://zircon.geology.union.edu/kamchatka/tanking>

Last year, John Garver of Union College in Schenectady, New York, organized a field trip to study the geology of Russia's remote and roadless Kamchatka peninsula. To reach his destination—the Srendiny range in the south of the peninsula—he and his team set forth in a modified ex-Red Army tank. Garver recounts his experiences in *Tanking in Kamchatka*, which originally appeared in *Union College Magazine*.



<http://www.beyonddiscovery.org>

The often-unanticipated benefits of basic research form the subject of *Beyond Discovery™*, a collection of illustrated essays from the National Academy of Sciences. Among the topics covered, which are available in Chinese and Spanish translations, are wavelets, vitamin D, and the global positioning system.



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With the aim of increasing the number of women in science and engineering, the **MentorNet** Web site pairs students with mentors. Online for five years, MentorNet currently connects about 3000 students with 3000 mentors.



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Compiled by CHARLES DAY