of 10 kilometers. Present models use grids roughly 100 to 200 kilometers on a side, and Manabe admits that the plan is "very optimistic." But Philip Jones, a climatologist at the University of East Anglia in the United Kingdom, says that level of resolution is needed for more accurate modeling of both local and global phenomena. "It would produce fantastic results if it were right," he says.

Despite such ambitious goals, the STA program and the other initiatives are seen as only small steps toward making Japan a major player in environmental science. Matsuno says many more positions are needed for environmental researchers, and Manabe notes that much bigger increases are necessary to bring environmental research spending in line with other R&D programs. One important change, says Higuchi, would be a national framework to coordinate efforts among the various agencies. Such a framework, he says, would give the community greater clout domestically and raise its profile internationally. Armed with such information, Japanese scientists might even be able to give Rowland a good answer to his question.

–Dennis Normile

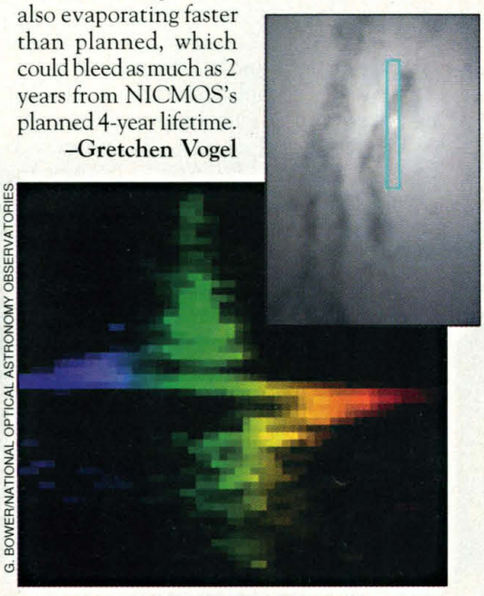
ASTRONOMY

Refitted Hubble Probes a Maelstrom

This signature of a black hole at the center of M84, a galaxy 50 million light-years away, is an early result from the Space Telescope Imaging Spectrograph (STIS), one of two new instruments installed aboard the Hubble Space Telescope during last February's servicing mission. STIS precisely mapped how light from stars and gas in a band crossing the galaxy's center (upper image) is Doppler-shifted by motion toward or away from Earth. The resulting image—"the best spectrum ever of a black hole," says Hubble project scientist Ed Weiler—shows that light from gas and stars above the galaxy's center is shifted far to the blue end of the spectrum, while just below the center the light is shifted far to the red (lower image). The shifts imply that the gas is whirling around the galactic center at 400 kilometers per second, in the grip of a black hole with a mass of 300 million suns.

Two cameras on the other new Hubble instrument, the Near Infrared Camera and Multi-Object Spectrometer (NICMOS), are also working fine, but a third has been pushed out of focus by an unexpected expansion of its solid nitrogen coolant. The coolant is also evaporating faster than planned, which could bleed as much as 2 years from NICMOS's planned 4-year lifetime.

–Gretchen Vogel



G. BOWER/NATIONAL OPTICAL ASTRONOMY OBSERVATORIES

New Members of the National Academy of Sciences

The National Academy of Sciences last month announced the election of 54 men and six women as new members.The total number of current active members is now 1773. Academy members also elected 15 foreign associates, bringing the total to 309.

Newly elected members and their affiliations at the time of election are:

Aizenman, Michael, Princeton University; **Allison, James P.**, University of California (UC), Berkeley; **Ashcroft, Neil W.**, Cornell University; **Atwater, Tanya M.**, UC Santa Barbara; **Bahcall, Neta A.**, Princeton University; **Beachy, Roger N.**, Scripps Research Institute, La Jolla, CA; **Bennett, Charles H.**, IBM T. J. Watson Research Center, Yorktown Heights, NY; **Cavenee, Webster K.**, UC San Diego; **Ceyer, Sylvia T.**, Massachusetts Institute of Technology (MIT); **Cheeger, Jeff**, New York University; **Chemla, Daniel S.**, Lawrence Berkeley National Laboratory and UC Berkeley; **Cohen, Joel E.**, Rockefeller University, New York City; **Crabtree, Gerald R.**, Stanford University; **Croteau, Rodney B.**, Washington State University, Pullman; **Curl, Robert F.**, Rice University; **Daly, John W.**, National Institute of Diabetes and Digestive and Kidney Diseases; **De Boor, Carl**, University of Wisconsin, Madison; **DeMaria, Anthony J.**, DeMaria Electro-Optics Systems, Bloomfield, CN; **Engelman, Donald M.**, Yale University; **Englander, S. Walter**, University of Pennsylvania; **Freund, L. Ben**, Brown University; **Frison, George C.**, University of Wyoming, Laramie; **Fulton, William**, University of Chicago; **Garruto, Ralph M.**, National Institute of Neurological Disorders and Stroke; **Gimbrone, Michael A., Jr.**, Brigham and Women's Hospital and Harvard Medical School; **Gloeckler, George**, University of Maryland, College Park; **Jencks, Christopher**, Harvard University; **Kay, Paul**, UC Berkeley; **Keen, Noel T.**, UC Riverside; **Kim, Peter S.**, Whitehead Institute and MIT; **Kreps, David M.**, Stanford University; **Lander, Eric S.**, Whitehead Institute and MIT; **Lindquist, Susan L.**, University of Chicago; **Lorimer, George H.**, DuPont Co., Wilmington, DE; **Marcus, Joyce**, University of Michigan; **Mather, John C.**, Goddard Space Flight Center, Greenbelt, MD; **McEwen, Bruce S.**, Rockefeller University; **Metzenberg, Robert L.**, Stanford University; **Miller, Lois K.**, University of Georgia, Athens; **Moore, Peter B.**, Yale University; **Murad, Ferid**, University of Texas, Houston; **Nei, Masatoshi**, Pennsylvania State University; **Nelson, Edward**, Princeton University; **Phillips, William D.**, National Institute of Standards and Technology; **Randall, Linda L.**, Washington State University, Pullman; **Raymond, Kenneth N.**, UC Berkeley; **Schwarz, John H.**, California Institute of Technology; **Smith, Kirk R.**, UC Berkeley; **Söll, Dieter G.**, Yale University; **Stossel, Thomas P.**, Harvard University and Brigham and Women's Hospital; **Tsien, Richard W.**, Stanford University and Beckman Center; **Tully, John C.**, Yale University; **Tumlinson, James H., III**, Agricultural Research Service, Gainesville, FL; **Turner, Michael S.**, University of Chicago and Fermi National Accelerator Laboratory, Batavia, IL; **Tyson, J. Anthony**, Lucent Technologies, Murray Hill, NJ; **Verma, Inder M.**, Salk Institute for Biological Studies; **Wallace, John M.**, University of Washington, Seattle; **Watson, Edward B.**, Rensselaer Polytechnic Institute, Troy, NY; **Williams, Lewis T. (Rusty)**, Chiron Technologies and UC San Francisco; and **Witte, Owen N.**, UC Los Angeles.

Newly elected foreign associates, their affiliations at the time of election, and their country of citizenship are:

Barenblatt, G. I., UC Berkeley (Russia); **Bolin, Bert R. J.**, Stockholm University (Sweden); **Connes, Alain**, Collège de France, Paris (France); **Cory, Suzanne**, Royal Melbourne Hospital, Victoria (Australia); **de la Chapelle, Albert**, University of Helsinki (Finland); **Deisenhofer, Johann**, Southwestern Medical Center, University of Texas, Dallas (Germany); **Dewey, John F.**, University of Oxford (U.K.); **Douce, Roland**, University of Grenoble (France); **Jortner, Joshua**, Tel Aviv University (Israel); **Leggett, Anthony J.**, University of Illinois, Urbana-Champaign (U.K.); **Mas-Colell, Andreu**, Universitat Ponpeu Fabra, Barcelona (Spain); **Nielsen, Ebbe S.**, Commonwealth Scientific and Industrial Research Organization, Canberra, Australia (Denmark); **Polge, Ernest J. C.**, Animal Biotechnology Cambridge Ltd., Cambridge (U.K.); **Reuter, Harald**, University of Bern (Switzerland); and **Simons, Kai L.**, European Molecular Biology Laboratory, Heidelberg, Germany (Finland).

(More information is available online at www.nas.edu/new)