

Rowan University
Rowan Astronomical Observatory
Glassboro, New Jersey 08028

[S0002-7537(93)02351-0]

This report covers the period from July 2001 to June 2002. The Rowan Astronomical Observatory website is at <http://scherzo.rowan.edu/> and has current information about Observatory activities.

1. PERSONNEL

During the report period, observatory staff included Assistant Professor Erick J. Guerra, Assistant Professor David R. Klassen, and Professor Karen Magee-Sauer. Undergraduates involved in research during the report period were Vincent LoBue, Christopher Metting, Stephen Noonan, Jamie Slapkus, T. J. Wark, Ray Winters, and Kaniz Zaman.

2. NEW SCIENCE BUILDING OPENS SPRING 2003

The Rowan Astronomical Observatory will move into the new science building in Spring 2003. A donation of \$1 million by Ric and Jean Edelman will fund the purchase of planetarium and observatory equipment for the new science building.

2.1 The Edelman Planetarium

The Edelman Planetarium will have a 40-foot diameter dome and a Spitz 1024 projection system. Housed in an elegant cylindrical structure, the planetarium will have a seating capacity of up to 104. The position and motion of celestial objects will be controlled by computer console. Operators will have the ability to display laser disk, DVD, videotape, and computer images using one LCD projector and two CRT projectors. A laser projector and a novel LED cove lighting are also available. One dozen slide projectors and an additional "all-sky" slide projection system complete the visual capabilities of the planetarium. A theater-quality sound system will include ADAT tape deck, cassette tape deck, and CD player. Audio-visual equipment can also be controlled from a lecture podium separate from the computer console. Audio and video feeds from both the lecture podium and the computer console will seamlessly share projector and audio equipment. The Edelman planetarium will be more than just a place to learn about the night sky. It will serve as a multimedia theater, lecture hall, and center for K-12 science outreach. A planetarium director will be hired in 2003 to work with faculty to plan innovative programming for the planetarium.

2.2 New Observatory

The new science building will include a rooftop observatory and an observing deck that will be used for astronomy courses, outreach, and student research. The new observatory will have a DFM Engineering 0.4-meter Cassegrain telescope with an f/8 focal ratio. Equipment will include UBVR filters, a suite of CCD cameras for photometry, and a low-res

spectrograph. The observatory will allow faculty to create new opportunities for student research such as asteroid searches and monitoring of variable stars.

3. RESEARCH

3.1 Guerra

In collaboration with astronomers from Haverford College, National Radio Astronomy Observatory, and NASA Goddard Space Flight Center, E. J. Guerra is examining astronomical radio sources with "inverted" radio spectra. Such a population of sources will be bright at higher radio frequency and should give insights on the evolution of radio-loud active galaxies. In addition, these radio sources will be a significant foreground to cosmic microwave background anisotropy experiments, such as NASA's Microwave Anisotropy Probe. Guerra also collaborates with astronomers from Penn State University and Space Telescope Science Institute who are studying powerful extended FRIIb radio galaxies, their gaseous environments and their use as a cosmological test. These efforts involve collecting radio data from the Very Large Array and X-ray data from NASA's Chandra X-ray Observatory.

3.1.1 External Funding

2002 NASA-ASEE Summer Faculty Fellowship at NASA Goddard Space Flight Center. Awarded \$12,000 to work with the Microwave Anisotropy Probe.

"Radio Galaxies with Inverted Spectra: Effects of Evolution and Doppler Boosting" funded by the Lindback Minority Faculty Grant. Awarded \$14,921 for the period from 09/01/02 to 08/31/03.

3.2 Klassen

David Klassen continues to work on his studies of Martian clouds under a grant from the NASA Mars Global Surveyor (MGS) Data Analysis Program. His project revolves around measuring the amount of water contained in clouds on Mars and how it changes over daily, seasonal, and inter-annual scales and to compare his near-infrared images from the NASA Infrared Telescope Facility to the spacecraft thermal infrared results. As part of this work, Klassen was awarded a summer faculty fellowship to work with MGS scientists at the NASA Goddard Space Flight Center for the summers of 2001 and 2002. Results from the most recent work are due to be published in *Icarus*.

3.2.1 External Funding

2001 NASA-ASEE Summer Faculty Fellowship at NASA Goddard Space Flight Center. Awarded \$10,000 to work with the Mars Global Surveyor.

“Clouds of Mars - an IRTF/MGS Comparison” funded by NASA Mars Global Surveyor Data Analysis Program. Awarded \$150,000 for the period from 08/15/01 to 08/14/04.

2002 NASA-ASEE Summer Faculty Fellowship at NASA Goddard Space Flight Center. Awarded \$12,000 to work with the Mars Global Surveyor.

3.3 Magee-Sauer

My research field is in planetary sciences and is supported by the National Science Foundation’s Research at Undergraduate Institutions (RUI) program and NASA’s Planetary Atmospheres program. I collaborate with scientists in the Laboratory for Extraterrestrial Physics at the NASA Goddard Space Flight Center in Greenbelt, MD. I primarily study the composition and behavior of comets by observing the infrared emission of cometary molecules. The telescopes that our group uses are the NASA Infrared Telescope Facility and the W.M. Keck telescope, both atop of Mauna Kea (14,000 ft) on the Big Island of Hawaii.

3.3.1 External Funding

“High Resolution Infrared Spectroscopy and Characterization of Comets” funded by the National Science Foundation, Research at Undergraduate Institutions Program. Awarded \$142,000 for the period from 05/01/01 to 04/30/04.

“The Composition and Heliocentric Dependence of Organics in Comet Hyakutake” funded by NASA, Planetary Atmospheres Program. Awarded \$27,000 for the period from 06/01/00 to 05/31/03.

4. SYNERGISTIC ACTIVITIES

4.1 Guerra

Guerra was a member of the American Astronomical Society’s Committee on Minorities in Astronomy and a panelist at a session on the status of minorities in astronomy at the 199th meeting of the American Astronomical Society. He taught elementary school students about the motion and appearance of stars in the night sky during an outreach activity in Penns Grove, NJ on the night of December 13, 2001. On December 13, he also lectured to the Kiwanis Club of Woodbury on “The Stars of the Christmas Sky.” Guerra contributed an astronomical activity for the “Wonders of Art and Science” exhibit at the Delaware Art Museum in Wilmington, DE on April 6, 2002. He also contributed an astronomical activity for “Take Your Daughter’s to Work Day” at William Paterson University on April 25, 2002.

4.2 Klassen

Klassen’s outreach activities include a continuing relationship with the Bucks County School District as a scientific

advisor for their collaboration with the Wyoming Infrared Observatory. This includes joining them in their remote observing sessions. The goal of this collaboration is to provide some research experiences for the students in the Bucks County high schools. Klassen also presented a school assembly program on planets and the “Pluto Issues” to the students of St. Catherine’s school in Glassboro.

4.3 Magee-Sauer

Magee-Sauer served on a NASA planetary astronomy grant review panel in October 2001. She was an external reviewer for NSF Planetary Astronomy grant program and reviewed journal articles for *Icarus* during the period of this report. Magee-Sauer has conducted outreach activities at the Ursuline Academy in Wilmington, DE and for Girl Scout Troop 852.

PUBLICATIONS

The publication list includes all papers published or submitted between July 2001 and July 2002.

- R. A. Daly & **E. J. Guerra**, 2002, “Quintessence, Cosmology, and Fanaroff-Riley Type IIb Radio Galaxies,” *Astronomical Journal*, Volume 124, Issue 4, 1831.
- R. A. Daly, **E. J. Guerra**, & M. Chester, 2001, “Magnetic Field Strengths in the Lobes and Bridges of FRIIb Sources,” in *Particles and Fields in Radio Galaxies*, ed. R. Laing & K. Blundell (ASP Conference Series), 413.
- N. Dello Russo, M. J. Mumma, M. A. Disanti, **K. Magee-Sauer**, & R. Novak, 2001, “Ethane Production and Release in Comet C/1995 O1 Hale-Bopp,” *Icarus*, Volume 153, Issue 1, 162.
- M. A. Disanti, M. J. Mumma, N. Dello Russo, & **K. Magee-Sauer**, 2001, “Carbon Monoxide Production and Excitation in Comet C/1995 O1 (Hale-Bopp): Isolation of Native and Distributed CO Source,” *Icarus*, Volume 153, Issue 2, 361.
- E. J. Guerra**, S. M. Newlander, D. B. Haarsma, & R. B. Partridge, 2002, “VLA-FIRST/GB6 Inverted-Spectrum Radio Sources at 20 GHz,” in *Life Cycles of Radio Galaxies*, *New Astronomy Reviews* (Elsevier Science), Volume 46, 303.
- E. J. Guerra** & R. A. Daly, 2001, “The Beam Power, Lifetime, and Energy of FRIIb Radio Galaxies,” in *Particles and Fields in Radio Galaxies*, ed. R. Laing & K. Blundell (ASP Conference Series), 417.
- D. R. Klassen** & J. F. Bell III, 2002, “Radiance Factor Calibration of Near-Infrared Spectral Images of Mars,” *Icarus*, submitted. txE. J. Guerra