

**Rutgers, The State University of New Jersey**  
**Department of Physics and Astronomy**  
*Piscataway, New Jersey 08854*

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This report is for September 1999 to August 2000.

## 1. PERSONNEL

The members of the astrophysics group were:

Faculty: J. P. Hughes, A. Kosowsky, T. A. Matilsky, D. Merritt, C. Pryor, J. A. Sellwood, T. B. Williams, and H. S. Zepolsky. C. L. Joseph and K.-I. Nishikawa are research faculty members. Three new faculty (P. Côté from Cal Tech, L. Ferrarese from UCLA and R. Jimenez from Edinburgh) arrive September 2000.

Postdoctoral fellows: Fidel Cruz, Percy Gomez and Rob Olling. Monica Valluri left during the year to move to the University of Chicago.

Graduate students: Vincent Jacobs, Andrés Jordán, Andrew Mack, Libarid Maljian, Milos Milosavljevic, Mingyan Poon, Cara Rakowski, Juntai Shen, Arend Sluis, Jianxiang Wang, and Bingrong Xie.

Dr. Tinatin Kakhniashvili from the Abastumani Astrophysical Observatory visited for about six months. Hughes and Rakowsky spent the year visiting Service d'Astrophysique, CEA-Saclay, France.

## 2. FACILITIES

Rutgers University is a partner in the SALT (Southern African Large Telescope) consortium, a group of countries and universities which are jointly constructing a 10-meter class optical telescope optimized for spectroscopic work that will closely resemble the Hobby-Eberly Telescope at McDonald Observatory. Construction is now underway and is scheduled to be completed by the end of 2004. The consortium consists of South Africa and Poland, the Board of the HET, and a number of universities, including Rutgers and Wisconsin.

Williams is constructing a new Imaging Fabry-Perot Spectrophotometer for use on the telescopes at CTIO by the end of 2001. It will be made available to the entire US astronomical community through an agreement between Rutgers and CTIO.

Two group members are individually involved in major space missions. Joseph is a member of the STIS instrument team for the Hubble Space Telescope, for which he receives GTO time to observe the nuclei of galaxies. Hughes was involved in the development of the new Chandra X-ray Observatory (formerly AXAF) and has access to GTO observations of supernova remnants and galaxy clusters.

Joseph has a well-equipped laboratory for characterizing optical and ultraviolet astronomical detectors.

A computer controlled 20-inch instructional telescope on the roof of our building is equipped with a CCD camera and fiber-fed CCD spectrograph. It is used for undergraduate and graduate training.

## 3. RESEARCH PROGRAMS

Research currently underway at Rutgers encompass both observational and theoretical programs in cosmology, extragalactic and galactic astronomy. Major activities are: galactic dynamics (Côté, Joseph, Merritt, Pryor, Sellwood), galaxy clusters (Hughes, Kosowsky), active galactic nuclei (Ferrarese, Merritt), the extragalactic distance scale (Ferrarese, Hughes), supermassive black holes (Ferrarese, Joseph, Merritt, Sellwood), dwarf galaxies (Côté, Pryor), globular clusters (Côté, Jimenez, Pryor, Williams), CMB and early universe theory (Kosowsky), supernovae (Hughes, Kosowsky), the interstellar medium (Joseph), damped Lyman alpha systems (Jimenez), X-ray astronomy (Hughes, Matilsky), optical and ultraviolet instrumentation (Joseph, Williams), chaos theory and non-linear dynamics (Matilsky, Merritt, Zepolsky), chemical and stellar evolution of galaxies (Côté, Jimenez, Pryor), gravitational lensing (Hughes, Jimenez, Kosowsky), stellar evolution theory (Jimenez), *N*-body and 3-D magnetohydrodynamic simulations (Merritt, Nishikawa, Sellwood), and high velocity clouds (Williams).

Observational work is both ground based, principally at the National Observatories, and space based, using mainly the Hubble Space Telescope and X-ray satellites.

All publications by members of the group are listed at <http://www.physics.rutgers.edu/ast/RAPs.html>.

## 4. GRADUATE PROGRAM

The Graduate Program has separate Physics and Astronomy options with differing course and examination requirements. The graduate curriculum in astronomy offers an introductory course plus separate advanced courses covering the major areas of astronomy. See our Department web site for further information: <http://www.physics.rutgers.edu>.

Students taking the astronomy option are expected to do research with one of the above-listed faculty members, but research opportunities relating to the interests of other members of the Department, e.g. the early universe, also exist within the physics option.

## 5. FURTHER INFORMATION

Further details relating to the facilities and full descriptions of specific research activities at Rutgers can be found on our web page: <http://www.physics.rutgers.edu/ast/group-ast.html>.