

**Carnegie Mellon University**  
**Astronomy Group**  
**Department of Physics**  
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The following report reviews the activities of the CMU astronomy group from November 1999 through November 2000.

## 1. RESEARCH PERSONNEL

**Faculty:** Richard Griffiths, Jeffrey Peterson, Robert Nichol, A. Kathy Romer.

**Research Scientists:** Andrew Ptak, Kavan Ratnatunga, A. Kathy Romer (until August 31st 2000).

**Postdoctoral Research Associates:** Elizabeth Blanton (until May 1st 2000), Percy Gomez, Christopher Miller, Takamitsu Miyaji, Andrew Ptak (until October 31st 2000).

**Research Staff:** Chris Cantalupo, Greg Griffin.

**PhD Candidates:** Shang-Shan Chong, Adam Knudson.

## 2. SELECTED PAPERS PUBLISHED DURING THE REPORT PERIOD

### R. E. Griffiths:

- Hornschemeier, A. E. *et al.* 2000, ApJ, 541, 49, *X-ray Sources in the Hubble Deep Field detected by Chandra*
- Almaini, O. *et al.* 2000, MNRAS, 315, 325, *X-ray variability in a deep, flux-limited sample of QSOs*
- Mould, J. R. *et al.* 2000, ApJ, 536, 266, *Jet-induced Star Formation in Centaurus A*
- Blair, A. J., Stewart, G. C., Georgantopoulos, I., Boyle, B. J., Griffiths, R. E., Shanks, T. & Almaini, O. 2000, MNRAS, 314, 138, *A deep ROSAT survey - XV. The average QSO spectrum and its evolution*
- Parmar, A. N. *et al.* 2000, Large Scale Structure in the X-ray Universe, Proceedings of the 20-22 September 1999 Workshop, Santorini, Greece, eds. Plionis, M. & Georgantopoulos, I., Atlantisciences, Paris, France, p.295, 295, *XEUS - The X-ray Evolving Universe Spectroscopy Mission*
- Stewart, G. C., Pappa, A., Georgantopoulos, I., Griffiths, R. E., Boyle, B. J., Shanks, T., Almaini, O. & Gunn, K. 2000, Large Scale Structure in the X-ray Universe, Proceedings of the 20-22 September 1999 Workshop, Santorini, Greece, eds. Plionis, M. & Georgantopoulos, I., Atlantisciences, Paris, France, p.243, 243, *The ASCA and ROSAT Deep Surveys*
- Vincent, M. B. *et al.* 2000, Icarus, 143, 205, *Jupiter's Polar regions in the Ultraviolet as Imaged by HST/WFPC2: Auroral-Aligned Features and Zonal Motions*
- Vincent, M. B. *et al.* 2000, Icarus, 143, 189, *Mapping Jupiter's Latitudinal Bands and Great Red Spot Using HST/WFPC2 Far-Ultraviolet Imaging*
- Griffiths, R. E. *et al.* 2000, Advances in Space Research, 25, 853, *Deep Survey Sources, and Predictions for XMM and AXAF*

- Monkiewicz, J. *et al.* 1999, PASP, 111, 1392, *The Age of the Sculptor Dwarf Spheroidal Galaxy from Imaging with WFPC2*

- Holtzman, J. A. *et al.* 1999, AJ, 118, 2262, *Observations and Implications of the Star Formation History of the Large Magellanic Cloud*

### P. L. Gomez:

- Patel, S. K. *et al.* 2000, ApJ, 541, 37, *The Distance and Mass of the Galaxy Cluster Abell 1995 Derived from Sunyaev-Zeldovich Effect and X-ray Measurements*

- Gómez, P. L., Hughes, J. P. & Birkinshaw, M. 2000, ApJ, 540, 726, *A Merger Scenario for the Dynamics of Abell 665*

- Patel, S. K. *et al.* 1999, American Astronomical Society Meeting, 195, 6403, *A Mass and Ho Estimate from Sunyaev-Zel'dovich Effect, X-ray, and Optical Measurements of Galaxy Cluster Abell 1995*

### C. J. Miller:

- Miller, C. J., Melott, A. L. & Gorman, P. 1999, ApJL, 526, L61, *Environmental Dependence of the Fundamental Plane of Galaxy Clusters*

- Miller, C. J. 1999, American Astronomical Society Meeting, 195, 3002, *Spatial Analyses of a Complete Sample of Rich Abell/ACO Clusters to  $z=0.14$*

- Krughoff, K. S., Miller, C. J., Batuski, D. J. & Hill, J. M. 1999, American Astronomical Society Meeting, 195, 1201, *Completion of a Rich Cluster Redshift Survey to  $m10 \leq 17.0$*

- Nichol, R. C., Melott, A. & Miller, C. J. 1999, American Astronomical Society Meeting, 195, 1001, *Wavelength Doesn't Matter: Optical and X-ray Correlations for Clusters of Galaxies*

### T. Miyaji:

- Franceschini, A., Hasinger, G., Miyaji, T. & Malquori, D. 1999, MNRAS, 310, L5, *On the relationship between galaxy formation and quasar evolution*

- Ishisaki, Y. *et al.* 2000, Advances in Space Research, 25, 845, *ASCA Detection of Faint Sources in the Lockman Hole and its Comparison with ROSAT Sources*

- Miyaji, T., Hasinger, G. & Schmidt, M. 2000, Advances in Space Research, 25, 827, *Evolution of AGNs and A Model of the X-Ray Background*

- Miyaji, T., Hasinger, G. ; & Schmidt, M. 2000, A&A, 353, 25, *Soft X-ray AGN luminosity function from it ROSAT surveys. I. Cosmological evolution and contribution to the soft X-ray background*

- Tanaka, I., Yamada, T., Aragón-Salamanca, A., Kodama, T., Miyaji, T., Ohta, K. & Arimoto, N. 2000, ApJ, 528, 123, *A Rich Cluster of Galaxies near the Quasar B2 1335+28 at  $z=1.1$ : Color Distribution and Star Formation Properties*

**R. C. Nichol:**

- York, D. G. *et al.* 2000, AJ, 120, 1579, *The Sloan Digital Sky Survey: Technical Summary*
  - Fan, X. *et al.* 2000, AJ, 120, 1167, *The Discovery of a Luminous  $Z=5.80$  Quasar from the Sloan Digital Sky Survey*
  - Holden, B. P. *et al.* 2000, AJ, 120, 23, *The Canada-France-Hawaii Telescope Optical PDCS Survey. II. Evolution in the Space Density of Clusters of Galaxies*
  - Adami, C., Holden, B. P., Castander, F. J., Nichol, R. C., Mazure, A., Ulmer, M. P., Postman, M. & Lubin, L. M. 2000, AJ, 120, 1, *The Canada-France-Hawaii Telescope Optical PDCS Survey (COP). I. The Data*
  - Joffe, M. *et al.* 2000, ApJL, 534, L131, *Weak Gravitational Lensing by the Nearby Cluster Abell 3667*
  - Bramel, D. A., Nichol, R. C. & Pope, A. C. 2000, ApJ, 533, 601, *The Local Space Density of Optically Selected Clusters of Galaxies*
  - Rusin, D., Hall, P. B., Nichol, R. C., Marlow, D. R., Richards, A. M. S. & Myers, S. T. 2000, ApJL, 533, L89, *Adaptive Optics Imaging of the CLASS Gravitational Lens System B1359+154 with the Canada-France-Hawaii Telescope*
  - Romer, A. K. *et al.* 2000, ApJS, 126, 209, *The Bright SHARC Survey: The Cluster Catalog*
  - Adami, C., Ulmer, M. P., Durret, F., Nichol, R. C., Mazure, A., Holden, B. P., Romer, A. K. & Savine, C. 2000, A&A, 353, 930, *A turn-over in the galaxy luminosity function of the Coma cluster core?*
  - Holden, B. P., Nichol, R. C., Romer, A. K., Metevier, A., Postman, M., Ulmer, M. P. & Lubin, L. M. 1999, AJ, 118, 2002, *Spectroscopic Observations of Optically Selected Clusters of Galaxies from the Palomar Distant Cluster Survey*
- J. B. Peterson:**
- Peterson, J. B. *et al.* 2000, ApJL, 532, L83, *First Results from Viper: Detection of Small-scale Anisotropy at 40 GHz*
  - Joffe, M. *et al.* 1999, American Astronomical Society Meeting, 195, 2903, *Weak Lensing Mass Distributions of Nearby Clusters of Galaxies*
- A. J. Ptak:**
- Ho, L. C., Ptak, A., Terashima, Y., Kunieda, H., Serlemitsos, P. J., Yaqoob, T. & Koratkar, A. P. 1999, ApJ, 525, 168, *X-Ray Properties of the Weak Seyfert 1 Nucleus in NGC 4639*
  - Griffiths, R. E. *et al.* 2000, Advances in Space Research, 25,

853, *Deep Survey Sources, and Predictions for XMM and AXAF*

- Terashima, Y., Ho, L. C., Ptak, A. F., Mushotzky, R. F., Serlemitsos, P. J., Yaqoob, T. & Kunieda, H. 2000, ApJ, 533, 729, *ASCA Observations of "Type 2" LINERS: Evidence for a Stellar Source of Ionization*
  - Terashima, Y., Ho, L. C., Ptak, A. F., Yaqoob, T., Kunieda, H., Misaki, K. & Serlemitsos, P. J. 2000, ApJL, 535, L79, *Iron K Line Variability in the Low-Luminosity Active Galactic Nucleus NGC 4579*
  - Terashima, Y., Ho, L. C. & Ptak, A. F. 2000, ApJ, 539, 161, *Hard X-Ray Emission and the Ionizing Source in LINERS*
- A. K. Romer:**
- Holden, B. P. *et al.* 2000, AJ, 120, 23, *The Canada-France-Hawaii Telescope Optical PDCS Survey. II. Evolution in the Space Density of Clusters of Galaxies.*
  - Romer, K., Viana, P. T. P., Liddle, A. R. & Mann, R. G. 2000, *Large Scale Structure in the X-ray Universe*, Proceedings of the 20-22 September 1999 Workshop, Santorini, Greece, eds. Plionis, M. & Georgantopoulos, I., Atlantisciences, Paris, France, p.409, 409, *A Serendipitous Galaxy Cluster Survey with XMM*
  - Metevier, A. J., Romer, A. K. & Ulmer, M. P. 2000, AJ, 119, 109, *The Butcher-Oemler Effect at Moderate Redshift.*
  - Romer, A. K. *et al.* 2000, ApJS, 126, 209, *The Bright SHARC Survey: The Cluster Catalog.*
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  - Joffe, M. *et al.* 1999, American Astronomical Society Meeting, 195, 2903, *Weak Lensing Mass Distributions of Nearby Clusters of Galaxies*
  - Holden, B. P., Nichol, R. C., Romer, A. K., Metevier, A., Postman, M., Ulmer, M. P. & Lubin, L. M. 1999, AJ, 118, 2002, *Spectroscopic Observations of Optically Selected Clusters of Galaxies from the Palomar Distant Cluster Survey.*
- K. U. Ratnatunga**
- Ratnatunga, K. U., Griffiths, R. E. & Ostrander, E. J. 1999, A. J. 117, 2010, *The Top Ten List of Gravitational Lens Candidates from the HST Medium Deep Survey*
  - Ratnatunga, K. U., Griffiths, R. E. & Ostrander, E. J. 1999, A. J. 118 86, *Disk and Bulge Morphology of WFPC2 galaxies: The HST Medium Deep Survey database*