

Catherine E. Grant

Massachusetts Institute of Technology
77 Massachusetts Ave., NE80-6053
Cambridge, MA 02139-4307
617-253-0797; FAX: 617-253-8084
cgrant@space.mit.edu
<http://space.mit.edu/home/cgrant>

Research Interests: X-ray detectors, CCDs, gravitational lenses, hot interstellar medium, galaxy groups, X-ray shadows, diffuse emission

Education:

A.B. cum laude, 1993, Astronomy and Astrophysics, Harvard University
Ph.D. 1999, Astronomy and Astrophysics, Penn State University
Advisor: Dr. David N. Burrows
Thesis title: 'The Three-Dimensional Structure of the Hot Interstellar Medium'

Research Experience:

Research Scientist, ACIS Instrument Team, Dr. Mark Bautz, MIT, Sept 2003 - present
Postdoctoral Associate, ACIS Instrument Team, Dr. Mark Bautz, MIT, Sept 1999 - Sept 2003

- Analysis of ACIS observations to search for diffuse X-ray cluster/group emission in the fields of strong gravitational lenses
- Developed and maintained instrument team monitoring program for ACIS CCDs including contamination and radiation damage
- Designed and tested hardware and software CTI mitigation strategies
- Developed CCD CTI simulation used by calibration team to create response matrices
- Analyzed ACIS particle background temporal characteristics
- Supported ACIS operations and calibration efforts
- Represented ACIS instrument team at internal and external meetings

Research Assistant, Dr. David N. Burrows, Penn State, June 1995 - August 1999

- Analyzed ROSAT PSPC observations towards molecular clouds
- Determined distances to two molecular clouds from high resolution spectra to better than ~20%
- Analyzed lab calibration data for *CUBIC* (Cosmic Unresolved X-ray Background Instrument Using CCDs) and created preliminary instrument response matrix

Research Assistant, Dr. Richard A. Wade, Penn State, June 1994 - June 1995

- Compared accretion disk models to IUE UV observations of cataclysmic variables.

Additional Experience:

Radiation lab, Goddard Space Flight Center, Sept. 2002 & May 2005

- Test of low energy proton radiation damage and bakeout on ACIS-type CCDs

Coudé Feed Telescope, Kitt Peak National Observatory, Nov. 1997

- High resolution spectroscopy of interstellar Na I D absorption lines

X-ray Calibration Facility, Marshall Space Flight Center, Sept. 1996, Feb.-May 1997

- X-ray calibration of *Chandra* with simulated ACIS-2C and flight ACIS instruments

Research Affiliate, Center for Space Research, MIT, Jan. - May 1996

- X-ray calibration of quantum efficiency and spectral resolution of ACIS CCDs

National Synchrotron Light Source, Brookhaven Laboratory, Nov. 1995

- Calibration of energy-dependent X-ray transmission of ACIS Optical Blocking Filter

Teaching Experience:

- Teaching Assistant, Pennsylvania State University, 1993-1995
- Taught astronomy lab course for non-majors

Honors/Recognitions:

NASA Group Achievement Award 2001, 2003
 NASA Graduate Student Researchers Program fellowship 1997-1999
 Radcliffe Club of the Peninsula Scholar 1991-1992
 Elizabeth Cary Agassiz Certificate of Merit 1990-1993
 Dean's List, Harvard College 1990-1993
 John Hertz Scholarship 1989-1991

Professional Societies/Committee Service:

American Astronomical Society
 Phi Kappa Phi Honor Society
 Sigma Xi Scientific Society
 President, Astronomy Graduate Association, Penn State Univ., 1996-1997
 Graduate Committee, Dept. of Astronomy, Penn State Univ., 1995-1996

Refereed Publications:

- Bautz, M., Prigozhin, G., Kissel, S., LaMarr, B., Grant, C., & Brown, S. 2005, 'Anomalous Annealing of a High-resistivity CCD Irradiated at Low Temperature', *IEEE Transactions on Nuclear Science*, 52, 519
- Grant, C.E., Bautz, M.W., Chartas, G., & Garmire, G. 2004, 'Detection of x-rays from galaxy groups associated with the gravitationally lensed systems PG 1115+080 and B1422+231', *ApJ*, 610, 686
- Weisskopf, M. et al. 2003, 'An Overview of the Performance of the Chandra X-ray Observatory', *Experimental Astronomy*, 16, 1
- Markevitch, M. et al. 2003, 'Chandra Spectra of the Soft X-ray Diffuse Background', *ApJ*, 583, 70
- Carney, B.W., Latham, D.W., Laird, J.B., Grant, C.E., Morse, J.A. 2001, 'A Survey of Proper Motion Stars. XIV. Spectroscopic Binaries Among Metal-poor Field Blue Stragglers', *AJ*, 122, 3419
- Grant, C.E., & Burrows, D.N. 1999, 'Distances to the High Galactic Latitude Molecular Clouds G192-67 and MBM 23-24', *ApJ*, 516, 243

Conference Proceedings:

- Grant, C.E. & Bautz, M.W. 2007, 'Finding galaxy groups and clusters in the fields of lensed quasars', *The Extreme Universe in the Suzaku Era*, in press
- Grant, C.E., Bautz, M.W., Kissel, S., LaMarr, B., & Prigozhin, G.Y. 2006, 'Temperature dependence of charge transfer inefficiency in Chandra X-ray CCDs', *Proc. SPIE*, 6276, in press (astro-ph/0606178)
- Grant, C.E., Bautz, M.W., Kissel, S.E., LaMarr, B., & Prigozhin, G.Y. 2005, 'Long-term trends in radiation damage of Chandra X-ray CCDs', *Proc. SPIE*, 5898, 201 (astro-ph/0509035)
- O'Dell, S.L. et al. 2005, 'Managing radiation degradation of CCDs on the Chandra X-ray Observatory II', *Proc. SPIE* 5898, 212
- Grant, C.E., Bautz, M.W., Kissel, S.E., & LaMarr, B. 2004, 'A charge transfer inefficiency correction model for the Chandra Advanced CCD Imaging Spectrometer', *Proc. SPIE*, 5501, 177 (astro-ph/0407199)

- Plucinsky, P.P. et al. 2004, 'An Evaluation of a Bake-out of the ACIS Instrument on the Chandra X-ray Observatory', Proc. SPIE, 5488, 251
- Marshall, H.L., Tennant, A., Grant, C.E., Hitchcock, A.P., O'Dell, S., & Plucinsky, P.P. 2003, 'Composition of the Chandra ACIS contaminant', Proc. SPIE, 5165, 497 (astro-ph/0308332)
- Grant, C.E., Prigozhin, G.Y., LaMarr, B., & Bautz, M.W. 2003, 'Sacrificial charge and the spectral resolution performance of the Chandra Advanced CCD Imaging Spectrometer', Proc. SPIE, 4851, 140 (astro-ph/0209126)
- Plucinsky, P.P. et al. 2003, 'The Flight Spectral Response of the ACIS Instrument', Proc. SPIE, 4851, 89 (astro-ph/0209161)
- Grant, C.E., Bautz, M.W., & Virani, S.N. 2002, 'The temporal characteristics of the Chandra X-ray Observatory high energy particle background', ASP Conf. Ser. 262: High Energy Universe at Sharp Focus: Chandra Science Symposium, 401 (astro-ph/0202086)
- Virani, S.N., Plucinsky, P.P., Grant, C.E., & LaMarr, B. 2002, 'Analysis of On-Orbit ACIS Squeegie Mode Data on Chip I0', ASP Conf. Ser. 262: High Energy Universe at Sharp Focus: Chandra Science Symposium, 409 (astro-ph/0112041)
- Prigozhin, G.Y., Kissel, S.E., Bautz, M.W., Grant, C.E., LaMarr, B., Foster, R.F., & Ricker, G.R. 2000, 'Characterization of the radiation damage in the Chandra X-ray CCDs', Proc SPIE, 4140, 123
- Prigozhin, G.Y., Kissel, S.E., Bautz, M.W., Grant, C., LaMarr, B., Foster, R.F., Ricker, G.R., & Garmire, G.P. 2000, 'Radiation damage in the Chandra X-ray CCDs', Proc. SPIE, 4012, 720
- Bautz, M.W. et al. 1998, 'X-ray CCD calibration for the AXAF CCD Imaging Spectrometer', Proc. SPIE, 3444, 210
- Nousek, J.A. et al. 1998, 'Joint AXAF high-resolution mirror assembly and AXAF CCD Imaging Spectrometer Calibration at the MSFC X-ray calibration facility', Proc. SPIE, 3444, 225
- Burrows, D.N., Grant, C.E., Cawley, L.J., Garmire, G.P., Mendenhall, J.A., Nousek, J.A., Skinner, M.A. 1996, 'CUBIC: Preflight Calibration Results and Initial Operations', Proc. SPIE, 2808, 48

Recent Posters and Presentations:

- Grant, C.E. & Bautz, M.W., 'Finding galaxy groups and clusters in the fields of lensed quasars', Dec 2006, The Extreme Universe in the Suzaku Era (poster)
- Grant, C.E. & Bautz, M.W., 'Finding galaxy groups and clusters in the fields of lensed quasars', Oct 2006, HEAD meeting (poster)
- Grant, C.E. & Bautz, M.W., 'Finding Galaxy Groups in the Fields of Lensed Quasars', Nov 2005, Six Years of Science with Chandra Symposium (poster)
- Grant, C.E., 'ACIS: Instrument Status and Performance Evolution', Oct 2005, Chandra Calibration Workshop (oral presentation)
- Grant, C.E., 'CCD Detectors', Aug 2005, Fourth International X-ray Astronomy School (lecture)
- Grant, C.E., 'Evolution of ACIS Performance', Oct 2004, Chandra Calibration Workshop (oral presentation)
- Grant, C.E. & Bautz, M.W., 'Finding Groups and Clusters in the Fields of Lensed Quasars', Oct 2004, HEAD meeting (poster)
- Grant, C.E., 'Time-dependence of ACIS contamination', Oct 2003, Chandra Calibration Workshop (oral presentation)
- Grant, C.E. & Bautz, M.W., 'Four Years of ACIS: Monitoring Detector Performance', Sep 2003, "Four Years of Chandra Science Observations" Symposium (poster)

Computer Experience: SunOS/Solaris and Mac OS X operating systems. Experience with CIAO, Fortran, FTOOLS, HTML, IDL, IRAF, \LaTeX , XSPEC and C-shell scripting.