

CURRICULUM VITAE

B. Glenn Piner, Ph.D.

EDUCATION

- 1998: Ph.D., Astronomy, University of Maryland (Title: *Geodetic VLBI Observations of EGRET Blazars*)
- 1995: M.S., Astronomy, University of Maryland
- 1991: B.S., Astronomy, University of Maryland
- 1991: B.S., Physics, University of Maryland

PRESENT POSITION

- Professor (Department of Physics and Astronomy, Whittier College, Whittier, CA)

PREVIOUS POSITIONS

- 1998-2000: Caltech Postdoctoral Scholar (U.S. Space VLBI Project, Jet Propulsion Laboratory, California Institute of Technology)
- 1993-1998: Graduate Research Assistant (U.S. Naval Observatory, Earth Orientation Department and NASA Goddard Space Flight Center, Laboratory for High Energy Astrophysics)
- 1992-1994: Graduate Teaching Assistant (Department of Astronomy, University of Maryland)
- 1991-1992: Undergraduate Research Assistant (NASA Goddard Space Flight Center, Laboratory for High Energy Astrophysics)

TEACHING EXPERIENCE

Whittier College (2000-present). Courses Taught:

- INTD 100: College Writing Seminar
- INTD 217: Search for Extraterrestrial Life
- PHYS 90: Astronomy
- PHYS 100: Astronomy of the Solar System
- PHYS 101: Astronomy of Stars, Galaxies, and the Universe
- PHYS 150: Calculus-Based Physics I (Mechanics)
- PHYS 180: Calculus-Based Physics II (Electricity, Magnetism, and Thermodynamics)
- PHYS 275: Optics and Modern Physics
- PHYS 310: Mechanics
- PHYS 325: Advanced Modern Physics
- PHYS 330: Electromagnetic Theory
- PHYS 360: Astrophysics
- PHYS 499: Senior Seminar

RESEARCH AREAS

- Quasars and Active Galactic Nuclei (AGNs), Radio Astronomy: Very Long Baseline Interferometry (VLBI), Gamma-Ray Astronomy

RESEARCH EXPERIENCE

- 2000-present: Whittier College—Studied quasar jets using data from the VLBA and other radio telescopes, with funding from NASA, NSF and Research Corporation. Involved undergraduate students in all aspects of the data analysis and publication.
- 1998-2000: Jet Propulsion Laboratory—Studied AGNs using space VLBI data from the Japanese HALCA satellite. Major participant in the first large survey of quasars using a space-based radio telescope, and in studying gamma-ray sources with space and ground-based VLBI.
- 1994-1998: NASA/GSFC and U.S. Naval Observatory—Worked jointly between NASA/GSFC and the Naval Observatory to image and analyze 10 years of archival geodetic VLBI observations of gamma-ray blazars for doctoral dissertation for the University of Maryland. Analyzed EGRET gamma-ray satellite data. Monitored gamma-ray blazars at optical wavelengths at Rosemary Hill Observatory, University of Florida.

GRANTS AND FELLOWSHIPS

- Principal Investigator on NASA Fermi Guest Investigator Cycle 7 grant “Completion of an Expanded Sample of TeV Blazars as Seen by the Upgraded VLBA”, awarded November 2014, \$98 K
- Principal Investigator on NASA Fermi Guest Investigator Cycle 6 grant “The Parsec-Scale Jets of an Expanded Sample of TeV Blazars as Seen by the Upgraded VLBA”, awarded August 2013, \$95 K
- Principal Investigator on NSF grant “VLBA Observations of Blazar Jets: Continuation of a Large Survey and Detailed Studies of Extreme Sources”, awarded August 2007, \$156 K
- Principal Investigator on NSF grant “VLBA Observations of Quasar Jets: A Large Survey and Detailed Study of Extreme Sources”, awarded May 2003, \$105 K
- Principal Investigator on Research Corporation Cottrell College Science Award “The Maximum Speed of Blazar Jets”, awarded May 2003, \$35 K
- NASA Summer Faculty Fellowships: Summer 2002 and Summer 2003

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Astronomical Society

COMMITTEE MEMBERSHIPS AND SERVICE

- Chair, Department of Physics and Astronomy (2016 – 2019, 2007 – 2010)
- Faculty Executive Council (2017 – 2019)
- Institutional Review Board (2016 – 2017)
- Faculty Personnel Committee (2014 – 2016)
- Assessment Committee (2009 – 2013)
- Faculty Executive Council (2007 – 2009)
- Chair, Admissions Committee (2005 – 2006)
- Educational Policies Committee (2004 – 2005)
- Professional Interests Committee (2002 – 2004)
- Athletics Committee (2001 – 2002)
- Liberal Education Committee (2000 – 2001)

REFEREED PUBLICATIONS

“Multi-Epoch VLBA Imaging of Twenty New TeV Blazars: Apparent Jet Speeds”, B. Glenn Piner and Philip G. Edwards, 2018, *Astrophysical Journal*, 853, 68

“Multiband variability studies and novel broadband SED modeling of Mrk 501 in 2009”, M. L. Ahnen and 292 coauthors, 2017, *Astronomy & Astrophysics*, 603, A31

“Parsec-Scale Structure and Kinematics of Faint TeV HBLs”, B. Glenn Piner and Philip G. Edwards, 2016, *Galaxies*, 4, 44

“First-epoch VLBA Imaging of 20 New TeV Blazars”, B. Glenn Piner and Philip G. Edwards, 2014, *Astrophysical Journal*, 797, 25

“Very Long Baseline Polarimetry and the gamma-ray connection in Markarian 421 during the broadband campaign in 2011”, R. Lico, M. Giroletti, M. Orienti, J.L. Gómez, C. Casadio, F. D’Ammando, M.G. Blasi, W. Cotton, P.G. Edwards, L. Fuhrmann, S. Jorstad, M. Kino, Y.Y. Kovalev, T.P. Krichbaum, A.P. Marscher, D. Paneque, B.G. Piner, and K.V. Sokolovsky, 2014, *Astronomy & Astrophysics*, 571, A54

“The TeV blazar Markarian 421 at the highest spatial resolution”, M.G. Blasi, R. Lico, M. Giroletti, M. Orienti, G. Giovannini, W. Cotton, P.G. Edwards, L. Fuhrmann, T.P. Krichbaum, Y.Y. Kovalev, S. Jorstad, A. Marscher, M. Kino, D. Paneque, M.A. Perez-Torres, B.G. Piner, and K.V. Sokolovsky, 2013, *Astronomy & Astrophysics*, 559, A75

“Relativistic Jets in the Radio Reference Frame Image Database. II. Blazar Jet Accelerations from the First 10 Years of Data (1994-2003)”, B.G. Piner, A.B. Pushkarev, Y.Y. Kovalev, C.J. Marvin, J.G. Arenson, P. Charlot, A.L. Fey, A. Collioud, and P.A. Voitsik, 2012, *Astrophysical Journal*, 758, 84

“VLBA monitoring of Mrk 421 at 15 GHz and 24 GHz during 2011”, R. Lico, M. Giroletti, M. Orienti, G. Giovannini, W. Cotton, P.G. Edwards, L. Fuhrmann, T.P. Krichbaum, K.V. Sokolovsky, Y.Y. Kovalev, S. Jorstad, A. Marscher, M. Kino, D. Paneque, M.A. Perez-Torres, and G. Piner, 2012, *Astronomy & Astrophysics*, 545, A117

“Increasing the Number of TeV Blazars with Parsec-Scale Kinematics”, Vivian C. Tiet, B. Glenn Piner, and Philip G. Edwards, 2012, *2012 Fermi & Jansky Proceedings*, arXiv: 1205.2399

“VLBA monitoring of Mrk 421 at 15 and 24 GHz during 2011”, R. Lico, M. Giroletti, M. Orienti, G. Giovannini, B. Cotton, P. Edwards, L. Fuhrmann, T. Krichbaum, K. Sokolovsky, S. Jorstad, A. Marscher, M. Kino, Y. Kovalev, D. Paneque, M.A. Perez-Torres, and G. Piner, 2012, *2012 Fermi & Jansky Proceedings*, arXiv: 1205.0418

“Erratic Jet Wobbling in the BL Lacertae Object OJ287 Revealed by Sixteen Years of 7mm VLBA Observations”, Ivan Agudo, Alan P. Marscher, Svetlana G. Jorstad, Jose L. Gomez, Manel Perucho, B. Glenn Piner, Maria Rioja, and Richard Dodson, 2012, *Astrophysical Journal*, 747, 63

“Fermi Large Area Telescope Observations of Markarian 421: The Missing Piece of its Spectral Energy Distribution”, A.A. Abdo and 367 coauthors, 2011, *Astrophysical Journal*, 736, 131

“Insights into the High-energy γ -ray Emission of Markarian 501 from Extensive Multifrequency Observations in the Fermi Era”, A.A. Abdo and 453 coauthors, 2011, *Astrophysical Journal*, 727, 129

“The Jets of TeV Blazars at Higher Resolution: 43 GHz and Polarimetric VLBA Observations from 2005-2009”, B. Glenn Piner, Niraj Pant, and Philip G. Edwards, 2010, *Astrophysical Journal*, 723, 1150

“Significant Limb-Brightening in the Inner Parsec of Markarian 501”, B. Glenn Piner, Niraj Pant, Philip G. Edwards, and Kaj Wiik, 2009, *Astrophysical Journal Letters*, 690, L31

“The Parsec-Scale Jets of the TeV Blazars H 1426+428, 1ES 1959+650, and PKS 2155-304: 2001-2004”, B. Glenn Piner, Niraj Pant, and Philip G. Edwards, 2008, *Astrophysical Journal*, 678, 64

“The VSOP 5 GHz Active Galactic Nucleus Survey: V. Imaging Results for the Remaining 140 sources”, R. Dodson, E.B. Fomalont, K. Wiik, S. Horiuchi, H. Hirabayashi, P.G. Edwards, Y. Murata, Y. Asaki, G.A. Moellenbrock, W.K. Scott, A.R. Taylor, L.I. Gurvits, Z. Paragi, S. Frey, Z.Q. Shen, J.E.J. Lovell, S.J. Tingay, M.J. Rioja, S. Fodor, M.L. Lister, L. Mosoni, G. Coldwell, B.G. Piner, and J. Yang, 2008, *Astrophysical Journal Supplement*, 175, 314

“Relativistic Jets in the Radio Reference Frame Image Database I: Apparent Speeds from the First Five Years of Data”, B.G. Piner, M. Mahmud, A.L. Fey, and K. Gospodinova, 2007, *Astronomical Journal*, 133, 2357

“The Fastest Relativistic Jets: VLBA Observations of Blazars with Apparent Speeds Exceeding $25 c$ ”, B.G. Piner, D. Bhattarai, P.G. Edwards, and D.L. Jones, 2006, *Astrophysical Journal*, 640, 196

“The Parsec-Scale Jet of PKS 0637-752”, Philip G. Edwards, B. Glenn Piner, Steven J. Tingay, James E.J. Lovell, Jun Kataoka, Roopesh Ojha, and Yasuhiro Murata, 2006, *Proceedings of the Astronomical Society of Japan*, 58, 233

“VLBA Polarization Observations of Markarian 421 After a Gamma-Ray High State”, B. Glenn Piner and Philip G. Edwards, 2005, *Astrophysical Journal*, 622, 168

“The VSOP 5 GHz AGN Survey III: Imaging Results for the First 102 Sources”, W.K. Scott, E.B. Fomalont, S. Horiuchi, J.E.J. Lovell, G.A. Moellenbrock, R.G. Dodson, P.G. Edwards, G.V. Coldwell, S. Fodor, S. Frey, L.I. Gurvits, H. Hirabayashi, M.L. Lister, L. Mosoni, Y. Murata, Z. Paragi, B.G. Piner, Z.Q. Shen, A.R. Taylor, and S.J. Tingay, 2004, *Astrophysical Journal Supplement*, 155, 33

“The VSOP 5 GHz AGN Survey II: Data Calibration and Imaging”, J.E.J. Lovell, G.A. Moellenbrock, S. Horiuchi, E.B. Fomalont, W.K. Scott, H. Hirabayashi, R.G. Dodson, S.M. Dougherty, P.G. Edwards, S. Frey, L.I. Gurvits, M.L. Lister, D.W. Murphy, Z. Paragi, B.G. Piner, Z.Q. Shen, S.J. Tingay, Y. Asaki, D. Moffett, and Y. Murata, 2004, *Astrophysical Journal Supplement*, 155, 27

“The Parsec-Scale Structure and Jet Motions of the TeV Blazars 1ES 1959+650, PKS 2155-304, and 1ES 2344+514”, B. Glenn Piner and Philip G. Edwards, 2004, *Astrophysical Journal*, 600, 115

“Parsec Scale Properties of Markarian 501”, M. Giroletti, G. Giovannini, L. Feretti, W.D. Cotton, P.G. Edwards, L. Lara, A.P. Marscher, J.R. Mattox, B.G. Piner, and T. Venturi, 2004, *Astrophysical Journal*, 600, 127

“Location of the nonthermal optical emission from jets in AGN”, D.L. Jones, A.E. Wehrle, S.C. Unwin, D.L. Meier, and B.G. Piner, 2003, *New Astronomy Reviews*, 47, 681

- “The Speed and Orientation of the Parsec-Scale Jet in 3C 279”, B. Glenn Piner, Stephen C. Unwin, Ann E. Wehrle, Alma C. Zook, C. Megan Urry, and Diane M. Gilmore, 2003, *Astrophysical Journal*, 588, 716
- “The Subluminal Parsec-Scale Jet of Markarian 501”, P.G. Edwards and B.G. Piner, 2002, *Astrophysical Journal Letters*, 579, L67
- “The radio jets and accretion disk in NGC 4261”, Ann E. Wehrle, Dayton L. Jones, David L. Meier, and B. Glenn Piner, 2002, *New Astronomy Reviews*, 46, 235
- “VSOP Space VLBI and Geodetic VLBI Investigations of Southern Hemisphere Radio Sources”, S.J. Tingay, J.E. Reynolds, A.K. Tzioumis, D.L. Jauncey, J.E.J. Lovell, R. Dodson, M.E. Costa, P.M. McCulloch, P.G. Edwards, H. Hirabayashi, D.W. Murphy, R.A. Preston, B.G. Piner, G.D. Nicolson, J.F.H. Quick, H. Kobayashi, and K.M. Shibata, 2002, *Astrophysical Journal Supplement*, 141, 311
- “Quasar Astrophysics with the Space Interferometry Mission”, S.C. Unwin, A.E. Wehrle, D.L. Jones, D.L. Meier, and B.G. Piner, 2002, *Publications of the Astronomical Society of Australia*, 19, 5
- “The Parsec-scale Jets of Extragalactic TeV Gamma-ray Sources”, B.G. Piner, P.G. Edwards, S. Fodor, and T.A. Rector, 2002, *Publications of the Astronomical Society of Australia*, 19, 114
- “Orientation and Speed of the Parsec-Scale Jet in NGC 4261 (3C 270)”, B. Glenn Piner, Dayton L. Jones, and Ann E. Wehrle, 2001, *Astronomical Journal*, 122, 2954
- “The Pearson-Readhead Survey of Compact Extragalactic Radio Sources from Space. I. The Images”, M.L. Lister, S.J. Tingay, D.W. Murphy, B.G. Piner, D.L. Jones, and R.A. Preston, 2001, *Astrophysical Journal*, 554, 948
- “In the Shadow of the Accretion Disk: Higher Resolution Imaging of the Central Parsec in NGC 4261”, Dayton L. Jones, Ann E. Wehrle, B. Glenn Piner, and David L. Meier, 2001, *Astrophysical Journal*, 553, 968
- “Measuring the Brightness Temperature Distribution of Extragalactic Radio Sources with Space VLBI”, S.J. Tingay, R.A. Preston, M.L. Lister, B.G. Piner, D.W. Murphy, D.L. Jones, D.L. Meier, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, Y. Murata, H. Kobayashi, and M. Inoue, 2001, *Astrophysical Journal Letters*, 549, 55
- “Kinematics of the Parsec-Scale Relativistic Jet in Quasar 3C 279: 1991-1997”, A.E. Wehrle, B.G. Piner, S.C. Unwin, A.C. Zook, W. Xu, A.P. Marscher, H. Terasranta, and E. Valtaoja, 2001, *Astrophysical Journal Supplement*, 133, 297
- “The VSOP 5 GHz AGN Survey I. Compilation and Observations”, H. Hirabayashi and 74 coauthors, 2000, *Publications of the Astronomical Society of Japan*, 52, 997
- “Chandra Discovery of a 100 kiloparsec X-ray Jet in PKS 0637-752”, D.A. Schwartz, H.L. Marshall, J.E.J. Lovell, B.G. Piner, S.J. Tingay, M. Birkinshaw, G. Chartas, M. Elvis, E.D. Feigelson, K.K. Ghosh, D.E. Harris, H. Hirabayashi, E.J. Hooper, D.L. Jauncey, K.M. Lanzetta, S. Mathur, R.A. Preston, W.H. Tucker, S. Virani, B. Wilkes, and D.M. Worrall, 2000, *Astrophysical Journal Letters*, 540, L69
- “Space VLBI Observations of 3C 279 at 1.6 and 5 GHz”, B.G. Piner, P.G. Edwards, A.E. Wehrle, H. Hirabayashi, J.E.J. Lovell, and S.C. Unwin, 2000, *Astrophysical Journal*, 537, 91
- “The Radio Jets and Accretion Disk in NGC 4261”, Dayton L. Jones, Ann E. Wehrle, David L. Meier, and B. Glenn Piner, 2000, *Astrophysical Journal*, 534, 165
- “The First Space VLBI Image of 3C 279”, H. Hirabayashi, P.G. Edwards, A.E. Wehrle, S.C. Unwin, B.G. Piner, J.E.J. Lovell, H. Kobayashi, R. Okayasu, F. Makino, T. Kii, and E. Valtaoja, 2000, *Advances in Space Research*, 26, 689
- “The Pearson-Readhead Survey from Space”, R.A. Preston, S.J. Tingay, D.W. Murphy, D.L. Meier, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, H. Kobayashi, M. Inoue, and B.G. Piner, 2000, *Advances in Space Research*, 26, 661
- “Space VLBI Observations of 3C 279 with HALCA”, P.G. Edwards, H. Hirabayashi, J.E.J. Lovell, B.G. Piner, S.C. Unwin, and A.E. Wehrle, 1999, *Astronomische Nachrichten*, 320, 230
- “VSOP and Ground-based VLBI Observations of Markarian 421”, B.G. Piner, S.C. Unwin, A.E. Wehrle, P.G. Edwards, A.L. Fey, and K.A. Kingham, 1999, *New Astronomy Reviews* (Proceedings of the 4th EVN/JIVE Symposium), 43, 711

“VSOP Space VLBI Observations of Pearson-Readhead Survey Sources”, S.J. Tingay, R.A. Preston, B.G. Piner, M.L. Lister, D.W. Murphy, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, H. Kobayashi, and M. Inoue, 1999, *New Astronomy Reviews* (Proceedings of the 4th EVN/JIVE Symposium), 43, 723

“VSOP and Ground-based VLBI Imaging of the TeV Blazar Markarian 421 at Multiple Epochs”, B.G. Piner, S.C. Unwin, A.E. Wehrle, P.G. Edwards, A.L. Fey, and K.A. Kingham, 1999, *Astrophysical Journal*, 525, 176

“Observations of OJ 287 from the Geodetic VLBI Archive of the Washington Correlator”, C.E. Tateyama, K.A. Kingham, P. Kaufmann, B.G. Piner, L.C.L. Botti, and A.M.P. de Lucena, 1999, *Astrophysical Journal*, 520, 627

“Geodetic VLBI Observations of EGRET Blazars”, B. Glenn Piner and Kerry A. Kingham, 1998, *Astrophysical Journal*, 507, 706

“Observations of BL Lac from the Geodetic VLBI Archive of the Washington Correlator”, C.E. Tateyama, K.A. Kingham, P. Kaufmann, B.G. Piner, A.M.P. de Lucena, and L.C.L. Botti, 1998, *Astrophysical Journal*, 500, 810

“A Slower Superluminal Velocity for the Quasar 1156+295”, B. Glenn Piner and Kerry A. Kingham, 1997, *Astrophysical Journal Letters*, 485, L61

“VLBI Observations of the Gamma-Ray Blazar 1611+343”, B. Glenn Piner and Kerry A. Kingham, 1997, *Astrophysical Journal*, 479, 684

“Preliminary Results from EGRET Phase 3 Observations of the Virgo Region”, C. Von Montigny, D.L. Bertsch, B.L. Dingus, J.A. Esposito, C.E. Fichtel, R.C. Hartman, S.D. Hunter, G. Kanbach, D.A. Kniffen, Y.C. Lin, M. Merck, H.A. Mayer-Hasselwander, R. Mukherjee, P.F. Michelson, P.L. Nolan, G. Piner, E. Schneid, and D.J. Thompson, 1996, *Astronomy & Astrophysics Supplement*, 120, 519C

“Nuclear Rings and Mass Inflow in Hydrodynamic Simulations of Barred Galaxies”, B. Glenn Piner, James M. Stone, and Peter J. Teuben, 1995, *Astrophysical Journal*, 449, 508

“EGRET Detection of High-Energy Gamma Radiation from the OVV Quasar 3C 454.3”, R.C. Hartman, D.L. Bertsch, B.L. Dingus, C.E. Fichtel, S.D. Hunter, G. Kanbach, D.A. Kniffen, Y.C. Lin, J.R. Mattox, H.A. Mayer-Hasselwander, P.F. Michelson, C. Von Montigny, P.L. Nolan, B.G. Piner, E. Schneid, P. Sreekumar, and D.J. Thompson, 1993, *Astrophysical Journal Letters*, 407, L41

OTHER PUBLICATIONS

“The Doppler crisis in TeV blazars and its possible resolutions”, B. Glenn Piner and Philip G. Edwards, 2017, *The Fourteenth Marcel Grossmann Meeting*, p. 3074

“Towards Parsec-Scale Jet Speed Measurements for the Full TeV Blazar Sample”, B. Glenn Piner and Philip G. Edwards, 2016, *Bulletin of the American Astronomical Society*, 228, 314.06

“VLBA Monitoring of New TeV Blazars”, B.G. Piner and P.G. Edwards, 2015, in *Relativistic Jets: Creation, Dynamics, and Internal Physics*, published online at <http://www.oa.uj.edu.pl/jets2015/Posters.html>

“Parsec scale polarization properties of the TeV blazar Markarian 421”, R. Lico, M. Giroletti, M. Orienti, J.L. Gomez, C. Casadio, F. D'Ammando, M.G. Blasi, W. Cotton, P.G. Edwards, L. Fuhrmann, S. Jorstad, M. Kino, Y.Y. Kovalev, T.P. Krichbaum, A.P. Marscher, D. Paneque, B.G. Piner, and K.V. Sokolovsky, 2015, in *Proceedings of the 12th European VLBI Network Symposium*, 025

“First-Epoch VLBA Images of Twenty Fainter TeV Blazars”, B. Glenn Piner and Philip G. Edwards, 2014, *Bulletin of the American Astronomical Society*, HEAD meeting 14, 106.13

“The Parsec-Scale Structure of the Newer TeV Blazars”, B. Glenn Piner and Philip G. Edwards, 2013, *European Physical Journal Web of Conferences*, 61, 4021

“Very Long Baseline Polarimetric monitoring at 15 GHz of the TeV blazar Markarian 421”, R. Lico, C. Casadio, J.L. Gomez, M. Giroletti, M. Orienti, G. Giovannini, M.G. Blasi, W. Cotton, P.G. Edwards, L. Fuhrmann, S. Jorstad, M. Kino, Y.Y. Kovalev, T.P. Krichbaum, A. Marscher, D. Paneque, M.A. Perez-Torres, G. Piner, and K.V. Sokolovsky, 2013, *European Physical Journal Web of Conferences*, 61, 7004

“Multi-frequency study of the TeV blazar Markarian 421 with VLBA observations taken during 2011”, R. Lico, M. Giroletti, M. Orienti, G. Giovannini, W. Cotton, P.G. Edwards, L. Fuhrmann, Y.Y. Kovalev, T.P. Krichbaum, S. Jorstad, M. Kino, A. Marscher, D. Paneque, M.A. Perez-Torres, B.G. Piner, and K.V. Sokolovsky, 2012, in *Proceedings of the 11th European VLBI Network Symposium*, 024

“Doubling the Sample of Jet Speed Measurements for the TeV Blazars”, B. Glenn Piner, V.C. Tiet, and P.G. Edwards, 2011, *Bulletin of the American Astronomical Society*, 218, 327.05

“A Complete Set of VSOP Observations of 3C279”, N.D. Pant, B.G. Piner, P.G. Edwards, H. Hirabayashi, A.E. Wehrle, and S.C. Unwin, 2009, in *Approaching Micro-Arcsecond Resolution with VSOP-2: Astrophysics and Technologies*, eds. Yoshiaki Hagiwara, Ed Fomalont, Masato Tsuboi, and Yasuhiro Murata, (ASP: San Francisco), p. 213

“Prospects for Observing Quasars and AGN with the Space Interferometry Mission”, Ann E. Wehrle, N. Zacharias, K. Johnston, D. Boboltz, A. Fey, R. Gaume, D.L. Meier, D.W. Murphy, D.L. Jones, R. Ojha, B. Piner, and S.C. Unwin, 2009, *Bulletin of the American Astronomical Society*, 213, 456.01

“Quasar astrophysics with the Space Interferometry Mission”, S.C. Unwin, A.E. Wehrle, D.L. Meier, D.L. Jones, and B.G. Piner, 2008, in *A Giant Step: from Milli- to Micro-arcsecond Astrometry*, IAU Symposium No. 248, p. 288

“Accretion Disks, Jets and Black Holes: Precision Astrometry of Quasars with SIM”, Stephen C. Unwin, A. Wehrle, D. Jones, D. Meier, and G. Piner, 2007, *Bulletin of the American Astronomical Society*, 211, 45.20

“The Misalignment Angle Distribution of Relativistic Jets from the Radio Reference Frame Image Database”, B.G. Piner, 2006, in *Challenges of Relativistic Jets*, Published online at <http://www.oa.uj.edu.pl/2006jets/posters.html>

“New VLBA Observations Of The Parsec-Scale Structures Of The TeV Blazars 1ES 1426+428, 1ES 1959+650, And PKS 2155-304”, B.G. Piner, N. Pant, and P.G. Edwards, 2006, *Bulletin of the American Astronomical Society*, HEAD meeting 9, 7.43

“Confirmation of Apparent Speeds Exceeding $25c$ in the Jets of Three EGRET Blazars”, B.G. Piner, D. Bhattarai, P.G. Edwards, and D.L. Jones, 2006, in *Blazar Variability Workshop II: Entering the GLAST Era*, eds. H. R. Miller, K. Marshall, J. R. Webb, and M. F. Aller, (ASP: San Francisco), p. 163

“QSO Astrophysics with the Space Interferometry Mission”, D. Londish, A.E. Wehrle, S.C. Unwin, D.L. Jones, D.L. Meier, and B.G. Piner, 2006, in *Blazar Variability Workshop II: Entering the GLAST Era*, eds. H. R. Miller, K. Marshall, J. R. Webb, and M. F. Aller, (ASP: San Francisco), p. 225

“How Stable will the Post-SIM Radio-Optical Frame Tie Be?”, D.L. Jones, A.E. Wehrle, S.C. Unwin, D.L. Meier, and B.G. Piner, 2005, *Bulletin of the American Astronomical Society*, 207, 117.08

“Blazars (VLBA & GLAST)”, B. G. Piner, 2005, in *Future Directions in High Resolution Astronomy: The 10th Anniversary of the VLBA*, eds. J. Romney and M. Reid, (ASP: San Francisco), p. 55

“The VSOP 5 GHz Continuum Survey: The Initial Imaging Results”, W.K. Scott, A.R. Taylor, S. Horiuchi, E.B. Fomalont, M.L. Lister, G.A. Moellenbrock, R.G. Dodson, P.G. Edwards, H. Hirabayashi, Y. Murata, Z.Q. Shen, J.E.J. Lovell, S. Tingay, S. Frey, L. Mosoni, L. Gurvits, Z. Paragi, G. Piner, S. Fodor, and G.V. Coldwell, 2005, in *Future Directions in High Resolution Astronomy: The 10th Anniversary of the VLBA*, eds. J. Romney and M. Reid, (ASP: San Francisco), p. 125

“The AGN Key Project for SIM Planetquest”, A.E. Wehrle, S.C. Unwin, D.L. Jones, D.L. Meier, B.G. Piner, and D. Londish, 2005, *Bulletin of the American Astronomical Society*, 206, 14.15

“Confirmation of Apparent Speeds Exceeding $25c$ in Three Blazar Jets”, B.G. Piner, D. Bhattarai, P.G. Edwards, and D.L. Jones, 2004, *Bulletin of the American Astronomical Society*, 205, 110.14

“Current Results from the RRFID Kinematic Survey: Apparent Speeds from the First Five Years of Data”, B.G. Piner, A.L. Fey, and M. Mahmud, 2004, in *Proceedings of the 7th Symposium of the European VLBI Network on New Developments in VLBI Science and Technology*, eds. R. Bachiller, F. Colomer, J.F. Desmurs, and P. de Vicente, p. 99

“Radio Observations of VERITAS Sources: Imaging the Parsec-Scale Jets”, B.G. Piner, 2004, *Bulletin of the American Astronomical Society*, HEAD meeting 8, 30.03

- “Relativistic Jet Speeds from the Radio Reference Frame Image Database: The 60 Best-Observed Sources”, B.G. Piner, A.L. Fey, M. Mahmud, and K. Gospidinova, 2003, *Bulletin of the American Astronomical Society*, 203, 92.07
- “VLBI Observations of TeV Gamma-Ray Emitting AGN”, Philip G. Edwards and Glenn Piner, 2003, in *Quasar Cores and Jets*, 25th meeting of the IAU, Joint Discussion 18
- “Tracking the moving optical photocenters of active galaxies: binary black holes, accretion disks and relativistic jets”, Ann E. Wehrle, Stephen C. Unwin, Dayton L. Jones, David L. Meier, and B.G. Piner, 2003, *Proceedings of the SPIE*, 4852, 152
- “Binary Black Holes, Accretion Disks and Relativistic Jets: Photocenters of Nearby AGN and Quasars”, Ann E. Wehrle, Dayton L. Jones, David L. Meier, B. Glenn Piner, and Stephen C. Unwin, 2002, in *Science with the Space Interferometry Mission*, eds. Stephen Unwin and Slava Turyshev, p. 22
- “Relativistic Jet Speeds from the Radio Reference Frame Image Database: The 23 Best-Observed Sources”, B.G. Piner, A.L. Fey, J. Milne, and M. Mahmud, 2002, *Bulletin of the American Astronomical Society*, 200, 45.01
- “VSOP Observations of 3C 279”, P.G. Edwards, H. Hirabayashi, and B.G. Piner, 2001, in *Asia-Pacific Radio Science Conference AP-RASC '01*, p. 390
- “Chandra Observations of the PKS 0637-752 X-ray Jet”, D.A. Schwartz, M. Elvis, D.E. Harris, E.J. Hooper, W.H. Tucker, S. Virani, B. Wilkes, H.L. Marshall, J.E.J. Lovell, S.J. Tingay, D.L. Jauncey, B.G. Piner, R.A. Preston, M. Birkinshaw, D.M. Worrall, G. Chartas, E.D. Feigelson, K.K. Ghosh, H. Hirabayashi, K.M. Lanzetta, and S. Mathur, 2001, in *X-ray Astronomy 2000*, eds. R. Giacconi, S. Serio, and L. Stella, (ASP: San Francisco), p.493
- “Quasar Astrometry with the Space Interferometry Mission”, S.C. Unwin, A.E. Wehrle, D.L. Jones, D.L. Meier, and B.G. Piner, 2001, *Bulletin of the American Astronomical Society*, DDA meeting 32, 03.05
- “TeV Blazars on the Milli-Arcsecond Scale”, P.G. Edwards, B.G. Piner, S. Fodor, and T.A. Rector, 2001, in *High Energy Gamma-Ray Astronomy*, eds. F.A. Aharonian and H.J. Volk, (AIP: Melville, NY), p. 672
- “The Parsec-Scale Structure of TeV Blazars”, B.G. Piner, P.G. Edwards, and S. Fodor, 2001, in *Blazar Demographics and Physics*, Eds. P. Padovani and C.M. Urry, (ASP: San Francisco), p. 18
- “Binary Black Holes, Accretion Disks, and Relativistic Jets: Photocenters of Nearby AGN and Quasars”, A.E. Wehrle, D.L. Jones, D.L. Meier, B.G. Piner, and S.C. Unwin, 2001, *Bulletin of the American Astronomical Society*, 198, 62.15
- “The Parsec-Scale Jets of Extragalactic TeV Gamma-Ray Sources”, B.G. Piner, P.G. Edwards, S. Fodor, and T.A. Rector, 2001, *Bulletin of the American Astronomical Society*, 198, 73.01
- “Spatial Analysis of the PKS0637-752 X-ray Jet”, D.A. Schwartz, H.L. Marshall, J.E.J. Lovell, S.J. Tingay, D.L. Jauncey, B.G. Piner, R.A. Preston, M. Birkinshaw, D.M. Worrall, G. Chartas, E.D. Feigelson, M. Elvis, E.J. Hooper, W.H. Tucker, S. Virani, K.K. Ghosh, H. Hirabayashi, K.M. Lanzetta, and S. Mathur, 2000, *Bulletin of the American Astronomical Society*, 197, 75.13
- “Orientation of the Parsec-Scale Jet and Accretion Disk in NGC 4261”, B.G. Piner, D.L. Jones, A.E. Wehrle, and D.L. Meier, 2000, *Bulletin of the American Astronomical Society*, 197, 134.08
- “Results of a VLBI Monitoring Campaign on TeV Blazars”, B.G. Piner, P.G. Edwards, S. Fodor, and T.A. Rector, 2000, *Bulletin of the American Astronomical Society*, HEAD meeting 5, 05.11
- “VLBI and space VLBI of TeV gamma-ray sources”, P.G. Edwards, B.G. Piner, and S. Fodor, 2000, in *EVN Symposium 2000, Proceedings of the 5th European VLBI Network Symposium*, p. 39
- “The Pearson-Readhead Survey from Space”, R.A. Preston, S.J. Tingay, M. Lister, B.G. Piner, D.W. Murphy, D.L. Jones, D.L. Meier, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, H. Kobayashi, and M. Inoue, 2000, in *Galaxies and their Constituents at the Highest Angular Resolution*, IAU Symposium No. 205
- “Co-ordinated VSOP and Chandra Observations of 0836+710”, D.W. Murphy, H. Marshall, C. Canizares, P. Coppi, R. Preston, G. Piner, M. Lister, and P. Edwards, 2000, in *Galaxies and their Constituents at the Highest Angular Resolution*, IAU Symposium No. 205
- “VLBI Observations of Extragalactic TeV Gamma-Ray Sources”, P.G. Edwards, B.G. Piner, and D.W. Murphy, 2000, in *Galaxies and their Constituents at the Highest Angular Resolution*, IAU Symposium No. 205

- “The Sub-Parsec Structure of Accretion Disks as Revealed by VLBI Imaging of Free-Free Absorption”, D.L. Jones, A.E. Wehrle, B.G. Piner, and D.L. Meier, 2000, in *Galaxies and their Constituents at the Highest Angular Resolution*, IAU Symposium No. 205
- “Higher Resolution Observations of the Accretion Disk in NGC 4261”, D.L. Jones, A.E. Wehrle, B.G. Piner, and D.L. Meier, 2000, *Bulletin of the American Astronomical Society*, 196, 50.20
- “3C 279 Results Derived from Two-Frequency VSOP Observations”, H. Hirabayashi, P.G. Edwards, B.G. Piner, A.E. Wehrle, S.C. Unwin, J.E.J. Lovell, R. Okayasu, T. Kii, and F. Makino, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 25
- “VLBI Monitoring of 3C 279 at 22 and 43 GHz: 1991-1997”, B.G. Piner, A.E. Wehrle, S.C. Unwin, A.C. Zook, W. Xu, and A.P. Marscher, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 55
- “VSOP Observations of a Sub-Parsec Accretion Disk”, D.L. Jones, A.E. Wehrle, B.G. Piner, and D.L. Meier, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 71
- “The VSOP Survey II: Reduction Methods”, G.A. Moellenbrock, J. Lovell, S. Horiuchi, E. Fomalont, H. Hirabayashi, R. Dodson, S. Dougherty, P. Edwards, S. Frey, L. Gurvits, M. Lister, D. Murphy, Z. Paragi, G. Piner, W. Scott, Z. Shen, S. Tingay, Y. Asaki, D. Jauncey, G. Langston, D. Meier, D. Moffet, Y. Murata, R. Preston, R. Taylor, and K. Wajima, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 177
- “The VSOP Survey III Statistical Results”, J.E.J. Lovell, S. Horiuchi, G. Moellenbrock, H. Hirabayashi, E. Fomalont, R. Dodson, S. Dougherty, P. Edwards, S. Frey, L. Gurvits, M. Lister, D. Murphy, Z. Paragi, B. Piner, W. Scott, Z.Q. Shen, S. Tingay, M. Inoue, Y. Murata, K. Wajima, B. Carlson, K.M. Shibata, J. Quick, M. Costa, A. Tzioumis, C. Trigilio, J. Nakajima, H. Xinyong, and W. Wei, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 183
- “The Impact of Minimal Ground Antenna Coverage on the VSOP Survey”, Matthew L. Lister, B. Glenn Piner, and S.J. Tingay, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 189
- “The Pearson-Readhead Survey From Space”, R.A. Preston, M.L. Lister, S.J. Tingay, B.G. Piner, D.W. Murphy, D.L. Meier, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, H. Kobayashi, and M. Inoue, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 199
- “The Pearson-Readhead Survey at 43 GHz”, Matthew L. Lister, R.A. Preston, B. Glenn Piner, and S.J. Tingay, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 203
- “VSOP and ATCA Observations of PKS 0637-752”, J.E.J. Lovell, S.J. Tingay, B.G. Piner, D.L. Jauncey, R.A. Preston, D.W. Murphy, P.M. McCulloch, M.E. Costa, G. Nicolson, H. Hirabayashi, J.E. Reynolds, A.K. Tzioumis, D.L. Jones, M.L. Lister, D.L. Meier, M. Birkinshaw, G. Chartas, E.D. Feigelson, G.P. Garmire, K.K. Ghosh, H.L. Marshall, S. Mathur, R.M. Sambruna, D.A. Schwartz, W.H. Tucker, B. Wilkes, and D.M. Worrall, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 215
- “VSOP and Chandra Observations of 0836+710”, D.W. Murphy, R.A. Preston, B.G. Piner, M.L. Lister, H. Marshall, and P.G. Edwards, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 219
- “VSOP Observations of TeV Gamma-Ray Sources”, P.G. Edwards, B.G. Piner, S.C. Unwin, A.E. Wehrle, D.W. Murphy, H. Hirabayashi, and K. Fujisawa, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p. 235
- “VSOP Observations of Bright, Compact Southern Hemisphere AGN”, S.J. Tingay, J.E. Reynolds, D.L. Jauncey, A.K. Tzioumis, R.A. Preston, D.W. Murphy, D.L. Jones, D.L. Meier, M.E. Costa, D. Moffet, P.M. McCulloch, G. Nicolson, E.A. King, P.G. Edwards, B.G. Piner, J.E.J. Lovell, H. Hirabayashi, M. Tornikoski, A. Mucke, H. Bignall, and R.W. Clay, 2000, in *Astrophysical Phenomena Revealed by Space VLBI*, eds. H. Hirabayashi, P.G. Edwards, and D.W. Murphy, (ISAS: Sagamihara), p.313
- “Space VLBI Observations of 3C 279 at 1.6 and 5 GHz”, B.G. Piner, P.G. Edwards, A.E. Wehrle, H. Hirabayashi, J.E.J. Lovell, and S.C. Unwin, 2000, in *Proceedings of the 5th Compton Symposium*, eds. M.L. McConnell and J.M. Ryan, (AIP: Melville, NY), p. 308

“VLBA and VSOP Monitoring of the Relativistic Jet in Quasar 3C 279”, B.G. Piner, P.G. Edwards, H. Hirabayashi, J.E.J. Lovell, A.P. Marscher, S.C. Unwin, A.E. Wehrle, W. Xu, and A.C. Zook, 2000, *Bulletin of the American Astronomical Society*, 195, 15.04

“Space VLBI Observations of the Pearson-Readhead AGN Survey”, M.L. Lister, R.A. Preston, S.J. Tingay, B.G. Piner, D.W. Murphy, D.L. Jones, D.L. Meier, T.J. Pearson, A.C.S. Readhead, H. Hirabayashi, H. Kobayashi, and M. Inoue, 2000, *Bulletin of the American Astronomical Society*, 195, 56.04

“VSOP and Ground-based VLBI Imaging of the TeV Blazar Markarian 421 at Multiple Epochs”, B.G. Piner, S.C. Unwin, A.E. Wehrle, P.G. Edwards, A.L. Fey, and K.A. Kingham, 1999, *Bulletin of the American Astronomical Society*, 194, 50.30

“High Resolution VLBA Observations of NGC 4261”, D.L. Jones, A.E. Wehrle, and B.G. Piner, 1999, *Bulletin of the American Astronomical Society*, 194, 50.18

“Geodetic VLBI Observations of EGRET Blazars”, B. Glenn Piner, 1998, *Bulletin of the American Astronomical Society*, 192, 16.02

“Superluminal Motion in the Gamma Ray Blazar 1611+343”, B. Glenn Piner and Kerry A. Kingham, 1996, in *Blazar Continuum Variability*, Eds. H.R. Miller, J.R. Webb, and J.C. Noble, (ASP: San Francisco), p. 279

“Towards 3-D Hydrodynamical Simulations of Gas Orbits in Barred Galaxies”, B. Glenn Piner, James M. Stone, and Peter J. Teuben, 1993, *Bulletin of the American Astronomical Society*, 183, 76.05

“Unidentified High Energy Gamma Ray Sources Detected by EGRET at High Galactic Latitudes”, R. C. Hartman, D.L. Bertsch, C.E. Fichtel, S.D. Hunter, D.J. Thompson, G. Kanbach, H.A. Mayer-Hasselwander, C. von Montigny, K. Pinkau, D.A. Kniffen, Y.C. Lin, P.F. Michelson, P.L. Nolan, J.R. Mattox, B.G. Piner, E. Schneid, P. Sreekumar, and B.L. Dingus, 1992, *Bulletin of the American Astronomical Society*, 183, 76.05