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## CURRICULUM VITAE

**Sebastian Heinz**  
**Assistant Professor**

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### Research Interests in Theoretical/High Energy Astrophysics:

- *Astrophysical objects:* Relativistic jets, black holes, AGNs, X-ray binaries, Cosmology, Galaxy clusters, gamma-ray bursts, interstellar and intergalactic medium
- *Processes:* Non-thermal radiation mechanisms, plasma processes, particle acceleration, dissipation, particle production, shocks, multi-phase gases
- *Methods:* Analytic descriptions of radiation and hydro/MHD scenarios, numerical fluid mechanics, statistical studies of multi-variate data sets, 3D visualization, kinetic theory

### Professional and Educational History:

- 2006-present Assistant Professor, University of Wisconsin, Madison
- 2003-2006 Center for Space Research, MIT: Chandra Postdoctoral Fellow
- 2000-2003 Max-Planck Institut für Astrophysik, Germany: Postdoctoral Fellow
- 1995-2000 University of Colorado, Boulder: M.S., Ph.D.
- 1992-1995 Universität Tübingen, Germany: undergraduate & graduate Physics
- 1991-1992 Leibniz Kolleg Tübingen, Germany: Studium Generale
- 1988 Narrabundah College, Canberra, Australia, study abroad program
- 1978-1991 Rudolf-Steiner-Schule Hamburg-Wandsbek, Germany: Abitur

### Scholarships, awards, memberships in professional organizations:

- 2003-2006 Chandra Fellowship
- 1995-1997 Fulbright Scholarship
- 1995-2000 University of Colorado Graduate Fellowship
- 2005-2009 Member of the American Astronomical Society

## Recent Invited Talks:

- March 2009 “Black hole scatology: The interaction of microquasars with the ISM”, high energy seminar, Center for Relativistic Astrophysics, Georgia Tech, Atlanta
- February 2009 “Black hole scatology: The interaction of microquasars with the ISM”, colloquium, University of Florida, Gainesville
- February 2009 “Black hole exhaust: An environmental impact study of microquasars”, Harvard/CfA colloquium, Cambridge
- December 2008 “Black hole scatology: The interaction of microquasars with the ISM”, Theoretical Astrophysics Center Seminar, Berkeley
- July 2008 “Jet-Disk connections and the central hypothesis”, invited talk, *putting gravity to work: from black holes to clusters*, Cambridge, UK
- April 2008 “Microquasars and the ISM”, invited colloquium, University of Virginia
- January 2008 “Feedback in Galaxy Clusters”, invited review, *211th AAS meeting*, Austin, Texas
- October 2007 “Microquasars and their environment”, invited review, *a population explosion: the nature and evolution of X-ray binaries in diverse environments*, St. Petersburg Beach, Florida
- September 2007 “Microquasars as High Energy Sources - from GLAST to ICE CUBE”, invited review, *High Energy Phenomena in Relativistic Jets*, Dublin, Ireland
- July 2007 “Microquasars as High Energy Sources”, invited high energy seminar, Max-Planck Institute for Nuclear Physics, Heidelberg, Germany
- April 2007 “Astrophysical Jets as Sources of High Energy Particles”, invited review talk at *Ice Cube workshop*, Lake Geneva, WI
- October 2006 “Microquasars and their impact on the Galaxy”, invited review, *2006 HEAD meeting*, San Francisco
- September 2006 “The interaction of Microquasars with the ISM”, invited review, *6th Microquasar Workshop*, Como, Italy
- June 2006 “Microquasar jets and the ambient medium”, invited reievew, conference on *Challenges of Relativistic Jets*, Cracow, Poland
- March 2006 “Scaling laws for microquasars”, invited talk at Sakler conference on *The history of the nuclear black holes in galaxies*, Harvard University, Massachusetts
- February 2006 “Jets and the growth of large scale structure”, colloquium, University of Chicago

## Teaching Record:

### Advising:

- 2006-2008 Supervising two postdocs
- 2006-2008 Supervising two graduate students
- 2007-2008 Supervised one undergraduate UW-Madison student.
- 2004-2006 Supervised 2 MIT undergraduate students.
- 2000-2003 Co-supervised graduate student at University of Colorado on project about radio galaxy/cluster interactions. CU Boulder

### Graduate:

- 2008 Astronomy 700 "Radiative Processes in Astrophysics"
- 2007 Astronomy 700 "Radiative Processes in Astrophysics"
- 2007 Guest lectured UW-Physics class on plasma physics
- 2007 Guest lectured UW Physics 772 High Energy Astroph. (3 weeks)
- 2000 Substitute lectured in graduate class on Internal Processes on MHD waves and the physics of shocks. CU Boulder.

### Undergraduate:

- 2008 Astronomy 335 "Cosmology"
- 2007 Guest lecturer for UW Astronomy 340 "Planetary Science"
- 2006 Taught UW Astronomy 113 - "The Hand-on Universe"
- 2000 Guest lectured class on black holes for non-science majors, CU Boulder.
- 1997-1998 Teaching Assistant, Astro 1010, CU Boulder

### Outreach and professional advancement

- 2009 Organizer and host of 10 week / 20 hour PLATO public lecture series on black holes (UW Space Place).
- 2009 Public lecture at UW Space Place on black hole feedback in galaxy clusters
- 2008 Public lecture on Black Holes at UW Fall Day
- 2008 Public lecturer at UW Space Place (lecture on the neutron star Circinus X-1. lecture series on black holes)
- 2008 PI for SEED grant proposal to the Astronomical Society of the Pacific to support outreach at UW Space Place
- 2007 NASA/UW Madison joint press release on first detected X-ray jet from a Neutron star X-ray binary

- 2007 Participated in STEMES/CIRTL workshop, Howard University
- 2005 Teacher at “Chandra Astrophysics Institute”: Four week summer program for local High School students (funded by *Chandra* EPO proposal)

### Academic Service Record:

- 2006-present Department/University committees:
  - ★ Strategic planning (2008-2009)
  - ★ Web design committee (2008-2009)
  - ★ Graduate admissions (2006-2008)
  - ★ Computing (2006-2009), chair (2009)
  - ★ Alternate senate representative (2006-2008)
  - ★ Graduate curriculum (2006-2007)
- 2008-present Member of executive committee/LOC/SOC for UW-Madison conference on “The Monster’s Fiery Breath: Feedback in galaxies, groups, and clusters” (June 2009)
- 2007-present Member of Constellation-X / IXO Science Team Panel on feedback and cluster physics
- 2007-present Member of AUI committee on Radio Astronomy Futures, drafting advisory document for Decadal Report
- 2006-present Regular member on review panels (including NSF, NASA, Canadian Research Council, Austrian Research Foundation)
- 1999-present Regular referee for Astrophysical Journal, Astronomical Journal, Monthly Notices of the Royal Astronomical Society, Astronomy & Astrophysics, Science
- 2008 Member of the SOC, conference “Radio Galaxies in the Chandra Era”, Cambridge, MA
- 2006 Organizer for weekly UW-Madison coffee/tea/astro-ph meetings
- 2004-2005 Implemented and organized department morning coffee meetings at MIT
- 2001-2003 Co-organizer for German node in EU Research & Training Network “Gamma Ray Bursts - an Enigma and a Tool”
- 2000-2003 Co-organized weekly MPA non-thermal processes seminar
- 2002 Member of the SOC for the conference "The Physics of Relativistic Jets in the Chandra/XMM Era", 23-27 September 2002, Bologna, Italy
- 2001 Member of the SOC/LOC for the "Ringberg workshop on Relativistic Jets", 5-7 September 2001, Ringberg Castle, Germany

## Successful P.I. Proposals:

- 2008 “Shaken, then stirred: The interaction of sound waves with X-ray cavities and bubbles in galaxy clusters”, AO10, *Chandra theory proposal*, P.I.: S. Heinz
- 2008 “From hot spots to shocked shells: The interaction of microquasars with the ISM”, AO10, *Chandra theory proposal*, 100 ksec, P.I.: S. Heinz
- 2008 “Hot on the trail of Circinus X-1: The first X-ray jet from an accreting neutron star”, AO10, *Chandra*, 100 ksec, P.I.: S. Heinz
- 2007 “The interaction of Microquasars with the ISM”, UW Graduate School Fall Research Competition (insurance grant against 2008 Chandra theory proposal)
- 2007 “Setting a speed trap for Cyg X-1: Measuring jet power and ISM density”, WIYN, 3 night - re-proposed.
- 2007 “Shocking the Cradle: Jet Induced Feedback in Galaxy Clusters from Growing Black Holes”, NSF
- 2006 “Setting a speed trap for Cyg X-1: Measuring jet power and ISM density”, WIYN, 1 night, P.I.: S. Heinz
- 2006 “The ring of fire: Constraining the jet power of Cygnus X-1 from its shocked shell”, AO8, *Chandra*, 50 ksec, P.I.: S. Heinz
- 2006 “A snapshot X-ray/radio survey of AGNs selected from the long menu of SDSS”, AO8, *Chandra*, 200 ksec, P.I.: S. Heinz
- 2004 “The answer is blowing in the wind: simulations of jets in non-spherical clusters of galaxies”, AO6, *Chandra theory proposal*, P.I.: S. Heinz
- 2004 “Observing the infrared jet of Cyg X-1”, AO1, *Spitzer Space Telescope*, 2.1hrs, P.I.: S. Heinz
- 2002 “Gamma Ray Bursts, an enigma and a tool”, framework 5, *European Research Network*, wrote German node contribution, Network P.I.: Ed Van den Heuvel
- 2002 “RXTE Observations of X1822-37”, *RXTE*, 120 ksec, P.I.: S. Heinz

## Successful Co-I Proposals:

- 2007 “AGN monitoring in support of Ice Cube”, UW Graduate School Fall Research Competition, Co-PI: T. Montaruli
- 2007 Director’s discretionary time HRC observation of Circinus X-1, Chandra, 50 ksec, P.I.: P. Jonker

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- 2007 “A Chandra Survey on Nearby X-shaped Radio Galaxies”, Chandra, 70 ksec, P.I.: C.S. Reynolds
  - 2004 “Measuring the high energy spectrum of SS433”, *RXTE*, 40 ksec, P.I.: H. Marshall
  - 2004 “Cygnus A - shock heating of the intra-cluster medium”, AO6, *Chandra X-ray Observatory*, 200 ksec., P.I.: A.J. Young
  - 2004 “The History of AGN Activity in M87 and the Interaction of Nuclear Outbursts with the Surrounding Atmosphere”, AO6, *Chandra X-ray Observatory*, 500 ksec., P.I.: W,R, Forman
  - 2004 “Deep ACIS-S observations of Abell 4059/PKS2354-35”, AO6, *Chandra X-ray Observatory*, 100 ksec, P.I.: C.S. Reynolds
  - 2004 “A Chandra Study of Two Nearby, Powerful Radio Galaxies in Poor Environments”, AO6, *Chandra X-ray Observatory*, 45 ksec, P.I.: R. Kraft
  - 2004 NASA EPO proposal “The Chandra Astrophysics Institute”, P.I.: I. Porro
  - 2003 “VLA Observations of PKS 2354-35”, *VLA*, 10 hrs., P.I.: C.S. Reynolds
  - 2002 “The Structure and Physics of Extragalactic Jets”, AO5, *Chandra X-ray Observatory*, 40 ksec, P.I.: E. Perlman
  - 2001 “4U 2129+47: From ADIOS to ADAF or Isolated Neutron Star?”, *Chandra X-ray Observatory*, 38 ksec, P.I.: M.A. Nowak
  - 1998 “Chandra X-ray Observations of Abell 4059”, AO1, *Chandra X-ray Observatory*, 40 ksec, P.I.: C.S. Reynolds
  - 1998 “UV Imaging of Radio Jets”, *Hubble Space Telescope*, 23 orbits, P.I.: S. Baum
  - 1997 “RXTE Observations of M87”, *RXTE*, 40 ksec, P.I.: C.S. Reynolds

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## PUBLICATION RECORD

### Sebastian Heinz

#### First Author Publications in Refereed Journals:

- “Blazing Trails: Microquasars as head-tail sources and the seeding of magnetized plasma into the ISM”, **Heinz, S.**, Grimm, H.J., Sunyaev, R.A., & Fender, R., 2008, *Astrophysical Journal*, 686, 1145
- “Evidence of a Parsec-Scale X-Ray Jet from the Accreting Neutron Star Circinus X-1”, **Heinz, S.**, Schulz, N., Brandt, N., & Galloway, D., 2007, *Astrophysical Journal Letters*, 663, L93
- “The kinetic luminosity function of AGN jets and the efficiency of jet production by growing black holes”, **Heinz, S.**, Merloni, A., & Schwab, J., 2007, *Astrophysical Journal Letters*, 658, L9
- “The answer is blowing in the wind: Simulating the interaction of jets with dynamic cluster atmospheres”, **Heinz, S.**, Brüggem, M., Young, A., & Levesque, E., 2006, *Monthly Notices of the Royal Astronomical Society*, 373, L65
- “Composition, collimation, contamination: The jet of Cygnus X-1”, **Heinz, S.**, 2006, *Astrophysical Journal*, 636, 316
- “Heating the bubbly medium of galaxy clusters with weak shocks and sound waves”, **Heinz, S.** & Churazov, E., 2005, *Astrophysical Journal Letters*, 634, L141
- “Estimating the kinetic luminosity function of X-ray binaries”, **Heinz, S.** & Grimm, H.J., 2005, *Astrophysical Journal*, 633, 384
- “Constraints on the role of synchrotron X-rays from jets of accreting black holes”, **Heinz, S.**, 2004, *Monthly Notices of the Royal Astronomical Society*, 355, 835
- “Constraints on relativistic beaming from estimators of the unbeamed flux”, **Heinz, S.**, & Merloni, A., 2004, *Monthly Notices of the Royal Astronomical Society*, 355, L1
- “Ram pressure stripping and the formation of cold fronts”, **Heinz, S.**, Churazov, E., Forman, W., Jones, C., & Briel, U. 2003, *Monthly Notices of the Royal Astronomical Society*, 346, 13
- “The non-linear dependence of flux on black hole mass and accretion rate in core-dominated jets”, **Heinz, S.** & Sunyaev, R.A. 2003, *Monthly Notices of the Royal Astronomical Society* 343, L59-L64
- “Radio lobe dynamics and the environment of microquasars”, **Heinz, S.** 2002, *Astronomy & Astrophysics* 388, L40-43
- “Cosmic rays from microquasars: A new narrow component to the CR spectrum?”, **Heinz, S.** & Sunyaev, R.A. 2002, *Astronomy & Astrophysics* 390, 751-766

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- “*Chandra* ACIS-S observations of Abell 4059: Signs of dramatic interaction between a radio galaxy and a galaxy cluster”, **Heinz, S.**, Choi, Y.-Y., Reynolds, C.S., & Begelman, M.C. 2002, *Astrophysical Journal Letters* 569, 79-82
  - “The flared disk project - simultaneous *RXTE/ASCA* observations of X1822-371”, **Heinz, S.** & Nowak, M.A. 2001, *Monthly Notices of the Royal Astronomical Society*, 320, 249-260
  - “Jet acceleration by tangled magnetic fields”, **Heinz, S.** & Begelman, M.C. 2000, *Astrophysical Journal*, 535, 104-117
  - “A shotgun model for gamma ray bursts”, **Heinz, S.** & Begelman, M.C. 1999, *Astrophysical Journal Letters*, 527, L35-38
  - “X-ray signatures from evolving radio galaxies”, **Heinz, S.**, Reynolds, C.S. & Begelman, M.C. 1998, *Astrophysical Journal*, 501, 126-136
  - “Analysis of the synchrotron emission from the M87 Jet”, **Heinz, S.** & Begelman, M.C. 1997, *Astrophysical Journal*, 490, 653-663

### Second Author Publications in Refereed Journals:

- “A Parsec scale X-ray extended structure from the X-ray binary Circinus X-1”, Soleri, P., Heinz, S., Fender, R., Wijnands, R., Tudose, V., Altamirano, D., Jonker, P., van der Klis, M., Kuiper, L., Kaiser, C., Casella, P., 2008, *Monthly Notices of the Royal Astronomical Society*, accepted for publication.
- “A synthesis model for AGN evolution: supermassive black holes growth and feedback modes”, Merloni, A. & Heinz, S., 2008, *Monthly Notices of the Royal Astronomical Society*, 388, 1011
- “A Deep *Chandra* Observation of Abell 4059: A New Face to ‘Radio-Mode’ AGN Feedback?”, Reynolds, C.S., Casper, E., & **Heinz, S.**, 2008, *Astrophysical Journal*, 679, 1181
- “Measuring the kinetic power of AGN in the radio mode”, Merloni, A. & **Heinz, S.**, 2007, *Monthly Notices of the Royal Astronomical Society*, 381, 589
- “Shock heating by Fanaroff-Riley type I radio sources in galaxy clusters”, Brüggem, M., **Heinz, S.**, Roediger, E., Ruszkowski, M., Simionescu, A., 2007, *Monthly Notices of the Royal Astronomical Society Letter*, 380, L67
- “Filaments, Bubbles, and Weak Shocks in the Gaseous Atmosphere of M87”, Forman, W., Jones, C., Churazov, E., Markevitch, M., Nulsen, P., Vikhlinin, A., Begelman, M., Böhringer, H., Eilek, J., **Heinz, S.**, Kraft, R., Owen, F., Pahre, M., *Astrophysical Journal*, 2007, 665, 1057

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- “Morphology of fossil bubbles in magnetized intracluster medium”, Ruszkowski, M., Ensslin, T., Brueggen, M., **Heinz, S.**, & Pfrommer, C., accepted for publication in Monthly Notices of the Royal Astronomical Society
  - “A radio-emitting outflow in the quiescent state of A0620-00: implications for modelling low-luminosity black hole binaries”, Gallo, E., Fender, R.P., Miller-Jones, J.C.A., Merloni, A., Jonker, P.G., **Heinz, S.**, Maccarone, T., & van der Klis, M., 2006, Monthly Notices of the Royal Astronomical Society, 370, 1351
  - “Why the fundamental plane of black hole activity is not simply a distance driven artifact”, Merloni, A., Koerding, E., **Heinz, S.**, Markoff, S., Di Matteo, T., & Falcke, H., 2006, NewA, 11, 567
  - “Reflections of AGN outbursts in the gaseous atmosphere of M87”, Forman, W., Nulsen, P., **Heinz, S.**, Owen, F., Eilek, J., Vikhlinin, A., Markevitch, M., Kraft, R., Churazov, E., & Jones, C., 2005, Astrophysical Journal, 635, 894
  - “A dark jet dominates the power output of the stellar black hole Cygnus X-1”, Gallo, E., Fender, R., Kaiser, C., Russell, D., Morganti, R., Oosterloo, T., **Heinz, S.**, 2005, Nature, 436, 819
  - “Is the IR coincidence just that?”, Nowak, M.A., Wilms, J., **Heinz, S.**, Pooley, G., Pottschmidt, K., & Corbel, S., 2005, Astrophysical Journal, 626, 1006
  - “The halo, hot spots and jet/cloud interaction of PKS 2153-69”, Young, A., Wilson, A., Tingay, S., & **Heinz, S.**, 2005, Astrophysical Journal, 622, 830
  - “Long term variability of Cygnus X-1. III. Radio-X-ray correlations”, Gleissner, T.; Wilms, J.; Pooley, G. G.; Nowak, M. A.; Pottschmidt, K.; Markoff, S.; **Heinz, S.**; Klein-Wolt, M.; Fender, R. P.; Staubert, R., 2004, Astrophysical Journal, 606, 185
  - “Observations of A4059 with Chandra, Hubble Space Telescope, and the Very Large Array: Unraveling a complex cluster/radio galaxy interaction”, Choi, Y.-Y.; Reynolds, C.S.; **Heinz, S.**; Rosenberg, J.L.; Perlman, E.S.; Yang, J., 2004, Astrophysical Journal, 606, 185
  - “A fundamental plane of black hole activity”, Merloni, A., **Heinz, S.**, & DiMatteo, T. 2003, Monthly Notices of the Royal Astronomical Society 345, 1057
  - “Hiding in plain sight: Chandra observations of the quiescent neutron star 4U 2129+47 in eclipse”, Nowak, M., **Heinz, S.**, & Begelman, M.C. 2002, Astrophysical Journal 573, 778-788
  - “Radio and X-ray detectability of buoyant radio plasma bubbles in clusters of galaxies”, Ensslin, T. & **Heinz, S.** 2002, Astronomy & Astrophysics 384, L27-31
  - “The hydrodynamics of dead radio galaxies”, Reynolds, C.S., **Heinz, S.**, & Begelman, M.C. 2002, Monthly Notices of the Royal Astronomical Society 332, 271-282

- “Shocks and sonic booms in the intracluster medium: X-ray shells and radio galaxy activity”, Reynolds, C.S., **Heinz, S.**, & Begelman, M.C. 2001, *Monthly Notices of the Royal Astronomical Society*, 549, L179-183
- “A Rossi X-Ray Timing Explorer study of M87 and the core of the virgo cluster”, Reynolds, C.S., **Heinz, S.**, Fabian, A.C., & Begelman, M.C. 1999, *Astrophysical Journal* 521, 99-102

### Proceedings articles:

- “Jets as high energy sources: Clues for particle content and energetics”, Heinz, S., 2008, in *Proceedings of Dublin-HEPRO meeting*, eds.: F. Aharonian & F. Rieger
- “The interaction of microquasar jets with the ISM”, Heinz, S., 2008, in *Proceedings of A population explosion: The Nature and Evolution of X-ray Binaries in Diverse Environments*, eds.: R. Bandyopadhyaya & S. Wachter
- “Modeling the Relativistic Jets in SS 433 Using Chandra X-ray Spectroscopy”, Marshall, H., Canizares, C., Heinz, S., Hillwig, T., Mioduszewski, A., & Schulz, N., 2008, in *Relativistic Astrophysics Legacy and Cosmology*, eds.: B. Aschenbach, V. Burwitz, G. Hasinger, & B Leibundgut
- “Jet feedback in clusters: Simulating the interaction of jets with dynamic cluster atmospheres”, **Heinz, S.**, Brueggen, M., Ruszkowski, M., Young, A., & Levesque, E., 2007, in *Proceedings of the conference on Extragalactic Jets: Theory and Observation from Radio to Gamma Rays*, eds. T. Rector
- “Cosmological evolution of the AGN Kinetic Luminosity Function”, Merloni, A. & **Heinz, S.**, 2007, in *Proceedings of the 238th IAU symposium, Black holes: from stars to galaxies - across the range of masses*, eds. V. Karas & G. Matt
- “The answer is blowing in the wind: The first 3D simulations of jets in realistic galaxy clusters”, **Heinz, S.**, Brueggen, M., Young, A., & Levesque, E., 2007 in *Proceedings of Cooling flows in galaxies and clusters of galaxies*, eds. H. Boehringer
- “The interaction of microquasar jets with the ISM”, **Heinz, S.**, 2007, in *Proceedings of VIth Microquasar Workshop, Microquasars and beyond*, eds. Belloni, T.
- “Why the fundamental plane of black hole activity is not a distance driven artifact”, **Heinz, S.**, Merloni, & DiMatteo, T., 2005, in *Proceedings of Triggering Relativistic Jets*, eds. W.H. Lee & E.R. Ruiz
- “The jet/ISM interaction in three nearby radio galaxies as seen with Chandra”, Kraft, R., Forman, W.R., Churazov, E., Eilek, J., Hardcastle, M., **Heinz, S.**, Jones, C., Markevitch, M., Murray, S., Nulsen, P, Owen, F, Vikhlinin, A., & Worrall, D., 2005, in *Proceedings of X-Ray and Radio Connections*, eds. L.O. Sjouwerman and K.K Dyer

- “Scale invariant jets: from binaries to AGNs”, **Heinz, S.**, Sunyaev, R., Merloni, A., & DiMatteo, T., 2004, in Proceedings of *Accretion on all mass scales*, eds. Maccarone, T., & Fender, R.P.
- “A fundamental plane of black hole activity: Pushing forward the unification scheme”, Merloni, A., **Heinz, S.**, DiMatteo, T., 2004, in Proceedings of *Accretion on all mass scales*, eds. Maccarone, T., & Fender, R.P.
- “Outbursts from supermassive black holes and their impacts on the hot gas in elliptical galaxies”, Forman, W.; Jones, C.; Churazov, E.; **Heinz, S.**; Kraft, R.; Markevitch, M.; Nulsen, P.; Vikhlinin, A., 2004, in Proceedings of *Growing black holes: Accretion in the cosmological context*, eds. Merloni, A., Nayakshin, S., Sunyaev, R.
- “The importance of outflows for black hole growth”, **Heinz, S.**, Sunyaev, R., Merloni, A., & DiMatteo, T., 2004, in Proceedings of *Growing black holes: Accretion in the cosmological context*, eds. Merloni, A., Nayakshin, S., Sunyaev, R.
- “The interaction of radio galaxies with the intracluster medium”, **Heinz, S.** & Ensslin, T., 2003, in Proceedings of *The Riddle of Cooling Flows in Galaxies and Clusters of Galaxies*, eds. Reiprich, T. H., Kempner, J. C., and Soker, N.
- “The interaction of relativistic jets with their environment”, **Heinz, S.**, 2003, *NewAR* 47, 565-567
- “Cosmic rays from microquasars”, **Heinz, S.** & Sunyaev, R.A. 2002, in Proceedings of the 4<sup>th</sup> Microquasar Workshop, eds. Ph. Durouchoux, Y. Fuchs, & J. Rodriguez (Kolkata: Center for Space Physics), 132-134
- “Simple scaling and the non-linear mass-luminosity relation in radio sources”, **Heinz, S.** & Sunyaev, R. A. 2002, in *Lighthouses of the Universe: The Most Luminous Celestial Objects and Their Use for Cosmology*, eds. M. Gilfanov, R. Sunyaev, E. Churazov (Berlin: Springer), 453-455
- “The synchrotron emission from the M87 jet”, **Heinz, S.** & Begelman, M.C. 1999, in *The Radio Galaxy M87*, eds. J. Röser & K. Meisenheimer, (Berlin, New York: Springer, Lecture Notes in Physics, 530), 229-234

### Abstracts and memos:

- “Dynamics of the SS 433 Jets from High Resolution X-ray Spectroscopy”, Marshall, H., Hillwig, T., Mioduszewski, A., **Heinz, S.**, Schulz, N., & Canizares, C., 2008, *211th AAS meeting*
- “Gone With The Wind: Interactive Feedback In Galaxy Clusters”, **Heinz, S.**, Brueggen, M., Ruszkowski, M., & Young, A., 2008, *211th AAS meeting*
- “The interaction of microquasars with the ISM - a review”. **Heinz, S.**, 2006, *HEAD meeting*

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- “Heating galaxy clusters with weak shocks and sound waves”. **Heinz, S.**, Churazov, E., & Levesque, E., 2006, *American Astronomical Society Meeting 207*
  - “Chandra HETG spectroscopy of the nucleus of M81”, Young, A., Canizares, C., Cheung, T., **Heinz, S.**, Jimenez-Garate, M., Markoff, S., Marshall, M., Nowak, M., 2005, *Six Years of Science with Chandra*
  - “Harassing the neighbors: A review of how jets interact with their environment”, **Heinz, S.**, 2005, *American Astronomical Society Meeting 206*
  - “Outflow signatures in highly resolved X-ray spectra of Circinus X-1”, Schulz, N. S.; Brandt, W. N.; Galloway, D. K.; Chakrabarty, D.; **Heinz, S.**, 2005, *American Astronomical Society Meeting 206*
  - “A jet is a jet, big or small: Making the connection between accretion and ejection”, **Heinz, S.**, Merloni, A., DiMatteo, T., & Sunyaev, R., 2004, *AAS/High Energy Astrophysics Division*,
  - “The halo, hot spots and jet / cloud interaction of PKS 2153--69”, Young, A., Wilson, A. S., Tingay, S.J., & **Heinz, S.**, 2004, *AAS/High Energy Astrophysics Division, Meeting #8*
  - “Reflections of AGN outbursts in the gaseous atmosphere of M87”, Jones, C.; Nulsen, P.; **Heinz, S.**; Owen, F.; Eilek, J.; Vikhlinin, A.; Markevitch, M.; Kraft, R.; Churazov, E.; Forman, W., 2004, *5th COSPAR Scientific Assembly*
  - “Total eclipse of the quiescent neutron star 4U2129+47”, Nowak, M.A. & **Heinz, S.**, 2001, *Two Years of Science with Chandra*
  - “Jet acceleration and dissipation”, **Heinz, S.** & Begelman, M., 1998, *19th Texas Symposium on Relativistic Astrophysics and Cosmology, Paris, France*
  - “An RXTE study of M87 and the core of the virgo cluster”, Reynolds, C.S., **Heinz, S.**, Fabian, A.C., & Begelman, M.C., 1998, *Technical Report, Colorado University, Boulder*.
  - “X-ray Signatures of evolving radio galaxies”, **Heinz, S.**, Reynolds, C.S., & Begelman, M.C., 1998, *AAS/High Energy Astrophysics Division, Meeting #5*

### Theses:

- Ph.D. Thesis: “Beams, bursts, bubbles, and bullets: Relativistic outflows in astrophysics”, **Heinz, S.** 2000, University of Colorado, 179 pages
- Masters Thesis: “Analysis of the synchrotron emission from the M87 jet”, **Heinz, S.** 1997, University of Colorado, 56 pages
- Honors Thesis: “The influence of interferon and hydrogen peroxide on neurlblastoma tumors cells” (German), **Heinz, S.** & Röben, P., 1992, Leibniz Kolleg, 110 pages