February 1, 2010

Attention: Maxim Markevitch, Astrophysicist
Smithsonian Astrophysical Observatory
MS 3
60 Garden St
Cambridge, MA 02138
USA

Dear Dr. Markevitch:

Please accept the attached application for your advertised postdoctoral position. A major part of my past and on-going research has focused on better understanding feedback from active galactic nuclei (AGN). As such, I am interested in the formation and evolution of supermassive black holes, the accretion modes which fuel AGN activity, and how AGN interact with, and alter, their host environments.

I feel SAO is an excellent fit for me, and the SAO research environment will benefit from my addition. My expertise in radio and X-ray astronomy – in addition to experience with infrared, optical, and UV analysis – ideally suits me for your advertised position. I am also eager to expand my research into theoretical modeling, specifically to consolidate our understanding of radio galaxies and their environments into a unified model which describes isolated FR-Is through FR-IIs in dense clusters. The SAO high-energy astrophysics group is an excellent place to pursue this goal.

Along with this letter are my CV, a list of publications, and a brief summary of my research interests. Letters of recommendation from Megan Donahue, Brian McNamara, Mark Voit, and Chris Carilli can be obtained via their contact information in my CV. Please do not hesitate to contact me if there is any further information I can provide as you review my application.

Thank you for your consideration.

Sincerely,

Dr. Kenneth W. Cavagnolo
University of Waterloo

Dr. Kenneth W. Cavagnolo
Curriculum Vitae

Last updated February 1, 2010; Hyperlinks colored blue

University of Waterloo
Department of Physics & Astronomy
200 University Avenue West
Waterloo, Ontario, Canada N2L 3G1

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519-888-4567 ext. 35074
kencavagnolo@gmail.com
www.pa.msu.edu/people/cavagnolo/

Education

Michigan State University — 2005 - 2008
Ph.D., Astronomy & Astrophysics

Michigan State University — 2002 - 2005
M.S., Astronomy & Astrophysics, *magna cum laude*

Georgia Institute of Technology — 1998 - 2002
B.S., Physics, *magna cum laude*

Research Experience

Postdoctoral Fellow — 2008 - Present
Supervisor: Brian McNamara, *Univ. of Waterloo*

Graduate Research Assistant — 2003 - 2008
Supervisor: Megan Donahue, *Mich. St. Univ.*

Graduate Research Assistant — 2002 - 2003
Supervisor: Jack Baldwin, *Mich. St. Univ.*

Undergraduate Research Assistant — 2000 - 2002
Supervisor: James Sowell, *Geor. Inst. of Tech.*

Research Program & Interests

My research program is focused on better understanding the connection between AGN and their host environments, with a specific interest in the role of AGN feedback on the formation and evolution of galaxies, galaxy groups, and galaxy clusters.

Areas of interest:
- Mechanical and radiative AGN feedback
- Cosmic magnetic fields
- Conditions for quasar-mode vs. radio-mode dominance
- Black hole accretion mechanisms
- Thermalization of AGN feedback energy
- Formation of ICM thermal instabilities
- Galaxy cluster radio halos
- Cosmological studies via structure formation

Honors

- Referee for ApJ, ApJL, AJ, and CanTAC — 2008 - Present
- Sherwood K. Haynes Award for Outstanding Graduate Student — 2008

- MSU College of Natural Science Dissertation Fellow 2007 - 2008
- ΣΞ National Scientific Research Society Member 2009 - Present
- ΣΠΣ National Physics Honor Society Member 2001 - Present
- American Astronomical Society Member 2002 - Present
- American Physical Society Member 2002 - Present
- Perimeter Institute Black Hole Reading Group Member 2009 - Present
- Dean's List, Georgia Inst. of Tech. 1998-2002

Scientific Skills

- Extensive experience with X-ray and radio data analysis
- Familiarity with infrared, optical, and UV data analysis
- Understanding of AIPS, CASA, CIAO, IRAF, OSA, and SAS analysis software
- Fluent in HTML, IDL, LaTeX, and PERL programming languages
- Working knowledge of C, FORTRAN, MySQL, PYTHON, SUPERMONGO, and TCL
- Mastery of DOS, Linux, Macintosh, and Windows computing architectures
- Expert of computer maintenance, system construction, and troubleshooting

Observing Experience

Giant Metrewave Radio Telescope (GMRT) Jan. 2010
60 hours observing 15 galaxy clusters

Chandra X-ray Observatory (CXO) Jan. 2009
21 hour queued observation of IRAS 09104+4109

Very Large Array Radio Telescope (VLA) Dec. 2008
39 hours observing 13 giant ellipticals

Accepted Proposals & Grants

GMRT Cycle 17, Co-I 2009
The Power and Particle Content of Extragalactic Radio Sources
PI: Somak Raychaudhury, *Univ. Birmingham*

GMRT Cycle 17, Co-I 2009
The Morphology of Steepest Spectrum Radio Sources in Galaxy Cluster Cores
PI: Alastair Edge, *Durham Univ.*

NOAO Cycle 2008A & 2009A/B, Co-I 2008-2009
Normalization and scatter of the $M - T$ relation for supermassive galaxy clusters
PI: Rachel Mandelbaum, *Princeton Univ.*

GMRT Cycle 16, Co-I 2008
The Content of Giant Cavities in the IGM of Galaxy Clusters
PI: Somak Raychaudhury, *Univ. Birmingham*

CXO Cycle 10, PI 2008
IRAS 09104+4109: An Extreme Brightest Cluster Galaxy

CXO Cycle 10, Co-I 2008
Conduction and Multiphase Structure in the ICM
PI: Mark Voit, *Mich. St. Univ.*

	Spitzer Cycle 5, Co-I Star Formation and AGN Feedback in BCGs PI: Megan Donahue, *Mich. St. Univ.*	2008
	Spitzer Cycle 5, Co-I Infrared Properties of a Control Sample of Brightest Cluster Galaxies PI: Megan Donahue, *Mich. St. Univ.*	2008
	NSF Grant, Co-I Star Formation in the Universe's Largest Galaxies PI: Mark Voit, *Mich. St. Univ.*	2008
	CXO Cycle 9, Co-I Quantifying Cluster Temperature Substructure PI: Mark Voit, *Mich. St. Univ.*	2007
	VLA A-configuration Cycle, Co-I Radio Feedback in Clusters and Galaxies PI: Brian McNamara, *Univ. Waterloo*	2007
Students Advised	Clif Kirkpatrick, Ph.D. candidate, *Univ. Waterloo* The 2-Dimensional metal abundance distributions in galaxy clusters	2008-present
	Mina Rohanizadegan, M.Sc. candidate, *Univ. Waterloo* Constraining the spin of SMBHs using measured AGN jet powers	2008-present
	Brad Whuiska, Undergraduate research, *Univ. Waterloo* Finding the largest galactic cores in the HST archive	2009-present
	Rob Myers, Undergraduate research, *Univ. Waterloo* In search of radio galaxies via X-ray and radio catalog cross-correlation	2009-present
Teaching Experience	Substitute Instructor Course: "Visions of the Universe"	Fall 2006
	Honors Physics Tutor Course: "Introductory Honors Physics I & II"	Summer 2003
	Graduate Teaching Assistant Course: "Visions of the Universe"	2002 - 2003
References	Megan Donahue, donahue@pa.msu.edu Tenured professor, Michigan State University	+00-1-517-884-5618
	Brian McNamara, mcnamara@uwaterloo.ca Tenured professor, University of Waterloo	+00-1-519-888-4567 ext. 38170
	G. Mark Voit, voit@pa.msu.edu Tenured professor, Michigan State University	+00-1-517-884-5619

Chris Carilli, ccarilli@nrao.edu +00-1-575-835-7306
National Radio Astronomy Observatory Chief Scientist

Personal Interests

- Academic: Environmental sciences, “Cradle2Cradle” design, and urban planning.
- Athletics: Triathlons, running, baseball, and Georgia Tech athletics.
- Hobbies: Backpacking, reading, building model airplanes, and raising bonsai trees.

Dr. Kenneth W. Cavagnolo
List of Publications

Last updated February 1, 2010; Hyperlinks colored blue

In Preparation

"A Relationship Between AGN Jet Power and Radio Luminosity"
K. Cavagnolo, B. McNamara, P. Nulsen, C. Carilli, C. Jones, W. Forman, & L. Bîrzan
Submitted to ApJ

"Mechanical Feedback from the Obscured Quasar in IRAS 09104+4109"
K. Cavagnolo, M. Donahue, B. McNamara, G. M. Voit, & M. Sun
Submitted to MNRAS

"A Multiwavelength Analysis of the Galaxy Cluster RBS 797: Evidence for a Cluster-scale Line-of-Sight AGN Outburst"
K. Cavagnolo, B. McNamara, P. Nulsen, M. Wise, M. Gitti, & M. Brüggen
In prep. for ApJ

"Entropy Scaling Relations of ACCEPT Galaxy Clusters"
K. Cavagnolo, G. M. Voit, M. Donahue, & S. Bruch
In prep. for ApJL

"The Complications of SMBH Spin Axis Reorientation and Implications for AGN Feedback Models"
K. Cavagnolo, B. McNamara, & N. Afshordi
In prep. for ApJL

"Normalization and Scatter of the Mass-Temperature relation for Supermassive Galaxy Clusters"
R. Mandelbaum, R. Nakajima, G. Bernstein, **K. Cavagnolo**, M. Donahue, C. Keeton, J. Hughes, N. Bahcall, T. Schrabback, N. Padmanabhan, S. Miyazaki, & A. Kravtsov
In prep. for ApJ

"Constraining the Spin of Supermassive Black Holes Using Measured AGN Jet Powers"
M. Rohanizadegan, B. McNamara, F. Kazemzadeh, P. Nulsen, & **K. Cavagnolo**
In prep. for ApJ

"Identifying AGN Feedback Relics Via Steep Spectrum Radio Sources"
A. Edge, **K. Cavagnolo**, H. Röttgering, B. McNamara, M. Wise, M. Brüggen, R. van Weeren, G. Brunetti, & J. Croston
In prep. for MNRAS

First Author Refereed Papers

"Intracluster Medium Entropy Profiles for a Chandra Archival Sample Of Galaxy Clusters"
K. Cavagnolo, M. Donahue, G. M. Voit, & M. Sun
ApJ Accepted, 2009

"An Entropy Threshold for Strong Hα and Radio Emission in the Cores of Galaxy Clusters"
K. Cavagnolo, M. Donahue, G. M. Voit, & M. Sun
ApJ Accepted, 2008

"Bandpass Dependence of X-Ray Temperatures in Galaxy Clusters"
K. Cavagnolo, M. Donahue, G. M. Voit, & M. Sun
ApJ Accepted, 2008

Co-Author Refereed Papers

"Direct Evidence for an Outflow of Metal-Enriched Gas Along the Radio Jets of Hydra A"
C. Kirkpatrick, M. Gitti, **K. Cavagnolo**, B. McNamara, L. David, P. Nulsen, & M. Wise
ApJL Accepted, 2009

"A Chandra X-ray Analysis of Abell 1664: Cooling, Feedback and Star Formation in the Central Cluster Galaxy"
C. Kirkpatrick, B. McNamara, D. Rafferty, P. Nulsen, L. Birzan, F. Kazemzadeh, M. Wise, M. Gitti, & **K. Cavagnolo**
ApJ Accepted, 2009

"Conduction and the Star Formation Threshold in Brightest Cluster Galaxies"
G. M. Voit, **K. Cavagnolo**, M. Donahue, D. Rafferty, B. McNamara, & P. Nulsen
ApJ Accepted, 2008

"Star Formation, Radio Sources, Cooling X-Ray Gas and Galaxy Interactions in the Brightest Cluster Galaxy in 2A0335+096"
M. Donahue, M. Sun, C. O'Dea, G. M. Voit, & **K. Cavagnolo**
AJ Accepted, 2007

"s-Process Abundances in Planetary Nebulae"
B. Sharpee, Y. Zhang, R. Williams, E. Pellegrini, **K. Cavagnolo**, J. Baldwin, M. Phillips, & X. Liu
ApJ Accepted, 2007

"Entropy Profiles in the Cores of Cooling Flow Clusters of Galaxies"
M. Donahue, D. Horner, **K. Cavagnolo**, & G. M. Voit
ApJ Accepted, 2006

Presented Work & Talks

POSTER: *"IRAS 09104+4109: At the Cross-roads of Massive Galaxy Formation?"*
Jun. 2010 – From Massive Galaxy Formation to Dark Energy; University of Tokyo-Kashiwa

POSTER: *"Probing SMBH Accretion History Via Radio Luminosities"*
Apr. 2010 – What drives the growth of black holes?; Durham University

TALK: *"The AGN Jet Power and Radio Power Relationship for Isolated Giant Elliptical Galaxies"*
Jun. 2009 – The Monster's Fiery Breath: Feedback in galaxies, groups, and clusters; University of Wisconsin-Madison

INVITED TALK: *"Using Galaxy Clusters as Galaxy Formation Labs"*
Oct. 2008 – Undergraduate Seminar Series; University of Waterloo

INVITED TALK: *"Understanding Cluster Cores: The Role of Core Entropy"*
Sep. 2008 – The Cool, Cooler and Cold - Cluster Cooling Flows in a New Light; Leiden University

INVITED TALK: *"Investigating Feedback and Relaxation in Clusters of Galaxies"*
Jul. 2008 – Center for Study of Cosmic Evolution; Michigan State University

INVITED TALK: *"From Cluster Cosmology to Galaxy Formation in Under One Hour"*
Mar. 2008 – Astrophysics Seminar; University of Waterloo

INVITED TALK: *"The Effect of Cluster Feedback on High-Precision Cosmology"*
Feb. 2008 – NASA Space Science and Technology Center; University of Alabama-Huntsville

INVITED TALK: *"Understanding Feedback in Galaxy Clusters"*
Jan. 2008 – Center for Study of Cosmic Evolution; Michigan State University

INVITED TALK: *"Band Dependence of X-ray Temperatures"*
Oct. 2007 – Astrophysics Seminar; University of Michigan

POSTER: *"The Entropy-Feedback Connection and Quantifying Cluster Virialization"*
Oct. 2007 – Eight Years of Science with Chandra; University of Alabama-Huntsville

POSTER: *"Chandra Studies of Dark Matter and Galaxy Formation: Signatures from the Intracluster Medium"*
Dec. 2006 – American Astronomical Society Meeting

PROCEEDING: *"Abundances of s-process elements in planetary nebulae: Br, Kr & Xe"*
Jul. 2006 – International Astronomical Union Symposium

POSTER: *"Studies of Entropy Distributions in X-ray Luminous Clusters of Galaxies"*
Dec. 2005 – American Astronomical Society Meeting

POSTER: *"Entropy Distributions in the Cores of Nearby X-ray Luminous Clusters of Galaxies"*
Dec. 2004 – American Astronomical Society Meeting

POSTER: *"Radio-Free Cluster Cooling Flows"*
Dec. 2004 – American Astronomical Society Meeting