

Curriculum Vitae

Aristotle Socrates

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Personal Information

Born January 25, 1977, New York, NY, USA
Citizenship: United States

Education

B.S. Applied Physics, Columbia University 1999
M.A. Physics, UC Santa Barbara 2002
PhD Physics, UC Santa Barbara 2004
Adviser: Omer Blaes

Previous Positions Held

Graduate research student, University of California, Santa Barbara
Hubble and Lyman Spitzer Jr. Fellow, Dept. of Astrophysical Sciences, Princeton University, Sept. 2004 - Aug. 2008

Current Position

John Bahcall Fellow, Long-Term (5-year) Member, Institute for Advanced Study, Princeton

Awards

John Bahcall Fellow, Institute for Advanced Study, Princeton
Hubble Fellow
Lyman Spitzer Jr. Fellow, Princeton University
TAC Fellow, UC Berkeley (declined)
CITA Fellowship, University of Toronto (declined)
Fellowship, Max Planck Institute for Astronomy, Garching (declined)
ITC Fellow, Harvard University (declined)

Research Areas

High energy astrophysics, extra-solar planets, theory of tides, galaxy formation, magnetohydrodynamics and astrophysical turbulence, accretion, black holes, supernovae, gamma-ray bursts, galaxy formation, astronomy with small telescopes.

Professional Service

Referee, *The Astrophysical Journal*, *The Astrophysical Journal Letters*, *Monthly Notices of the Royal Astronomical Society*, *Physics of Plasmas*, *Nature*

Refereed and Submitted Publications

- “Super-eccentric Migrating Jupiters ” A. Socrates, B. Katz, S. Dong and S. Tremaine 2011, ApJ submitted, arXiv:1110.1644
- “Swift J1644+57: An Ultra-Luminous X-ray Event” A. Socrates 2011, ApJ submitted, arXiv:1105.2557
- “Thermal Tides in Fluid Extrasolar Planets” P. Arras & A. Socrates 2010, ApJ, 714, 1
- “Relativistic Accretion Mediated by Turbulent Comptonization ” A. Socrates 2010, ApJ, 719, 784
- “The Eddington Limit in Cosmic Rays: An Explanation for the Observed Lack of Low-Mass Radio-Loud Quasars and the $M_{\bullet} - M_{\star}$ Relation” L. Sironi & A. Socrates 2010, ApJ, 710, 891
- “Thermal Tides in Hot Jupiters” P. Arras & A. Socrates 2009, ApJ submitted, arXiv:0901.0735
- “Coronal Activity of the ASAS Eclipsing Binaries” Szczygiel, D., Socrates, A., Paczynski, B., & Pojmanski, G. 2008, AcA, 58, 405
- “Brilliant Pebbles: A Method of Detection of Very Large Dust Grains” A. Socrates & B.T. Draine 2009, ApJL 702, L77
- “The Eddington Limit in Cosmic Rays: An Explanation for the Observed Faintness of Starbursting Galaxies ” Aristotle Socrates, Shane W. Davis, & Enrico Ramirez-Ruiz 2008, ApJ, 697, 202
- “The Coulomb Bubble Instability: Over-stable Magnetosonic Motion Driven by the An-isotropic Diffusion of Energy” Aristotle Socrates, I. Parrish, J. Stone 2008, ApJ, 675, 357
- “Ultraluminous X-ray Sources Powered by Radiatively Efficient Two-Phase Super-Eddington Accretion onto Stellar Mass Black Holes” Aristotle Socrates & Shane W. Davis 2006, ApJ, 651, 1049
- “Supernovae and Gamma-Ray Bursts Powered by Hot Neutrino-Cooled Coronae ” E. Ramirez-Ruiz and A. Socrates 2005, ApJ submitted, astro-ph/0504257
- “The Neutrino Bubble Instability: A Mechanism for Generating Pulsar Kicks” A.Socrates, O. Blaes, A. Hungerford, & C. Fryer, 2005, ApJ, 632, 531
- “Non-Linear Evolution of the Photon Bubble Instability in Accretion Disks” N. Turner, O. Blaes, A. Socrates, M. Begelman, & S. Davis, 2005, ApJ, 624, 267
- “Turbulent Comptonization in Black Hole Accretion Disks,” A.Socrates, S.W. Davis, & O. Blaes,

2004, ApJ, 601, 405

“Local Radiative Hydrodynamic and Magnetohydrodynamic Instabilities in Optically Thick Media,” O. Blaes & A. Socrates, 2003, ApJ, 596, 509

“The Kozai Mechanism and the Evolution of Binary Supermassive Black Holes,” O. Blaes, M.H. Lee, & A. Socrates, 2002, ApJ, 578, 775B

“Local Dynamical Instabilities in Magnetized, Radiation Pressure-supported Accretion Disks,” O. Blaes & A. Socrates, 2001, ApJ, 553, 987B

Work in Preparation

“Kozai Cycles and Tidal Friction: Quenching, Migration Rates and Capture Criteria” S. Dong, B. Katz, A. Socrates and S. Tremaine

“Tidal Dissipation in Super-Eccentric Orbits” B. Katz, A. Socrates & S. Dong

“Photon Bubbles in Massive Stars” R. Fernandez & A. Socrates

“An Observed Correlation Between Thermal Tidal Torques and Radius Anomaly for the Hot Jupiters” P. Arras & A. Socrates

“Theory of the Dynamical Thermal Tide in Planets and Stars I: Resonant Excitation of Eigenmodes” P. Arras & A. Socrates

“Theory of the Dynamical Thermal Tide in Planets and Stars II: Excitation of Wave Packets” P. Arras & A. Socrates

“Measurement of the Cosmic Ray Mean Free Path in External Galaxies I: Framework and Method” L. Sironi & A. Socrates

“Measurement of the Cosmic Ray Mean Free Path in External Galaxies II: FIR-Radio Correlation, Gamma-Ray Emission and the Eddington Limit” L. Sironi & A. Socrates

Conference Proceedings

“On the Release of Binding Energy and Accretion Power in Core-Collapse Environments” Socrates, A. & Ramirez-Ruiz, E. 2007, to appear in “Supernova 1987A: 20 Years After: Supernovae and Gamma-Ray Bursters” AIP, New York, eds. S. Immler, K.W. Weiler, and R. McCray (New York: AIP)

“Turbulent Comptonization in Relativistic Accretion Disks ” Socrates, A., Davis, S.W. & Blaes, O. 2006, astro-ph/0609797

“All-Sky Patrols” A. Socrates and B. Paczynski, online talk located at http://online.kitp.ucsb.edu/online/grbtu_c06/socrates

“Photon Bubbles in Young Massive Stars ” Turner, N.J., Yorke, H.W., Socrates, A., & Blaes, O.M. 2004, to appear in the proceedings of “AGN Physics with the SDSS”, eds. G. T. Richards and P.

B. Hall (San Francisco: ASP)

“Effects of Fluid Instabilities on Accretion Disk Spectra ” S.W. Davis, O.M. Blaes, N.J. Turner, & A. Socrates 2004, to appear in the proceedings of ”AGN Physics with the SDSS”, eds. G. T. Richards and P. B. Hall (San Francisco: ASP)

Recent and Upcoming Talks

- Astrophysics Seminar, University of Pennsylvania, November, 2011
- High Energy Seminar, University of Illinois, Urbana-Champaign, November 2011
- Contributed Talk, Extreme Solar Systems II, Jackson, Wyoming, September 2011
- Seminar, CITA, Toronto, Canada, April 2011
- Astronomy Colloquium, University of Texas, Austin, March 2011
- Cosmology Talk, Perimeter Institute for Theoretical Physics, February 2011
- Astronomy Colloquium, University of Waterloo, Canada, February 2011
- Astronomy Colloquium, University of California, Santa Cruz, November, 2010
- Astronomy Colloquium, Yale University, New Haven, CT, September, 2010
- Colloquium, STSci, Baltimore, MD, September, 2010
- Lunch Session, STSci, Baltimore, MD, September, 2010
- Galaxy Seminar, Cornell University, Ithaca, NY, April 2010
- Astronomy Colloquium, Cornell University, Ithaca, NY, April 2010
- Informal Seminar, Carnegie Observatories, Pasadena, CA, January 2010
- ACKS Seminar, Stanford/KIPAC, Palo Alto, CA, October, 2009
- Colloquium, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, September 2009
- Contributed Talk at “Accretion and Ejection in AGN: A Global View” Como, Italy, June 2009
- TAC Seminar, UC Berkeley, November 2008
- Astronomy Colloquium, UCLA, November 2008
- Astronomy Colloquium, The Ohio State University, 2008
- Informal Seminar, IAS, Princeton, May 2008

- Astronomy Colloquium, Caltech, April 2008
- Invited Talk at “The First Two Billion Years of Galaxy Formation: The Reionization Epoch and Beyond,” February 2008
- Astronomy Seminar, NYU, February 2008
- Astronomy Seminar, MIT, January 2008
- Colloquium, University of Delaware, November 2007
- Theory Seminar, Caltech, June 2007
- Invited talk at “New Trends in Radiation Hydrodynamics,” Stockholm, Sweden, May 2007
- Wunch Seminar, Department of Astrophysical Sciences, Princeton, May 2007
- Contributed Talk at “Supernova 1987A: 20 Years After,” Aspen Center for Physics, February 2007
- Colloquium, University of California, Santa Cruz, CA, January 2007
- Colloquium, University of California, Santa Cruz, CA, November 2006
- Colloquium, Rutgers, Piscataway, NJ, October 2006
- ITC Colloquium, Harvard, Cambridge, MA, June 2006
- TAC Seminar, University of California, Berkeley, CA, May 2006
- Seminar, CITA, Toronto, Canada, May 2006
- Invited Talk at “The Transient Universe,” ITP, Santa Barbara, CA, March 2006
- Colloquium, University of Rochester, Rochester, NY, December 2005
- Colloquium, Johns Hopkins University, Baltimore, MD, November 2005

References

Omer Blaes, Professor and Chair, Department of Physics, University of California, Santa Barbara

Bruce Draine, Professor, Department of Astrophysical Sciences, Princeton University

Peter Goldreich, Professor Emeritus, Caltech and Institute for Advanced Study, Princeton

Jeremy Goodman, Professor, Department of Astrophysical Science, Princeton University

Enrico Ramirez-Ruiz, Professor, Department of Astronomy and Astrophysics, University of California, Santa Cruz

Jim Stone, Professor, Department of Astrophysical Sciences, Princeton University

Scott Tremaine, Professor, Institute for Advanced Study, Princeton

Teaching Experience

Teaching Assistant 9/99-12/02 UCSB

Courses Taught: graduate High Energy Astrophysics, O. Blaes

undergraduate Statistical Mechanics, G. Ahlers

undergraduate General Relativity, O. Blaes

undergraduate Cosmology, R. Geller

Physics for Engineers, J. Ruhl

Introduction to Astronomy, R. Antonucci

Teaching Assistant 9/98-5/99 Columbia University

Courses Taught: Introduction to Physics, J. Conrad

Students Supervised at Princeton Z. Bertha (Junior Project), I. Parrish, R. Rheyas, L. Sironi and D. Szczygiel

Public Lectures

“Six Months Ago, a Super-massive Black Hole Swallowed a Star: It was Very Bright ” After Hours Conversations, Institute for Advanced Study, Princeton, NJ 10/11

“Extrasolar Planets ” Friends Forum Lecture, Institute for Advanced Study, Princeton, NJ 10/11

“Solar Systems Unlike Our Own: Why Are They Interesting ” After Hours Conversations, Institute for Advanced Study, Princeton, NJ 10/09

“Astrophysics of Black Holes” Sponsored by United Astronomy Clubs of New Jersey, Inc. Given at UACNJ Observatory at Jenny Jump State Park 10/06.

“Gravity, Turbulence, and Then Light: The Astrophysics of Black Holes” Sponsored by the Santa Barbara Astronomy Unit. Given at the Santa Barbara Museum of Natural History 9/02.