

Dr. Shane W. Davis

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PRIMARY RESEARCH INTERESTS High energy astrophysics, Accretion Theory, Black Holes, X-ray Binaries, Active Galactic Nuclei, Ultraluminous X-ray Sources, Magnetars, Radiative Transfer, Star Formation Feedback, and Magnetohydrodynamics

EDUCATION University of California, Santa Barbara, CA
Ph.D., Physics, received 2006
Carnegie Mellon, Pittsburgh, PA
B.S., Physics, with University Honors, received 2000

EMPLOYMENT Assistant Professor, Aug. 2014 - present
Department of Astronomy, University of Virginia, Charlottesville, VA
Senior Research Associate, Sep. 2012 - July 2014
Postdoctoral Fellow, Sep. 2010 - Aug. 2012
Canadian Institute of Theoretical Astrophysics, University of Toronto, Toronto, ON
Postdoctoral Fellow, Sep. 2006 - Aug. 2010
School of Natural Sciences, Institute for Advanced Study, Princeton, NJ
Graduate Research and Teaching Assistant, Sep. 2000 - Aug. 2006
Department of Physics, University of California, Santa Barbara, CA
Undergraduate Research and Teaching Assistant, Sep. 1998 - Aug. 2000
Department of Physics, Carnegie Mellon, Pittsburgh, PA

AWARDS AND FELLOWSHIPS Kavli Frontiers of Science Fellow, 2016
Mead Honored Faculty, U. of Virginia, 2016
Alfred P. Sloan Research Fellowship, 2015
Beatrice D. Tremaine Award, CITA, 2012
Chandra Fellowship, 2006
Phi Beta Kappa and Phi Kappa Phi Honor Societies, 2000
Barry M. Goldwater Scholarship, 1999

PROFESSIONAL SERVICE Peer Reviewer for Astronomy & Astrophysics, The Astrophysical Journal, Nature, Monthly Notices of the Royal Astronomical Society, and Publications of the Astronomical Society of Japan
Panel Reviewer for NASA (3 times) and National Science Foundation (2 times)

REFEREED PUBLICATIONS A NASA ADS linked list is maintained at www.astro.virginia.edu/~swd8g under the Publications link.

47. *A Broadband X-Ray Spectral Study of the Intermediate-mass Black Hole Candidate M82 X-1 with NuSTAR, Chandra, and Swift*
Brightman, M., Harrison, F. A., Barret, D., **Davis, S. W.**, Furst, F., Madsen, K. K., Middleton, M., Miller, J. M., Stern, D., Tao, L., Walton, D. J., 2016, ApJ, 829, 28
46. *Iron Opacity Bump Changes the Stability and Structure of Accretion Disks in Active Galactic Nuclei*
Jiang, Y.-F., **Davis, S. W.**, & Stone, J. M., 2016, ApJ, 827, 10
45. *X-ray polarimetry with the Polarization Spectroscopic Telescope Array (PolSTAR)*
Krawczynski, H. S., Stern, D., Harrison, F. A., et al., 2016, Astroparticle Physics, 75, 8
44. *Radiation Feedback in ULIRGS: Are Photons Movers and Shakers?*
Davis, S. W., Jiang, Y.-F., Stone, J. M., & Murray, N., 2014, ApJ, 796, 107
43. *A Global Three Dimensional Radiation Magnetohydrodynamic Simulation of Super-Eddington Accretion Disks*
Jiang, Y.-F., Stone, J. M., & **Davis, S. W.**, 2014, ApJ, 796, 106
42. *An Algorithm for Radiation Magnetohydrodynamics Based on Solving the Time-dependent Transfer Equation*
Jiang, Y.-F., Stone, J. M., & **Davis, S. W.**, 2014, ApJS, 213, 7
41. *Dynamics of warped accretion discs*
Tremaine, S. & **Davis, S. W.**, 2014, MNRAS, 441, 1408
40. *Radiation Magneto-hydrodynamic Simulations of the Formation of Hot Accretion Disk Coronae*
Jiang, Y.-F., Stone, J. M. & **Davis, S. W.**, 2014, ApJ, 784, 169
39. *Line Driven Winds and the UV Turnover in AGN Accretion Disks*
Laor, A. & **Davis, S. W.**, 2014, MNRAS, 438, 3024
38. *The Effects of Irradiation on the Cloud Evolution in Active Galactic Nuclei*
Proga, D., Jiang, Y.-F., **Davis, S. W.**, Stone, J. M., & Smith, D., 2014, ApJ, 780, 51
37. *On the Thermal Stability of Radiation Dominated Disks*
Jiang, Y.-F., Stone, J. M. & **Davis, S. W.**, 2013, ApJ, 778, 65
36. *Saturation of the MRI in Strongly Radiation Dominated Accretion Disks*
Jiang, Y.-F., Stone, J. M. & **Davis, S. W.**, 2013, ApJ, 767, 148
35. *Non-linear Evolution of Rayleigh-Taylor Instability in a Radiation Supported Atmosphere*
Jiang, Y.-F., **Davis, S. W.** & Stone, J. M., 2013, ApJ, 763, 102
34. *The Eye of the Storm: Light from the Inner Plunging Region of Black Hole Accretion Disks*
Zhu, Y., **Davis, S. W.**, Narayan, R., Kulkarni, A., Penna, R. A., & McClintock, J. E., 2012, MNRAS, 424, 2504
33. *Intrinsic Disc Emission and the Soft X-ray Excess in AGN*
Done, C., **Davis, S. W.**, Jin, C., Blaes, O. M., and Ward, M., 2012, MNRAS, 420, 1848
32. *A Godunov Method for Multidimensional Radiation Magnetohydrodynamics based on a variable Eddington tensor*
Jiang, Y.-F., Stone, J. M., & **Davis, S. W.**, 2012, ApJS, 199, 14
31. *A Radiation Transfer Solver for Athena using Short Characteristics*
Davis, S. W., Stone, J. M., & Jiang, Y.-F., 2012, ApJS, 199, 9
30. *The Extreme Spin of the Black Hole in Cygnus X-1*
Gou, L., McClintock, J. E., Reid, M. J., Orosz, J. A., Steiner, J. F., Narayan, R., Xian, J., Remillard, R. A., Arnaud, K. A., & **Davis, S. W.**, 2011, ApJ, 742, 85
29. *Cold Accretion Disks and Lineless Quasars*
Laor, A., & **Davis, S. W.**, 2011, MNRAS, 417, 681

28. *Measuring Black Hole Spin by the Continuum-Fitting Method: Effect of Deviations from the Novikov-Thorne Disc Model*
Kulkarni, A. K., Penna, R. F., Shcherbakov, R. V., Steiner, J. F., Narayan, R., McClintock, J. E., Sadowski, A., Zhu, Y., **Davis, S. W.**, & McKinney, J. C., 2011, MNRAS, 414, 1183
27. *Measuring the Spins of Accreting Black Holes*
McClintock, J. E., Narayan, R., **Davis, S. W.**, Gou, L., Kulkarni, A., Orosz, J. A., Penna, R. F., Remillard, R. A., Steiner, J. F. 2011, Classical and Quantum Gravity, 28, 114009
26. *The Cool Accretion Disk in ESO 243-49 HLX-1: Further Evidence of an Intermediate Mass Black Hole*
Davis, S. W., Narayan, R., Zhu, Y., Barret, D., Farrell, S. A., Godet, O., Servillat, M., & Webb, N. A., 2011, ApJ, 734, 111
25. *The X-Ray Polarization Signature of Quiescent Magnetars: Effect of Magnetospheric Scattering and Vacuum Polarization*
Fernández, R. & **Davis, S. W.**, 2011, ApJ, 730, 131
24. *The Radiative Efficiency of Accretion Flows in Individual AGN*
Davis, S. W. & Laor, A., 2011, ApJ, 728, 98
23. *Erratum: Precise Measurement of the Spin Parameter of the Stellar-Mass Black Hole M33 X-7*
Liu, J., McClintock, J. E., Narayan, R., **Davis, S. W.**, & Orosz, J. A. 2010, ApJ, 719, 109
22. *Testing Accretion Disk Structure with Suzaku Data of LMC X-3*
Kubota, A., Done, C., **Davis, S. W.**, Dotani, T., Mizuno, T., & Ueda, Y., 2010, ApJ, 714, 860
21. *Sustained Magnetorotational Turbulence in Local Simulations of Stratified Disks with Zero Net Magnetic Flux*
Davis, S. W., Stone, J. M., & Pessah, M. E. 2010, ApJ, 713, 52
20. *The Effects of Magnetic Fields and Inhomogeneities on Accretion Disk Spectra and Polarization*
Davis, S. W., Blaes, O. M., Hirose, S., & Krolik, J. H. 2009, 703, 569
19. *A Determination of the Spin of the Black Hole Primary in LMC X-1*
Gou, L., McClintock, J. E., Liu, J., Narayan, R., Steiner, J. F., Remillard, R. A., Orosz, J. A., **Davis, S. W.**, Ebisawa, K., & Schlegel, E. M. 2009, ApJ, 701, 1076
18. *The Eddington Limit in Cosmic Rays: An Explanation for the Observed Faintness of Starbursting Galaxies*
Socrates, A., **Davis, S. W.**, & Ramirez-Ruiz, E. 2008, ApJ, 687, 202
17. *Angular Momentum Transport in Accretion Disks and its Implications for Spin Estimates in Black Hole Binaries*
Done, C. & **Davis, S. W.** 2008, ApJ, 683, 389
16. *Precise Measurement of the Spin Parameter of the Stellar-Mass Black Hole M33 X-7*
Liu, J., McClintock, J. E., Narayan, R., **Davis, S. W.**, & Orosz, J. A. 2008, ApJL, 679, 37
15. *The UV Continuum of Quasars: Models and SDSS Spectral Slopes*
Davis, S. W., Woo, J.-H., & Blaes, O., M. 2007, ApJ, 668, 682
14. *Black Hole Spin in GRS 1915+105*
Middleton, M., Done, C., Gierlinski, M., & **Davis, S. W.** 2006, MNRAS, 373, 1004
13. *The Spin of the Near-Extreme Kerr Black Hole GRS 1915+105*
McClintock, J. E., Shafee, R., Narayan, R., Remillard, R. A., **Davis, S. W.**, & Li, L.-X. 2006, ApJ, 652, 518

12. *Ultraluminous X-ray Sources Powered by Radiatively Efficient Two-Phase Super-Eddington Accretion onto Stellar Mass Black holes*
Socrates, A., & **Davis, S. W.** 2006, ApJ, 651, 1049
11. *Testing Accretion Disk Theory in Black Hole X-ray Binaries*
Davis, S. W., Done, C. & Blaes, O. M. 2006, ApJ, 647, 525
10. *Magnetic pressure support and accretion disk spectra*
Blaes, O. M., **Davis, S. W.**, Hirose, S., Krolik, J. H., & Stone, J. M. 2006, ApJ, 645, 1402
9. *A Grid of Relativistic, non-LTE Accretion Disk Models for Spectral Fitting of Black Hole Binaries*
Davis, S. W., & Hubeny, I. 2006, ApJS, 164, 530
8. *Estimating the Spin of Stellar-Mass Black Holes via Spectral Fitting of the X-ray Continuum*
Shafee, R., McClintock, J. E., Narayan, R., **Davis, S. W.**, Li, L.-X., & Remillard, R. A. 2005, ApJ, 636, 113
7. *The Effects of Photon Bubble Instability in Radiation-Dominated Accretion Disks*
Turner, N. J., Blaes, O. M., Socrates, A., Begelman, M. C., & **Davis, S. W.** 2005, ApJ, 624, 267
6. *Relativistic Accretion Disk Models of High State Black Hole X-ray Binary Spectra*
Davis, S. W., Blaes, O. M., Hubeny, I., & Turner, N. J., 2005, ApJ, 621, 327
5. *Multiwavelength Observations of Radio Galaxy 3C 120 with XMM-Newton*
Ogle, P. M., **Davis, S. W.**, Antonucci, R. R. J, Colbert, J. W., Malkan, M. A., Page, M. J., Sasseen, T. P., & Tornikoski, M. 2005 ApJ, 618, 139
4. *Turbulent Comptonization in Black Hole Accretion Disks*
Socrates, A., **Davis, S. W.**, & Blaes O. 2004, ApJ, 601, 405
3. *The origin of the Fe K features in Markarian 205 and Markarian 209*
Page, M. J., **Davis, S. W.**, & Salvi, N. J. 2003, MNRAS, 343, 1241-1247
2. *The X-ray spectrum of the Seyfert 1 galaxy Mrk 766: Dusty Warm Absorber or Relativistic Emission Lines?*
Mason, K. O., Branduardi-Raymont, G., Ogle, P. M., Page, M. J., Puchnarewicz, E. M., Behar, E., Cordova, F. A., **Davis, S.**, Maraschi, L., McHardy, I. M., O'Brien, P. T., Priedhorsky, W. C., & Sasseen, T. P. 2003, ApJ 582, 95
1. *Cluster-based Monte Carlo Simulation of Ferrofluids*
Davis, S. W., McCausland, W., McGahagan, H. C., Tanaka, C. T., & Widom, M. 1999, Phys. Rev. E, 59, 2424

INVITED
TALKS AND
SEMINARS
(2012-
PRESENT)

- ◇ Astrophysics Seminar, Johns Hopkins U., Baltimore, MD, Sep. 8, 2016
- ◇ Invited Talk, Simulations and Modelling of Relativistic MHD Accretion Disks, Oxford, UK, July, 11, 2016
- ◇ Invited Talk, Stellar Remnants at the Junction: Comparing Accreting White Dwarfs, Neutron Stars, and Black Holes, Junction, TX, USA, May 5, 2016
- ◇ Special Seminar, U. of Bern, Bern, Switzerland, Feb. 29, 2016
- ◇ Informal Seminar, Institute for Advanced Study, Princeton, NJ, USA, Nov. 19, 2015
- ◇ Invited Talk, The Physics of Supermassive Black Hole Formation and Feedback, Annapolis, MD, USA, Oct. 13, 2015
- ◇ Astronomy Colloquium, U. of California, Los Angeles, CA, USA, Mar. 11, 2015
- ◇ Invited Talk, Compact Objects as Astrophysical and Gravitational Probes, Leiden, Netherlands, Feb. 2, 2015

- ◇ Astronomy Colloquium, Caltech, Pasadena, CA, USA, Oct. 8, 2015
- ◇ High Energy Seminar, Max Planck Institute for Astrophysics, Garching, Germany, Aug. 29, 2014
- ◇ Cosmology Seminar, Max Planck Institute for Astrophysics, Garching, Germany, Aug. 26, 2014
- ◇ Invited Talk, Fire Down Below: The Impact of Feedback on Star and Galaxy Formation, Santa Barbara, CA, USA, Apr. 15, 2014
- ◇ Invited Talk, Hyper-accretion Kavli IPMU Workshop, Tokyo, Japan, Apr. 7, 2014
- ◇ Astrophysics Seminar, University of Waterloo, Waterloo, ON, Canada, Feb. 26, 2014
- ◇ NRAO–UVa Joint Colloquium, Charlottesville, VA, USA, Jan. 27, 2014
- ◇ Invited Talk, Black hole (g)Astronomy - Exploring the different flavours of accretion, Brindisi, Italy, Sep. 2, 2013
- ◇ Invited Talk, Revealing Radiative Processes Near Black Holes, Princeton, NJ, USA, May 10, 2013
- ◇ Astrophysics Seminar, University of Rochester, Rochester, NY, USA, Apr. 29, 2013
- ◇ Astronomy Colloquium, University of Maryland, College Park, MD, USA, Mar. 13, 2013
- ◇ Astronomy Colloquium, Northwestern University, Evanston, IL, USA, Jan. 28, 2013
- ◇ Astronomy Colloquium, University of Nevada, Las Vegas, USA, Oct. 12, 2012
- ◇ Space Science and Astrophysics Semniar, Washington University, St. Lous, USA, Sep. 21, 2012
- ◇ Invited Talk, Black Holes by the Black Sea, Istanbul, Turkey, June 25, 2012
- ◇ Invited Talk, The Physics and Evolution of Active Black Holes, Haifa, Israel, May 28, 2012
- ◇ Physics Colloquium, Columbia University, New York, NY, USA, March 7, 2012
- ◇ Astrophysics Colloquium, Massachusetts Institute of Technology, Cambridge, MA, USA, Feb. 21, 2012
- ◇ Astrophysical & Planetary Sciences Colloquium, University of Colorado, Boulder, CO, USA, Feb. 13, 2012
- ◇ Astrophysics/High Energy Seminar, Purdue University, West Lafayette, IN, USA, Feb. 2, 2012