Carl A. Schmidt

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Education

Ph.D., Astronomy, Boston University 2013
Thesis: *Mercury's Sodium Exosphere* (M. Mendillo Advisor)
M.A., Astronomy, Boston University 2008
B.A., Physics, University of Colorado 2005

Employment

Research Scientist, Boston Univ. 2017 - Present

- Commissioning the Rapid Imaging Planetary Spectrograph
- Study of Io's neutral atmosphere via HST Cosmic Origins Spectrograph

Research Associate, CNRS/LATMOS Paris (F. Leblanc Supervisor) 2015 - 2017

- Simulation of Mercury's environment using Monte-Carlo and hybrid codes
- Ground-based observation & analysis of the environments of Io, Europa and Mercury

Research Associate, Univ. of Virginia (R. E. Johnson Supervisor) 2013 - 2015

- Gas distributions in cometary coma: Integral-field spectroscopy, narrow-band imaging, numeric and analytic modeling
- Observations of Io's plasma torus, volcanic activity and neutral clouds

Graduate Research Assistant, Boston Univ. (M. Mendillo Supervisor) 2006 - 2013

- Observation, analysis and simulation of Mercury's atmospheric escape
- Assisted in design and testing of the imaging spectrograph at Poker Flat Observatory and two standard spectrographs for mobile calibration

Undergraduate Research Assistant, Univ. Colorado (F. Hearty Supervisor) 2002 - 2005

- Comissioning the Near-Infrared Camera and Fabry-Perot Spectrometer

Teaching Experience

Lecturer, Boston Univ. 2018

- Instructor for *AS101 The Solar System* undergraduate course

Graduate Teaching Assistant, Boston Univ. 2007

- Lab instructor for *AS101 The Solar System* undergraduate course

Mentoring: Chase Young (BU), Apurva Oza (UPMC), Jake Turner & Haley Williamson (UVa).

Peer Reviewed Publications

- C. Schmidt, N. Schneider, F. Leblanc, C. Gray, J. Morgenthaler, J. Turner, C. Grava (2018) Optical Measurements of Io's Plasma Torus in the Hisaki Epoch. Journal of Geophysical Research, *IN REVIEW / 2018JA025296*
- R.E. Johnson, A. Oza, F. Leblanc and C. Schmidt (2018) The Origin and Fate of O_2 in Europa's Ice: An Atmospheric Perspective. Ices in the Solar System, Chapter 10. Space Science Reviews, *IN REVIEW*
- A. Oza, F. Leblanc, R. E. Johnson, C. Schmidt, L. Leclercq, T. Cassidy, J.-Y. Chaufray (2018) Dusk Over Dawn Molecular Oxygen Asymmetry In Europa's Exosphere. Icarus, *IN REVIEW*
- F. Leblanc, A. Oza, L. Leclercq, C. Schmidt, T. Cassidy, R. Modolo, J.Y. Chaufray, R. E. Johnson (2017) On the Orbital Variability of Ganymede's Atmsophere. Icarus, Vol. 293, p. 185-198.
- J. D. Turner, D. Christie, P. Arras, R. E. Johnson, C. Schmidt (2016) Investigation of the environment around close-in transiting exoplanets using CLOUDY. Monthly Notices fo the Royal Astronomical Society, Vol 458 (4), p.3880-3891.
- C. Schmidt (2016) High Resolution Integral-Field Spectroscopy of Gas and Ion Distributions in the Coma of Comet C/2012 S1 ISON. Icarus, Vol 265, p. 35-41.
- R.E. Johnson, A. Oza, L.A. Young, A.N. Volkov, C. Schmidt (2015) Volatile Loss and Classification of Kuiper Belt Objects. Astrophysical Journal, Vol 809 (1), article id. 43.
- N.-E. Raouafi, C. M. Lisse, G. Stenborg, G. H. Jones, C. Schmidt (2015) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. Journal of Geophysical Research, Vol 120 (7), pp. 5329-5340.
- C. Schmidt, R.E. Johnson, J. Baumgardner, M. Mendillo (2015) Observations of Sodium in the Coma of Comet C/2012 S1 (ISON) During Outburst. Icarus, Vol 247, p. 313-318.
- C. Schmidt (2013) Monte-Carlo Modeling of North-South Asymmetries in Mercury's Sodium Exosphere, Journal of Geophysical Research, Vol 118, A50396.
- C. Schmidt, J. Baumgardner, M. Mendillo., J. Wilson (2012) Escape rates and variability constraints for high-energy sodium sources at Mercury, Journal of Geophysical Research, Vol 117, A03301.

- C. Schmidt, J. Wilson, J. Baumgardner, M. Mendillo (2010) Orbital Effects on Mercury's Escaping Sodium Exosphere, Icarus, Vol 207 (1), p. 9-16.

Abstracts

- Oza, Leblanc, Chaufray, Schmidt, Roth, Johnson, Cassidy, Leclercq, Modolo (2017) Europa and Ganymede's Water-Product Exospheres. EPSC Meeting Abstract.
- Schmidt, Leblanc, Moore, Bida (2017) Detection of Mercury's Potassium Tail. DPS Meeting Abstract.
- Schmidt (2017) Absorption By Mercury's Atmosphere During Solar Transit. Transiting Exoplanet Conference. Keele, UK.
- Schmidt, Reardon, Killen, Gary, Ahn, Leblanc, Baumgardner, Mendillo, Beck, Mangano (2016) Absorption by Mercury's Exosphere During the May 9th, 2016 Solar Transit. AGU Meeting Abstract.
- Nerney, Bagenal, Schmidt, Yoshioka, Steffl, Schneider (2016) Observations of Ion Composition in the Io Plasma Torus. AGU Meeting Abstract.
- Raouafi, Lisse, Stenborg, Jones, and Schmidt (2016) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. AGU Meeting Abstract.
- Schmidt, Schneider, Leblanc, Johnson (2016) Characteristics of the SII ribbon in the Io Plasma Torus from Visible Wavelength Spectroscopy. ISSI Workshop on the influence of Io on Jupiter's magnetosphere in Berne, Switzerland.
- Leblanc, Oza, Schmidt, Leclercq, Modolo, Chaufray (2016) 3D multispecies collisional model of Ganymede's atmosphere. EPSC/DPS Meeting Abstract.
- Skrutskie, Nelson, Schmidt (2016) Monitoring the Near-infrared Volcanic Flux from Io's Jupiter-facing Hemisphere from Fan Mountain Observatory. EPSC/DPS Meeting Abstract.
- Leclercq, Chanteur, Modolo, Leblanc, Schmidt, Langlais, Thebault (2016) Study of the internal magnetic field of Mercury through 3D hybrid simulations. EPSC/DPS Meeting Abstract.
- Oza, Leblanc,Schmidt, Johnson (2016) Origin and Evolution of Europa's Oxygen Exosphere. EPSC/DPS Meeting Abstract.
- Schmidt, Leblanc, Johnson, Mendillo, Baumgardner (2015) Evidence for a Plasma Interaction with Europa's Sodium Clouds from High Resolution Integral Field Spectroscopy. AGU Meeting Abstract.
- Raouafi, Lisse, Stenborg, Jones, and Schmidt (2015) Dynamics of High-Velocity Evanescent Clumps (HVECs) Emitted from Comet C/2011 L4 (Pan-STARRS) as Observed by STEREO. AGU Meeting Abstract.
- Schmidt, Johnson, Mendillo, Baumgardner, Leblanc (2015) Neutral and Plasma Distributions in the Coma of Comet C/2012 S1 ISON: Narrowband Imaging and Integral-Field Spectroscopy. EPSC Meeting Abstract.

- Schneider and 11 co-authors including Schmidt (2015) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. EPSC Meeting Abstract.
- Schmidt, Schneider, Turner, Johnson, Chaffin, Rugenski, McNeil (2015) Optical Spectroscopy of the Io Plasma Torus in Support of Hisaki/EXCEED. MOP Meeting Abstract.
- Schmidt, Johnson, Mendillo, Baumgardner (2014) Velocity-Resolved Multi-Scale Imaging of Na Escape from Io. AGU Meeting Abstract.
- Turner and 11 co-authors including Schmidt (2014) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. AGU Meeting Abstract.
- Schmidt, Johnson, Baumgardner, Mendillo (2014) Gas Distributions in Comet ISON's Coma: Concurrent Integral-Field Spectroscopy and Narrow-band Imaging, DPS Meeting Abstract DPS2014-113.02.
- Johnson, Oza, Young, Volkov, Schmidt (2014) Volatile Loss and Classification of Kuiper Belt Objects, DPS Meeting Abstract DPS2014-510.01.
- Schmidt, Mendillo, Baumgardner, Johnson (2013) Sodium Escape in Mercury's Atmosphere: Ground-Based Observations in Support of MESSENGER, DPS Meeting Abstract DPS2013-102.07.
- Schmidt, Baumgardner, Mendillo (2012) Hemispheric Asymmetries in Mercury's Exosphere, DPS Meeting Abstract DPS2012-410.05.
- Clarke and 9 co-authors including Schmidt (2012) HST observations and modeling of the Martian hydrogen corona, DPS Meeting Abstract DPS2012-214.01.
- Schmidt, Baumgardner, Mendillo, Sundberg, Walsh (2012) Hemispheric Asymmetries in Mercury's Exosphere Due to the Offset Magnetic Dipole, AGU Meeting Abstract P33B-1931
- Schmidt, Baumgardner, Mendillo, Wilson (2011), Escape rates and variability constraints for high-energy sodium sources at Mercury, Joint EPSC/DPS Meeting Abstract EPSC-DPS2011-100.
- Mangano and 19 co-authors including Schmidt (2010) The sodium emission from Mercury's exosphere as detected by the IMW coordinated campaign in June 2006, COSPAR Paper B07-0022-10.
- Schmidt, Baumgardner, Mendillo, Davis, Musgrave (2010) Observations of Extended Emissions at Mercury by the STEREO Spacecraft, EPSC proceedings p419.
- Schmidt, Baumgardner, Mendillo, Davis, Musgrave (2010) Observations of tail structures at Mercury with the STEREO spacecraft, Joint MESSENGER / BepiColombo Workshop Abstract 2.2.1.
- Schmidt, Wilson, Baumgardner, Mendillo (2009) Variability in Mercury's Escaping Sodium Atmosphere, DPS Meeting Abstract DPS2009-35.01
- Schmidt, Wilson, Baumgardner, Mendillo (2008) Wide Field Observations of Variability in Mercury's Comet-like Sodium Tail, DPS Meeting Abstract DPS2008-51.09
- Schmidt, Wilson, Baumgardner, Mendillo (2008) Wide Field Observations of Mercury's Extended Sodium Exosphere, COSPAR paper B07-0036-08

- Schmidt, Baumgardner (2007) Boston University Calibration Facility for Optical Aeronomy. CEDAR Meeting Abstract

Non-peer Reviewed Publications

- J. Clarke, C. Schmidt, J. Baumgarder, C. Carveth, M. Matta, M. Mendillo, L. Moore, and P. Withers (2013) White Paper on Comparative Planetary Exospheres. National Research Council Decadal Survey. Solar and Space Physics: A Science for a Technological Society. National Academies Press.
- F. Hearty and 11 co-authors including C. Schmidt (2005) Colorado's Near-Infrared Camera (AKA NIC-FPS) Commissioning on the ARC 3.5M Telescope, Proc. SPIE, Vol 5904, p. 199-211.

Invited Seminars & Lectures

Io's Volcanic Atmosphere and Plasma Torus, Boston University, Boston, MA, USA	2018
Io's Plasma Torus Density & the S^+ Ribbon, Royal Institute of Technology, SE	2017
Small Telescopes Applications: Mercury, Io & Comets, Université de Liège, BE	2017
Planetary Applications for Small Telescopes, Institute of Astronomy, Sofia, BG	2017
Visible Spectroscopy of the Io Plasma Torus, LESIA, l'Observatoire de Paris, FR	2016
Observations of Io, its Plasma Torus and Neutral Clouds, Lancaster Univ, UK	2016
Modern Planetary Applications for Small Telescopes, UMD, College Park, MD, USA	2015
Characteristics of Sodium Escape at Mercury, SERENA-HEWG, Killarney, IRL	2014
Atmospheric Escape in Our Solar System, Space Challenges, Sofia, BG	2013
Mercury's Sodium Atmosphere, AOSS, Univ. of Michigan, Ann Arbor, MI, USA	2012
Mercury's Tenuous Atmosphere, Heliophysics, NASA GSFC, Greenbelt, MD, USA	2012

Grants & Fellowships

- NASA Solar System Observations *Ground-based observations of Mercury's exosphere in the post-MESSENGER era*, PI, 2018.03.01 to 2021.02.28. 17-SSO17-2-0040. $507,403.
- NASA Solar System Workings *The Ins and Outs of the Io Plasma Torus: understanding mass and energy transport using two decades of optical and radio observations*, Co-I (PI J. Morgenthaler), 2017.08.23 to 2020.08.22. SSW16-2-0086. $526,604.
- Hubble Space Telescope Cycle 25 *Extreme Doppler Shifting of Io's Neutral Jets*, PI, 2018.03.01 to 2019.02.28. HST-GO-15147. $39,999.
- NSF Astronomy and Astrophysics Research Grant *The Influence of Mercury's Magnetosphere on Its Outermost Atmosphere*, Science PI (PI L. Moore), 2016.07.15 to 2019.06.30. AST-1614903. $374,407.
- NASA Earth and Space Sciences Fellowship. *Mercury's Escaping Atmosphere*, Science PI (PI M. Mendillo), 2010.03.15 to 2013.03.15. 10-Planet10F-0041. $90,000.

Telescope Time Awarded

Hubble Space Telescope, STScI	2018
Dunn Solar Telescope, National Solar Observatory	2016
Vacuum Tube Telescope, SOLARNET	2016
GREGOR, SOLARNET (as Co-I, PI V. Mangano)	2016
Very Large Telescope, ESO (as Co-I, PI B. Bonfond)	2015

Via Internal TACs: InfraRed Telescope Facility, Apache Point Observatory 3.5m, Discovery Channel Telescope

Professional Activities & Service

- Journal Reviews: Icarus, Geophsycial Research Letters, Nature, Astronomy & Astrophysics
- ESA BepiColombo mission, PHEBUS instrument Co-Investigator
- International Space Science Institute, The influence of Io on Jupiter's Magnetosphere Co-Investigator
- Panelist for various NASA solicitations including DDAP, PMDAP, CDAP, RDAP, OPR, GI, PDS and SSW
- Convener for the 2014 Fall AGU session: Dynamics of the Io-Jupiter System
- Chair, Io plasma torus splinter meetings at MOP 2017 & 2018
- Deputy Chair, Scientific Organizing Committee for the Jupiter Day workshop at Boston University

Media & Public Outreach

TV Interview, Space Challenges Documentary, Bulgarian National Television	2017
TV Interview, NASA ScienceCast: The 2016 Transit of Mercury	2016
Content Advising, Science in the News, Harvard University GSAS	2013 - 2016
Lecturer, Fan Mountain Observatory Public Night	2014 - 2015
Radio Interview, Science Straight Up, WTJU FM	2014
Science Fair Judge, Virginia Piedmont Regionals, Charlottesville, VA	2014
Workshop Coordinator, Sprout, www.thesprouts.org, Somerville, MA	2010 - 2013
Lab Instructor, Upward Bound program, Boston University	2010
Science Fair Judge, O'Bryant School for Math and Science, Roxbury, MA	2009