

Carl A. Schmidt

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Education

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

Appointments

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| Research Assistant Professor, Boston University | 2021 - Present |
| Research Scientist, Boston University | 2017 - 2021 |
| Research Associate, CNRS/LATMOS Paris (F. Leblanc Supervisor) | 2015 - 2017 |
| Research Associate, Univ. of Virginia (R. E. Johnson Supervisor) | 2013 - 2015 |
| Graduate Research Assistant, Boston Univ. (M. Mendillo Supervisor) | 2006 - 2013 |
| Undergraduate Research Assistant, Univ. Colorado (F. Hearty Supervisor) | 2002 - 2005 |

Research Areas: Planetary exospheres, plasma interactions with surfaces and atmospheres, Monte-Carlo modelling, telescope-based observation and instrumentation

Teaching Experience

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| Lecturer, Boston Univ. | 2018 - 2021 (Summer term, annually) |
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- *AS101 The Solar System* course in Boston University's Astronomy Dept targeted at undergraduate non-majors fulfilling a laboratory science requirement, 4 credits, typically 16 students enrolled with 1 teaching assistant.

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| Teaching Assistant, Boston Univ. | 2007 (Spring term) |
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- Lab instructor for *AS101 The Solar System* undergraduate course

Undergraduate Research Advisor:

- Chase Young (Spring - Summer 2018)
- Mikhail Sharov (Fall 2018 - Spring 2021)
- Cameron Moye (Univ. Maryland, NASA SUPPR intern, Summer 2020)
- Aishwarya Ganesh (Univ. Texas, NASA SUPPR intern, Summer 2021)

- Patrick Lierle (Summer 2019 -)

Graduate Research Advisor:

- Emma Lovett (Fall 2021 -)

Articles Under Review (students underlined)

- P. R. Lierle, C. Schmidt, J. Baumgardner, L. Moore, T. Bida and R. Swindle (2021) *The Spatial Distribution and Temperature of Mercury's Potassium Exosphere*. The Planetary Science Journal, AAS36212, under review.
- C. Schmidt (2021) *Doppler-Shifted Alkali D Absorption as Indirect Evidence for Exomoons*. Frontiers in Astronomy and Space Sciences, under review.

Book Chapters Under Review (students underlined)

- C. Schmidt and J. Baumgardner (2021) *Lunar Atmosphere, Alkali Lunar Exosphere* in *Encyclopedia of Lunar Science*, Editors B. Cudnik & C. Ahrens, Springer, [DOI](#).
- F. Leblanc, C. Schmidt, V. Mangano, A. Mura, G. Cremonese, J. M. Raines, J.M. Jasinski, M. Sarantos, A. Milillo, R.M. Killen, S. Massetti, T. Cassidy, R.J. Vervack Jr., S. Kameda, M.T. Capria, M. Horanyi, D. Janches, A. Berezhnoy, A. Christou, T. Hirai, P. Lierle and J. Morgenthaler (2021) *Comparative Na and K Mercury and Moon exospheres* in *Surface Bounded Exospheres and Interactions in the Solar System*, Space Sciences Series of ISSI, Springer, under review.

Peer-Reviewed Articles (students underlined)

- A. L. E. Werner, S. Aizawa, F. Leblanc, J. Y. Chaufray, R. Modolo, J. M. Raines, W. Exner, U. Motschmann and C. Schmidt (2022) *Ion density and phase space density distribution of planetary ions Na^+ , O^+ and He^+ in Mercury's magnetosphere*. Icarus, Vol. 372, 114734, [DOI](#).
- T. Cassidy, C. Schmidt, A. Merkel, J. Jasinski and M. Burger (2021) *Detection of Large Exospheric Enhancements at Mercury due to Meteoroid Impacts*, The Planetary Science Journal, Vol. 2, 175, [DOI](#).
- J. Baumgardner, S. Luetggen, C. Schmidt, M. Mayyasi, S. Smith, C. Martinis, J. Wroten, L. Moore and M. Mendillo (2021) *Long-Term Observations and Physical Processes in the Moon's Extended Sodium Tail*, Journal of Geophysical Research: Planets, Vol. 126, 3, [DOI](#).
- V. Mangano and 61 co-authors including C. Schmidt (2021) *BepiColombo science investigations during cruise and flybys at the Earth, Venus and Mercury*, Space Science Reviews, Vol. 217, 23, [DOI](#).

- C. Schmidt, J. Baumgardner, L. Moore, T. A. Bida, R. Swindle and P. Lierle (2020) *The Rapid Imaging Planetary Spectrograph: Observations of Mercury's Sodium Exosphere in Twilight*. The Planetary Science Journal, Vol. 1, 4, [DOI](#).
- A. Oza, R.E. Johnson, E. Lellouch, C. Schmidt, N. Schneider, C. Huang, D. Gamborino, A. Gebek, A. Wyttenbach and B-O Demory. (2019) *Sodium and Potassium as Remnants of Volcanic Satellites Orbiting Close-in Gas Giant Exoplanets*, Astrophysical Journal, V885, 2, [DOI](#).
- L. Moore, H. Melin, T. Stallard, J. O'Donoghue, J. Moses, S. Miller and C. Schmidt (2019) *Modelling H_3^+ in Planetary Atmospheres: Effects of Vertical Gradients on Observed Quantities*, Philosophical Transactions of the Royal Society A, 377, [DOI](#).
- R.E. Johnson, A. Oza, F. Leblanc, C. Schmidt and T.A. Nordheim (2019) *The Origin and Fate of O_2 in Europa's Ice: An Atmospheric Perspective*. Space Science Reviews, 215 (1), 20, [DOI](#).
- J. Morgenthaler, J. Rathbun, C. Schmidt, J. Baumgardner and N. Schneider (2019) *Large Volcanic Event on Io Inferred from Jovian Sodium Nebula Brightening*, Astrophysical Journal Letters, 871 (2), L23, [DOI](#).
- A. Oza, F. Leblanc, R. E. Johnson, C. Schmidt, L. Leclercq, T. Cassidy and J.-Y. Chaufray (2019) *Dusk Over Dawn O_2 Asymmetry in Europa's Near-Surface Atmosphere*. Planetary & Space Science, 167, 23-32, [DOI](#).
- C. Schmidt, N. Schneider, F. Leblanc, C. Gray, J. Morgenthaler, J. Turner and C. Grava (2018) *Optical Measurements of Io's Plasma Torus in the Hisaki Epoch*. Journal of Geophysical Research: Space Physics, 123, 7, 5610-5624, [DOI](#).
- F. Leblanc, A. Oza, L. Leclercq, C. Schmidt, T. Cassidy, R. Modolo, J.Y. Chaufray and R. E. Johnson (2017) *On the Orbital Variability of Ganymede's Atmosphere*. Icarus, Vol. 293, p. 185-198, [DOI](#).
- J. D. Turner, D. Christie, P. Arras, R. E. Johnson and C. Schmidt (2016) *Investigation of the environment around close-in transiting exoplanets using CLOUDY*. Monthly Notices of the Royal Astronomical Society, Vol 458 (4), p.3880-3891, [DOI](#).
- 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, [DOI](#).
- R.E. Johnson, A. Oza, L.A. Young, A.N. Volkov and C. Schmidt (2015) *Volatile Loss and Classification of Kuiper Belt Objects*. Astrophysical Journal, Vol 809 (1), 43, [DOI](#).
- N.-E. Raouafi, C. M. Lisse, G. Stenborg, G. H. Jones and 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, [DOI](#).
- C. Schmidt, R.E. Johnson, J. Baumgardner and M. Mendillo (2015) *Observations of Sodium in the Coma of Comet C/2012 S1 (ISON) During Outburst*. Icarus, Vol 247, p. 313-318, [DOI](#).
- C. Schmidt (2013) *Monte-Carlo Modeling of North-South Asymmetries in Mercury's Sodium Exosphere*, Journal of Geophysical Research, Vol 118, A50396, [DOI](#).

- C. Schmidt, J. Baumgardner, M. Mendillo and J. Wilson (2012) *Escape rates and variability constraints for high-energy sodium sources at Mercury*, Journal of Geophysical Research, Vol 117, A03301, [DOI](#).
- C. Schmidt, J. Wilson, J. Baumgardner and M. Mendillo (2010) *Orbital Effects on Mercury's Escaping Sodium Exosphere*, Icarus, Vol 207 (1), p. 9-16, [DOI](#).

Conference Proceedings and Abstracts (students underlined)

- Sharov, M., Schmidt, C., Gray, C., Schneider, C., Withers, P. (2021) An ARCES study of Io's Aurora in Jupiter's Shadow. APO Science Symposium, held virtually 26-28 July, [link](#).
- Morgenthaler J., Vogt, M., Schmidt, C., Schneider, N. (2021) Using Io Input/Output observatory (IoIO) observations to provide an new approach to resolving the question: Is mass flow in Jupiter's magnetosphere driven by internal or external processes? Magnetospheres of the Outer Planets, held July 11-15, 2021 in Liege, BE, [link](#).
- Schmidt, C., Cassidy, T., Merkel, A., Jasinski, J., Burger, M. (2021) Simulating Impulsive Events in the Mercury Exosphere as Observed by MESSENGER UVVS. Mercury Exploration Assessment Group, #6025, held Feb 3-5, 2021, Virtual, [link](#).
- Schmidt, C. (2020) The Io-Torus Interaction as Seen Through a Telescope, Outer Planet Moon-Magnetosphere Interaction Workshop, #24, held Nov 5-6 2020, ESA/ESTEC, Noordwijk, The Netherlands, [link](#).
- Moye, C., Schmidt, C., Roth, L., Ivchenko, N., Saur, J., & Retherford, K. (2020). Evidence for an Ionic Pathway in Oxygen and Sulfur Atoms Escaping Io. Bulletin of the AAS, 52(6), [link](#).
- Baumgardner, J., Luetgten, S., Schmidt, C., Mayyasi, M., Smith, S., Martinis, C., Wroten, J., Moore, L., Mendillo, M. (2020) A new long-term study of the Moon's extended tail of sodium atoms. American Geophysical Union, Fall Meeting 2020, abstract #SM33F-3282.
- Lierle, P., Schmidt, C., Baumgardner, J., Moore, L., Swindle, R. (2020) The Brightness of Mercury's Potassium Exosphere. Europlanet Science Congress, Vol.14, EPSC2020-493, 2020, held 21 Sept - 9 Oct 2021, Virtual, [DOI](#).
- Sharov, M., Schmidt, C., Gray, C., Schneider, C., Withers, P. (2020) Io's Optical Airglow in Jovian Eclipse. Europlanet Science Congress, Vol.14, EPSC2020-457, 2020, held 21 Sept - 9 Oct 2021, Virtual, [DOI](#).
- Schmidt, C., Moullet, A., de Kleer, K., Spencer J., Roth, L. (2019) A Multi-Wavelength Study of Io's Atomic Oxygen and Sulfur Emission. American Geophysical Union, Fall Meeting 2019, abstract #SM33F-3282.
- Spencer J., Grundy, W., Schmidt C. (2019) Rapid Temporal Variability of Condensed Oxygen on Europa? EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, [link](#).

- Mangano V., Zender, J., Huovelin, J., Schmidt, C., Killen, R., Kameda, S. (2019) Sodium exosphere of Mercury: a call for new Earth-based telescopes and observers. EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, [link](#).
- Bhattacharyya, D., Clarke, J., Mayyasi, M., Chaufray, J.-Y., Schmidt, C., Johnson, R. E., Bertaux, J.-L., Moore, L., Chaffin, M., Groeller, H., Schneider, N. (2019) Evidence of Hot Hydrogen in the Exosphere of Mars. EPSC-DPS Joint Meeting, held 15-20 Sept 2019 in Geneva, Switzerland, [link](#).
- Oza, A. and 14 co-authors including Schmidt C. (2019) Alkaline Signatures of an Active Exomoon, *Extreme Solar Systems* 4, id. 306.05. *Bulletin of the American Astronomical Society*, Vol. 51, No. 6, [link](#).
- Baumgardner, J., Schmidt, C., Moore, L., Mendillo M., Mayyasi M. (2019) 20 Years of Observations of the Lunar Sodium Tail. 50th Lunar and Planetary Science Conference, held 18-22 March, 2019 in Woodlands, Texas. LPI id.1940, [link](#).
- Morgenthaler J. & Schmidt, C. (2018) Evidence for a large Volcanic Outburst on Io in Early January 2018 from Ground-Based Sodium Observations by the Io Input/Output facility (IoIO). American Geophysical Union, Fall Meeting 2018, abstract #SM52A-04
- Baumgardner, J., Schmidt, C., Moore, L., Swindle, R., Shaw, C. (2018) Concurrent Lucky Imaging and Spectroscopy of the Mercury Exosphere with the Rapid Imaging Planetary Spectrograph. American Geophysical Union, Fall Meeting 2018, abstract #P22B-05
- Johnson, R. E., Oza, A., Schmidt, C., Leblanc, F. (2018) Plasma and Thermal Processing of Europa's Surface, Europa Deep Dive: Chemical Composition of Europa and State of Laboratory Data, held 9-11 Oct, 2018 in Houston, Texas, id.3041, [link](#).
- Oza, A. and 11 co-authors including Schmidt C. (2018) Exogenic Volatiles in the Extended Exospheres of Extrasolar Giant Planets, European Planetary Science Congress 2018, held 16-21 September 2018 at TU Berlin, Germany, id.EPSC2018-1199, [link](#).
- Schmidt, Baumgardner, J., Moore, Bida (2018) Ground-Based BepiColombo Support with the Rapid Imaging Planetary Spectrograph, European Planetary Science Congress 2018, held 16-21 September 2018 at TU Berlin, Germany, id.EPSC2018-1216, [link](#).
- Schneider, N., Schmidt C., Kagitani, M., Kasaba, Y., Kimura, T., Murakami, G., Tsuchiya, F., Yamakazi, I., Yoshikawa, I., Yoshioka, K. (2018) A Search for Ion Scale Height Variability in Hisaki Io Torus Observations, Magnetospheres of the Outer Planets, held July 8-11, 2018 at University of Colorado, [link](#).
- Schmidt C., (2018) Visible Wavelength Spectroscopy of the Io Torus During the Hisaki Mission, Magnetospheres of the Outer Planets, held July 8-11, 2018 at University of Colorado, [link](#).
- Schmidt C., Leblanc, F., Reardon, K., Killen, R., Gary D. E., Ahn, K. (2018) Absorption Spectroscopy of Mercury's Exosphere During the 2016 Solar Transit, Mercury: Current and Future Science of the Innermost Planet, Proceedings of the conference held 1-3 May, 2018 in Columbia, MD, 2047, [link](#).
- Nerney, E. G., Bagenal, F., Yoshioka, K., Schmidt, C. (2017) Constraining Plasma Conditions of the IPT via Spectral Analysis of UV & Visible Emissions and Comparing

with a Physical Chemistry Model, American Geophysical Union, Fall Meeting 2017, abstract #SM33C-2672

- Oza, A. V., Leblanc, F., Chaufray, J. Y., Schmidt, C., Roth, L., Johnson, R. E., Cassidy, T. A., Leclercq, L., Modolo, R. (2017) Europa and Ganymede's Water-Product Exospheres. European Planetary Science Congress 2017, held 17-22 September, 2017 in Riga Latvia, id. EPSC2017-626, [link](#).
- Schmidt, C., Leblanc, F., Moore, L., Bida, T. A. (2017) Detection of Mercury's Potassium Tail. American Astronomical Society, DPS meeting #49, id.422.01
- Schmidt, C. (2017) Absorption By Mercury's Atmosphere During Solar Transit. Transiting Exoplanets, held 17-21 July at Keele University, UK, [link](#).
- Schmidt, C., Reardon, K., Killen, R. M., Gary, D. E., Ahn, K., Leblanc, F., Baumgardner, J. L., Mendillo, M., Beck, C., Mangano, V. (2016) Absorption by Mercury's Exosphere During the May 9th, 2016 Solar Transit. American Geophysical Union, Fall General Assembly 2016, abstract #P53B-2198.
- Nerney, E. G., Bagenal, F., Schmidt, C., Yoshioka, K., Steffl, A., Schneider, N. M. (2016) Observations of Ion Composition in the Io Plasma Torus. American Geophysical Union, Fall General Assembly 2016, abstract #P23C-2177
- Raouafi, N. E., Lisse, C. M., Stenborg, G., Jones, G., Schmidt, C. (2016) Dynamics of HVECs emitted from comet C/2011 L4 as observed by STEREO. American Geophysical Union, Fall General Assembly 2016, #P43B-2114
- Leblanc, F., Oza, A., Schmidt, C., Leclercq, L., Modolo, R., Chaufray, J.-Y. (2016) 3D multispecies collisional model of Ganymede's atmosphere. American Astronomical Society, DPS meeting #48, id.429.09
- Skrutskie, M., Nelson, M., Schmidt, C. (2016) Monitoring the Near-infrared Volcanic Flux from Io's Jupiter-facing Hemisphere from Fan Mountain Observatory. American Astronomical Society, DPS meeting #48, id.429.22
- Leclercq, L., Chanteur, G., Modolo, R., Leblanc, F., Schmidt, C., Langlais, B., Thebault, E. (2016) Study of the internal magnetic field of Mercury through 3D hybrid simulations. American Astronomical Society, DPS meeting #48, id.117.01
- Oza, A. Leblanc, F., Schmidt, C., Johnson R. E. (2016) Origin and Evolution of Europa's Oxygen Exosphere. American Astronomical Society, DPS meeting #48, id.517.05
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J. L., Moore, L., O'Donoghue, J., Leblanc, F. (2015) Evidence for a Plasma Interaction with Europa's Sodium Clouds from High Resolution Integral Field Spectroscopy. American Geophysical Union, Fall Meeting 2015, abstract #SM31B-2491
- Lisse, C. M., Raouafi, N. E., Stenborg, G., Jones, G. H., Schmidt, C. (2015) Dynamics of High-Velocity Evanescent Clumps (HVECs) Emitted from Comet C/2011 L4 (Pan-STARRS) as Observed by STEREO. American Geophysical Union, Fall Meeting 2015, abstract #SM31D-2542
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J., Leblanc, F. (2015) Neutral and Plasma Distributions in the Coma of Comet C/2012 S1 ISON: Narrowband

Imaging and Integral-Field Spectroscopy. European Planetary Science Congress, held 27 Sept - 2 Oct, 2015 in Nantes, France, [link](#).

- Schneider N., and 11 co-authors including Schmidt C., (2015) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. European Planetary Science Congress, held 27 Sept - 2 Oct, 2015 in Nantes, France, [link](#).
- Schmidt, Schneider, Turner, Johnson, Chaffin, Rugenski, McNeil (2015) Optical Spectroscopy of the Io Plasma Torus in Support of Hisaki/EXCEED. Magnetospheres of the Outer Planets, held June 1-5, 2015 at Georgia Tech.
- Schmidt, C., Johnson, R. E., Mendillo, M., Baumgardner, J. L. (2014) Velocity-Resolved Multi-Scale Imaging of Na Escape from Io. American Geophysical Union, Fall Meeting 2014, abstract #P21A-3901
- Turner, J., Schmidt, C., Schneider, N., Chaffin, M., McNeil, E., Chanover, N., Oza, A., Rugenski, S., Thelen, A., Johnson, R. E., Bittle, L., King, P. (2014) Plasma Parameters in Io's Torus: Measurements from Apache Point Observatory. American Geophysical Union, Fall Meeting 2014, abstract #P13E-07
- Schmidt, C., Johnson R. E., Baumgardner, J., Mendillo M., (2014) Gas Distributions in Comet ISON's Coma: Concurrent Integral-Field Spectroscopy and Narrow-band Imaging, American Astronomical Society, DPS meeting #46, id.113.02
- Johnson R. E., Oza, A., Young, L., Volkov, A., Schmidt C. (2014) Volatile Loss and Classification of Kuiper Belt Objects. American Astronomical Society, DPS meeting #46, id.510.01
- Schmidt C., Mendillo M., Baumgardner, J., Johnson, R. E. (2013) Sodium Escape in Mercury's Atmosphere: Ground-Based Observations in Support of MESSENGER, American Astronomical Society, DPS meeting #45, id.102.07
- Bhattacharyya, D., Clarke, J. T., Bertaux, J., Chaufray, J., Montgomery, J., Schmidt, C. (2013) Analyzing HST observations of the Martian Corona with different modeling techniques, American Astronomical Society, DPS meeting #45, id.313.15
- Schmidt C., Baumgardner, J., Mendillo, M. (2012) Hemispheric Asymmetries in Mercury's Exosphere, American Astronomical Society, DPS meeting #44, id.410.05
- Clarke, J. T., Bhattacharyya, D., Montgomery, J., Bertaux, J., Chaufray, J., Gladstone, R., Quemerais, E., Wilson, J., Schmidt, C., Mendillo, M (2012) HST observations and modeling of the Martian hydrogen corona, American Astronomical Society, DPS meeting #44, id.214.01
- Schmidt C., Baumgardner, J., Mendillo, M., Sundberg, T., Walsh B. (2012) Hemispheric Asymmetries in Mercury's Exosphere Due to the Offset Magnetic Dipole, American Geophysical Union, Fall Meeting 2012, abstract #P33B-1931
- Schmidt C., Baumgardner, J., Mendillo, M., Wilson J. K. (2011), Escape rates and variability constraints for high-energy sodium sources at Mercury, EPSC-DPS Joint Meeting 2011, held 2-7 Oct 2011 in Nantes, France, Vol. 6, EPSC-DPS2011-100.
- Mangano V. and 19 co-authors including Schmidt, C. (2010) The sodium emission from Mercury's exosphere as detected by the IMW coordinated campaign in June

2006, 38th COSPAR Scientific Assembly, held 18-15 July 2010, in Bremen, Germany, p.5, B07-0022-10.

- Schmidt, C., Baumgardner, J., Mendillo, M., Davis, C., Musgrave, I. (2010) Observations of Extended Emissions at Mercury by the STEREO Spacecraft, European Planetary Science Congress, held 20-24 Sept in Rome, Italy, Vol. 5, EPSC2010-419.
- Schmidt, C., Baumgardner, J., Mendillo, M., Davis, C., Musgrave, I. (2010) Observations of tail structures at Mercury with the STEREO spacecraft, Joint MESSENGER / BepiColombo Workshop, held, Nov 2-5, in Boulder, CO, Abstract 2.2.1.
- Schmidt, Wilson, Baumgardner, J., Mendillo (2009) Variability in Mercury's Escaping Sodium Atmosphere, American Astronomical Society, DPS meeting #41, id.35.01
- Schmidt, Wilson, Baumgardner, J., Mendillo (2008) Wide Field Observations of Variability in Mercury's Comet-like Sodium Tail, American Astronomical Society, DPS meeting #40, id.51.09; Bulletin of the American Astronomical Society, Vol. 40, p.491
- Schmidt, Wilson, Baumgardner, J., Mendillo (2008) Wide Field Observations of Mercury's Extended Sodium Exosphere, 37th COSPAR Scientific Assembly. Held 13-20 July 2008, in Montreal, Canada., p.2775, B07-0036-08
- Schmidt, Baumgardner (2007) Boston University Calibration Facility for Optical Aeronomy. CEDAR Meeting Abstract

Non-Peer-Reviewed Publications

- Chanover, N., Schmidt, C., & DeColibus, D. (2021) *The Continued Relevance of 4m Class Telescopes to Planetary Science in the 2020s* White paper #497 submitted to the Decadal Survey in Planetary Science and Astrobiology 2023-2032, Bulletin of the AAS, 53(4), [DOI](#).
- P. Prem, A. Kereszturi, A. Deutsch, C. Hibbitts, C. Schmidt and 36 co-authors (2021) *Lunar Volatiles and Solar System Science*, White paper #68 submitted to the Decadal Survey in Planetary Science and Astrobiology 2023-2032, Bulletin of the AAS, 53(4), [ArXiv](#), [DOI](#).
- A. Deutsch, N. Chabot, A. Maiti, A. Luspai-Kuti, A. Kereszturi, A. Lucchetti, A. Virkki, A. Colaprete, A. Vorburger, B. Byron, B. Jones, B. Anzures, B. Butler, C. Schmidt and 59 co-authors (2021) *Science Opportunities offered by Mercury's Ice-Bearing Polar Deposits*. Whitepaper #69 submitted to the Planetary Science and Astrobiology Decadal Survey 2023-2032, Bulletin of the AAS, 53(4), [DOI](#).
- J. Clarke, C. Schmidt, J. Baumgardner, C. Carveth, M. Matta, M. Mendillo, L. Moore, and P. Withers (2013) White Paper on Comparative Planetary Exospheres. White paper submitted to Heliophysics Decadal Survey, [link](#).
- F. Hearty, S. Beland, J. Green, N. Cunningham, J. Barentine, M. Drosback, R. Valentine, A. Bondarenko, C. Schmidt, J. Walawender, C. Froning, J. Morse and P. Hartigan (2005) Colorado's Near-Infrared Camera (AKA NIC-FPS) Commissioning on the ARC 3.5M Telescope, Proc. SPIE, Vol 5904, p. 199-211, [DOI](#).

Invited Colloquia

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| Io's Atmosphere and Plasma Torus, Boise State University, Boise, ID, USA | 2022 |
| Optical Spectroscopy of Jupiter's Moons, AAVSO, Cambridge, MA, USA | 2021 |
| Observing the Exospheres of Mercury & the Moon, UMASS, Lowell, MA, USA | 2020 |
| Io's Escaping Atmosphere & Plasma Torus, Boston College, Boston, MA, USA | 2018 |
| Solar Transit Spectroscopy of Mercury's Exosphere, Universiteit van Amsterdam, NL | 2018 |
| Io's Escaping Atmosphere & Plasma Torus, Universität zu Köln, DE | 2018 |
| 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, Awards & Fellowships

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- NSF Astronomy and Astrophysics Research Grant. *Mass transport in Jupiter's magnetosphere: driven by internal or external processes?* Co-I/Institutional PI (PI Jeff Morgenthaler, Planetary Science Institute), 2021.09.01 to 2024.08.30. AST-2108416. Funding to BU: \$94,720
 - NASA Solar System Observations *Dynamic Processes on the Galilean Satellites*, Co-I/Institutional PI (PI John Spencer, Southwest Research Institute), 2021.07.01 to 2024.06.30. 20-SSO20-2-0034. Funding to BU: \$59,981.
 - NASA Discovery Data Analysis Program *Investigating the Impactor Contribution to Mercury's Exosphere*, Co-I/Institutional PI (PI Aimee Merkel, Univ. Colorado), 2021.05.21 to 2024.04.30. DDAP18-2-0053. Total budget: \$551,469. Funding to BU: \$131,866
 - NASA Science Mission Directorate *Characterizing Mercury's Exosphere with BepiColombo-PHEBUS: US-based Co-Investigators*, PI, 2020.10.13 to 2025.10.12, SMDSS20-0011. Total budget / funding to BU: \$226,061
 - NASA/NExSCI Keck Award *Response of Io's atomic atmosphere and ionosphere to Jovian eclipse: joint observations with HIRES and HST*, PI, 2020.02.01 to 2020.09.30. 87/2020A-N079. Total budget / funding to BU: \$11,775
 - NASA New Frontiers Data Analysis Program *The plasma distribution in the Io torus during the Juno epoch*, Co-I (PI Paul Withers, Boston Univ.), 2019.03.21 to 2022.02.28. NFDAP18-2-0022. Total budget / funding to BU: \$289,272

- SOFIA Guest Observer Cycle 7 *Io's Atomic Sulfur Atmosphere in the Mid-IR*, PI, 2019.04.01 to 2020.03.31. 07-0221. Total budget / funding to BU: \$16,700
- NASA/NEExSCI NN-EXPLORE WIYN PI Data Award *Confirming a High Velocity Exo-Exosphere at HD 80606b*, PI, 2019.02.01 to 2021.01.31. N0223. Total budget / funding to BU: \$10,100
- NASA/NEExSCI Keck Award *Juno Support: Io's Auroral Emissions in Jovian Eclipse*, PI, 2019.02.01 to 2020.01.31. 84-208B-N110. Total budget / funding to BU: \$10,062
- Hubble Space Telescope Cycle 26 *Auroral and magnetospheric context for Juno in situ instruments during Cycle 26*, Co-I (PI Denis Grodent, Univ. Liege), 2019.03.01 to 2020.02.28. HST-GO-15638. Total budget / funding to BU: \$134,087
- NASA Solar System Workings *Physical Processes Governing Mercury's Alkali Exosphere*, PI, 2018.11.01 to 2021.03.31. 17-SSW17-0206. Total budget: \$352,275. Funding to BU: \$203,872
- 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. Total budget: \$507,403. Funding to BU: \$165,281
- 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 Jeff Morgenthaler, Planetary Science Institute), 2017.08.23 to 2020.08.22. SSW16-2-0086. Total budget: \$526,604. Funding to BU: \$115,358
- Hubble Space Telescope Cycle 25 *Extreme Doppler Shifting of Io's Neutral Jets*, PI, 2018.03.01 to 2019.02.28. HST-GO-15147. Total budget / funding to BU: \$39,999
- NSF Astronomy and Astrophysics Research Grant *The Influence of Mercury's Magnetosphere on Its Outermost Atmosphere*, Science PI (PI Luke Moore, Boston Univ.), 2016.07.15 to 2019.06.30. AST-1614903. Total budget / funding to BU: \$374,407
- NASA Earth and Space Sciences Fellowship *Mercury's Escaping Atmosphere*, Science PI (PI Michael Mendillo, Boston Univ.), 2010.0+3.15 to 2013.03.15. 10-Planet10F-0041. Total budget / funding to BU: \$90,000

Telescope Time Awarded

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| Keck I & II, NASA NEExSci (as Co-I, PIs L. Moore & K. de Kleer) | 2021 |
| Very Large Telescope, ESO (as Co-I, PI A. Oza) | 2020 |
| Keck I & II, NASA NEExSci (as PI & Co-I, PI M. Vogt) | 2020 |
| THEMIS Solar Telescope, SOLARNET (as Co-I, PI V. Mangano) | 2019, 2020 |
| Big Bear Solar Observatory | 2019 |
| GREGOR Solar Telescope | 2019 |
| SOFIA, USRA | 2019 |
| IRTF, NASA (as Co-I, PI L. Moore) | 2019 |
| WIYN, NASA NEExSci | 2019 |
| Keck I, NASA NEExSci (as PI & Co-I, PI K. de Kleer) | 2019 |
| Hubble Space Telescope, STScI (as Co-I, PI D. Grodent) | 2019 |

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| Hubble Space Telescope, STScI | 2018 |
| Dunn Solar Telescope, National Solar Observatory | 2016 |
| Vacuum Tube Telescope, SOLARNET | 2016 |
| GREGOR Solar Telescope, SOLARNET (as Co-I, PI V. Mangano) | 2016 |
| Very Large Telescope, ESO (as Co-I, PI B. Bonfond) | 2015 |
| Via Institutions Partnerships: Large Binocular Telescope, IRTF, Apache Point 3.5m, Lowell Discovery Telescope | |

Service & Team Activity

- Instrument Science PI: Rapid Imaging Planetary Spectrograph: <http://carlschmidt.science/RIPS.html>
- Mission Science Co-I: ESA/JAXA BepiColombo mission
- Institutional Representative: Massachusetts Space Grant Consortium (2020 -)
- International Space Science Institute Teams: The influence of Io on Jupiter's Magnetosphere (2016 - 2017), Surface Bounded Exospheres and Interactions in the Solar System (2020), Mass loss from Io's unique atmosphere: Do volcanoes really control Jupiter's magnetosphere? (2021 - 2022), Exosphere-Surface Interactions (2021 - 2022)
- Journal Reviews: Icarus (outstanding reviewer award 2017), Journal of Geophysical Research, Geophysical Research Letters, Nature, Astronomy & Astrophysics
- Panelist for NASA programs: 11x Research Opportunities in Space and Earth Science (ROSES) programs, Keck Time Allocation Committee, PDS Derived Data Review, Discovery Mission Extension Review.
- Local Organizing Committees: Cool Stars 20 Conference, Boston University (2018), DPS Conference, Providence RI (2021)
- Scientific Organizing Committees: Jupiter Day, Boston University (2018)
- Session Chair: AGU, Dynamics of the Io-Jupiter System (2014), Io plasma torus splinter meetings at MOP (2017 & 2018), Exosphere/Magnetosphere, Mercury: Current and Future Science of the Innermost Planet, USRA (2018)
- Memberships: American Astronomical Society, International Astronomical Union, American Geophysical Union

Public Outreach, Press & Media

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| Boston Globe: <i>Bad weather may hurt viewing of rare lunar eclipse Friday in Mass.</i> | 2021 |
| Swedish National Public Television: <i>Today a storm from the moon pulls past the earth.</i> | 2021 |
| NY Times: <i>The Moon Has a Comet-Like Tail.</i> | 2021 |
| Wall Street Journal: <i>Comet Neowise as Seen Around the World</i> | 2020 |
| Sky & Telescope: <i>Comet NEOWISE Dazzles at Dusk</i> | 2020 |
| Fox News: <i>Comet NEOWISE may have sodium tail, new images suggest</i> | 2020 |
| Host, Navajo-Hopi Astronomy Outreach Program, Lowell Observatory | 2018 |
| TV Interview, Space Challenges Documentary, Bulgarian National Public Television | 2017 |

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| TV Interview, NASA ScienceCast: The 2016 Transit of Mercury | 2016 |
| Content Advisor, 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 |
| Lab Instructor, Upward Bound program, Boston University | 2010 |
| Phys.org: <i>Mercury's comet-like appearance spotted by satellites looking at the Sun</i> | 2010 |
| Universe Today: <i>STEREO Catches Mercury Acting Like a Comet</i> | 2010 |
| Science Fair Judge, O'Bryant School for Math and Science, Roxbury, MA | 2009 |
| Workshop Coordinator, Sprout, www.thesprouts.org , Somerville, MA | 2009 - 2013 |