

Curriculum Vitae

Marc Kornbleuth

Born: 1990

Boston University, Department of Astronomy
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Education

Ph.D. Astronomy August 2020

Department of Astronomy, Boston University

Dissertation: Using Hydrogen Energetic Neutral Atoms to Study the Heliosphere

Advisor: Prof. Merav Opher

M.A. Astronomy September 2016

Department of Astronomy, Boston University

B.A. Astronomy & Physics with Honors Spring 2013

Department of Astronomy, Boston University

Dissertation: The Effect of Heating and Acceleration of Winds for Calculating Mass

Loss Rates of Stars

Advisor: Prof. Merav Opher

Research Appointments

Deputy Director of Global Heliosphere (Research Thrust #1) Team, SHIELD Drive
Center April 2022-present

Department of Astronomy, Boston University, PI: Dr. Merav Opher

Postdoctoral Associate August 2022-present

Department of Astronomy, Boston University, Advisor: Dr. Merav Opher

Graduate Researcher September 2014 – August 2020

Department of Astronomy, Boston University, Advisor: Dr. Merav Opher

Research Assistant September 2013 – August 2014

Harvard-Smithsonian Center for Astrophysics, Advisor: Dr. Bradford Wargelin

Undergraduate Student Researcher September 2011 - May 2013

Boston University, Advisor: Dr. Merav Opher

Research Awards & Honors

NASA Drive Center Grant (Co-I)	2022-present
Heliophysics Guest Investigator Grant (Scientific PI)	2022-present
Heliophysics Supporting Research Grant (Co-I)	2021-2022
NASA Earth and Space Science Fellowship	May 2018
NSF Graduate Research Fellowship - Honorable Mention	March 2016
Second Prize in Ionosphere/Magnetosphere category of the Community Coordinated Modeling Center Student Research Contest - NSF, CCMC	May 2014
Student Research Award - Boston University	Summer 2012

Teaching Appointments

Teaching Fellow PY 105 Elementary Physics I Department of Physics, Boston University	Summer 2018
REU Seminar Coordinator Department of Astronomy, Boston University	Summer 2017
Teaching Fellow AS 109 Cosmology Department of Astronomy, Boston University	Spring 2015
Teaching Fellow AS 102 The Astronomical Universe Department of Astronomy, Boston University	Fall 2014

Mentored Students

Ethan Bair	2022-present
Chika Onubogu	2021-present
Xiaohan Ma	2020-present
Erick Powell	2020-present
Warren Shelley	2020
Mark Hubbert	2017
Matthew Schueler	2017
Christopher Bambic	2016

Public Outreach, Service, and Teams

Senior Review - Voyager	2022
Outer Heliosphere and Very Local Interstellar Medium Seminar Co-coordinator	2021-

ISSI Space Science Team (Early Career Scientist)	2021-
30th Anniversary of the Center for Space Physics	2018
Boston University Astronomy Department Twitter Account	2016 – 2020
Boston University Public Open Nights	2016 – 2019
Boston University Natural Sciences Curriculum Committee	Fall 2016

Professional Memberships

American Geophysical Union (AGU)

Refereed Publications

1. The Heliosphere and Local Interstellar Medium from Neutral Atom Observations at Energies below 10 keV, Galli, A., Baliukin, I., Bzowski, M., Izmodenov, V., **Kornbleuth, M.**, Kucharek, H., Mobius, E., Opher, M., Reisenfeld, D., Schwadron, N. A., Swaczyna, P., Space Science Reviews, 218, 31, doi:10.1007/s11214-022-00901-7
2. The Structure of the Large-Scale Heliosphere as Seen by Current Models, Kleimann, J., Dialynas, K., Fraternali, F., Galli, A., Heerikhuisen, J., Izmodenov, V., **Kornbleuth, M.**, Opher, M. Pogorelov, N., Space Science Reviews, Space Science Reviews, 218, 36, doi:10.1007/s11214-022-00902-6
3. Interstellar Neutrals, Pickup Ions, and Energetic Neutral Atoms Throughout the Heliosphere: Present Theory and Modeling Overview, Sokol, J. M., Kucharek, H., Baliukin, I., Izmodenov, V. V., **Kornbleuth, M.**, Mostafavi, P., Opher, M., Park, J., Pogorelov, N., Quinn, P., Smith, C. W., Zank, G., Zhang, M., Space Science Reviews, 218, 18, doi:10.1007/s11214-022-00883-6
4. Gkioulidou, M., Opher, M., **Kornbleuth, M.**, Dialynas, K., Giacalone, J., Richardson, J. D., Zank, G. P., Fuselier, S. A., Mitchell, D. G., Krimigis, S. M., Roussos, E., Baliukin, I. (2022), First Comparison of Composite 0.52-55 keV ENA Spectra Observed by IBEX and Cassini/INCA with Simulated ENAs Inferred by Proton Hybrid Simulations Downstream of the Termination Shock, Astrophysical Journal Letters, Accepted
5. **Kornbleuth, M.**, Opher, M., Baliukin, I., Gkioulidou, M., Richardson, J. D., Zank, G. P., Michael, A. T., Toth, G., Tenishev, V., Izmodenov, V., Alexashov, D., Fuselier, S., Drake, J. F., Dialynas, K. (2021), The Development of a Split-Tail Heliosphere and the Role of Non-ideal Processes: A Comparison of the BU and Moscow Models, Astrophysical Journal, 923, 179, doi: 10.3847/1538-4357/ac2fa6
6. **Kornbleuth, M.**, Opher, M., Baliukin, I., Dayeh, M. A., Zirnstein, E. J., Gkioulidou, Dialynas, K., Galli, A., Richardson, J. D., Izmodenov, V., Zank, G. P., Fuselier, S.

- P.(2021), Signature of a Heliotail Organized by the Solar Magnetic Field and the Role of Non-ideal Processes in Modeled IBEX ENA Maps: A Comparison of the BU and Moscow MHD Models, *Astrophysical Journal*, 921, 164, doi: 10.3847/1538-4357/ac1e2a
7. Opher, M., Drake, J. F., Zank, G., Powell, E., Shelley, W., **Kornbleuth, M.**, Florinski, V., Izmodenov, V., Giacalone, J., Fuselier, S., Dialynas, K., Loeb, A., Richardson, J. (2021), A Turbulent Heliosheath Driven by the Rayleigh-Taylor Instability, *Astrophysical Journal*, 922, 181, doi: 10.3846/1538-4357/ac2d2e
 8. Fuslier, S. A, Galli, A., Richardson, J. D., Reisenfeld, D. B., Zirnstien, E. J., Heerikhuisen, J., Dayeh, M. A., Schwadron, N. A., McComas, D. J., Elliot, H. A., Gomez, R. G., Starkey, M. J., **Kornbleuth, M. Z.**, Opher, M., Dialynas, K. (2021) Energetic Neutral Atom Fluxes from the Heliosheath: Constraints from in situ Measurements and Models, *Astrophysical Journal Letters*, 915, L26, doi: 10.3847/2041-8213/ac0d5c
 9. **Kornbleuth, M.**, M. Opher, A. T. Michael, J. M. Sokół, G. Toth, V. Tenishev, and J. F. Drake (2020), The Confinement of the Heliosheath Plasma by the Solar Magnetic Field as Revealed by Energetic Neutral Atoms, *Astrophysical Journal Letters*, 895, L26, 10.3847/2041-8213/ab922b.
 10. **Kornbleuth, M.**, M. Opher, A. T. Michael, and J. F. Drake (2018), Globally Distributed Energetic Neutral Atoms for the ‘Croissant’ Heliosphere, *Astrophysical Journal*, 865, 84, doi:10.3847/1538-4357/aadbac.
 11. Kay, C., M. Opher, and **M. Kornbleuth** (2016), Probability of CME Impact on Exoplanets Orbiting M Dwarfs and Solar-like Stars, *Astrophysical Journal*, 826, 195, doi:10.3847/0004-637X/826/2/195.
 12. Wargelin, B.J., **M. Kornbleuth**, P. L. Martin, and M. Juda (2014), Observation and Modeling of Geocoronal Charge Exchange X-Ray Emission during Solar Wind Gusts, *Astrophysical Journal*, 796,28, doi:10.1088/0004-637X/796/1/28.

Conference Abstracts

1. A Comparison of Heliotail Configurations Arising from Different Treatments of Non-ideal MHD Effects with ENA Maps at IBEX Energies, **Kornbleuth, M. Z.**, Opher, M., Baliukin, I., Dayeh, M., Zirnstien, E., Gkioulidou, M., Dialynas, K., Galli, A., Richardson, J. D., Izmodenov, V., Zank, G. P., Fuselier, S. A., Michael, A., Toth, G., Tenishev, V., Alexashov, D., Drake, J. F., AGU Fall Meeting Abstracts, December 2021, Oral Presentation, SH21B-02
2. A Turbulent Heliosheath Driven by Rayleigh-Taylor Instability, Opher, M., Drake, J. F., Zank, G. P., Toth, G., Powell, E., **Kornbleuth, M. Z.**, Florinski, V. A., Izmodenov,

- V., Giacalone, J., Fuselier, S., Dialynas, K., Loeb, A., Richardson, J. D., AGU Fall Meeting Abstracts, December 2021, Oral Presentation, SH21B-06
3. Interplanetary Hydrogen Properties as Probes into the Heliospheric Interface, Mayyasi, M., Clarke, J. T., Quemerais, E., Katushkina, O. A., Izmodenov, V., Provornikova, E., Sokol, J. M., Brandt, P. C., Galli, M., Opher, M., **Kornbleuth, M. Z.**, Linsky, J. L, Wood, B. E., AGU Fall Meeting Abstracts, December 2021, Poster, SH15F-2069
 4. A Time-Dependent Split Tail Heliosphere, Powell, E., Opher, M., Toth, G., Tenishev, V., Michael, A., **Kornbleuth, M.**, Richardson, J. D., AGU Fall Meeting Abstracts, December 2021, Poster, SH15F-2075
 5. The Structure of the Heliosphere as Revealed by Modeled ENA Maps at IBEX Energies, **Kornbleuth, M.**, Opher, M., Toth, G., Tenishev, V., Izmoddenov, V., Baliukin, I., Michael, A., 43rd COSPAR Scientific Assembly, January 2021, Oral Presentation, D1.3-0013-21
 6. Structure of the Heliotail, Opher, M., Richardson, J., Krimigis, S., Toth, G., Tenishev, V., Zank, G., Drake, J., Izmodenov, V., Fuselier, S., Dialynas, K., Baliukin, I., Dayeh, M., Zieger, B., Michael, A., **Kornbleuth, M.**, Gkioulidou, M., 43rd COSPAR Scientific Assembly, January 2021, Oral Presentation, D1.2-0014-21
 7. The Effect of Changing Solar Magnetic Field Intensity on ENA Maps, **Kornbleuth, M. Z.**, Opher, M., Michael, A. T., Sokol, J. M., Toth, G., Tenishev, V., AGU Fall Meeting Abstracts, December 2020, Poster, SH023-0008
 8. Heliospheric Ly alpha Absorption in a Split Tail Heliosphere, Powell, E., Opher, M., Michael, A. T., **Kornbleuth, M. Z.**, Wood, B. E., Izmodenov, V., Toth, G., Tenishev, V., Richardson, J. D., AGU Fall Meeting Abstracts, December 2020, Poster, SH017-0013
 9. The Confinement of the Heliosheath Plasma by the Solar Magnetic Field as Revealed by ENAs, **Kornbleuth, M.**, Opher, M., Michael, A.T., & Sokół. J.M., AGU Fall Meeting Abstracts, December 2019, Poster, SH51C-3335
 10. Energetic Neutral Atom Maps from the ‘Croissant-like’ Heliosphere, **Kornbleuth, M.**, Opher, M., Michael, A.T., & Drake, J.F., AGU Fall Meeting Abstracts, December 2018, Poster, SH33C-3664
 11. The Energetic Neutral Atom Maps of the ‘Croissant-like’ Heliosphere with Jets, **Kornbleuth, M.**, Opher, M., & Michael, A.T., AGU Fall Meeting Abstracts, December 2017, Poster, SH51D-2535

12. The Structure of the Heliosphere with Solar Cycle and Its Effect on the Conditions in the Local ISM, Opher, M., Drake, J.F., Toth, G., Swisdak, M., Michael, A., **Kornbleuth, M.Z.**, & Zieger, B., AGU Fall Meeting Abstracts, December 2017, Oral Presentation, SH54B-04
13. Understanding the Heliosphere with Jets Using Energetic Neutral Atoms, **Kornbleuth, M.**, Opher, M., & Michael, A.T., Solar Heliospheric and Interplanetary Environment Conference, July 2017, Poster, 167
14. Investigating the Effect of the Heliosphere with Jets on ENAs, **Kornbleuth, M.**, Opher, M., Michael, A.T., & Zieger, B., AGU Fall Meeting Abstracts, December 2016, Poster, SH31A-2535
15. Probing the Nature of Pick-up Ions (and Kappa Distribution) in the Heliosheath through Global ENA Measurements and In-site Measurements, Opher, M., Zieger, B., Drake, J.F., **Kornbleuth, M.Z.**, & Toth, G., AGU Fall Meeting Abstracts, December 2016, Oral Presentation, SH13D-01
16. The Heliosphere with Jets and its implications for the global Energetic Neutral Atoms Maps throughout the Solar Cycle and its impact on the large-scale draping of the interstellar magnetic field, Opher, M., Drake, J.F., **Kornbleuth, M.Z.**, Michael, A., Zieger, B., Swisdak, M., & Toth, G., AGU Fall Meeting Abstracts, December 2016, Oral Presentation, SH23A-05
17. Investigating the Effect of the Heliosphere with Jets on ENAs, **Kornbleuth, M.**, Opher, M., Michael, A.T., & Zieger, B., Solar Heliospheric and Interplanetary Environment Conference, July 2016, Poster, 124
18. The Effect of the Heating and Acceleration of Winds on the Conditions Ahead of Hot Jupiters: Solar and V374 Peg Cases, **Kornbleuth, M.**, Opher, & Evans, R.M., Solar Heliospheric and Interplanetary Environment Conference, July 2015, Poster, 88
19. Chandra Observations and Modeling of Geocoronal Charge Exchange X-Ray Emission During Solar Wind Gusts, **Kornbleuth, M.**, Wargelin, B.J., & Juda, M., Geospace Environment Modeling Workshop, June 2014, Poster
20. Chandra Observations and Modeling of Geocoronal Charge Exchange X-Ray Emission During Solar Wind Gusts, **Kornbleuth, M.**, Wargelin, B.J., & Juda, M., American Astronomical Society, AAS Meeting #224, June 2014, Poster, 321.03

Seminars and Contributed talks

1. Using SHIELD to Study our Heliospheric Shield, November 2020, Space Physics Seminar Series, Boston University, Boston, MA

2. Predicting the ENAs from the Croissant Heliosphere, November 2018, New England Space Science Consortium Meeting #27, Lowell, MA
3. CCMC Modeling, GEM Student Tutorial Presentation, June 2014, Geospace Environment Modeling Summer Workshop 2014, Portsmouth, VA, Invited Talk

Panels

1. High Energy ENA Facilitator, Session 6: Outer Heliosphere and Interstellar, May 5 2021, Helio 2050 Workshop

Press

1. Want to See Five Planets with Your Naked Eye This Week?, BU Today, 22 June 2022, <https://www.bu.edu/articles/2022/see-five-planets-with-your-naked-eye-this-week/>
2. Office Artifacts: Marc Kornbleuth, BU Today, 27 April 2022, <https://www.bu.edu/articles/2022/office-artifacts-marc-kornbleuth/>
3. NSF Program Brings Budding Astronomers to BU, BU Today, 21 July 2017, <https://www.bu.edu/articles/2017/nsf-program-astronomy-mentorship>
4. Under Pressure: Extreme Atmosphere Stripping May Limit Exoplanets' Habitability, Phys.org, 3 July 2017, <https://phys.org/news/2017-07-pressure-extremeatmosphere-limit-exoplanets.html>