# PAWEŁ SWACZYNA – CV

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## RESEARCH INTERESTS

Solar wind – Heliosphere – Very Local Interstellar Medium – Interstellar clouds – Space plasma – Interstellar neutral atoms – Energetic neutral atoms – Pickup ions – Elastic and charge exchange collisions – Composition of the solar wind – Solar cycle modulation of interstellar neutral atoms

## DEGREES

June 2024 **Habilitation** in **Astronomy**
Space Research Centre of the Polish Academy of Sciences (CBK PAN), Warsaw, Poland
Achievement: *Determination of Physical Conditions in the Interstellar Medium Around the Heliosphere from Observations of Interstellar Neutral Helium Atoms*

March 2018 **Ph.D. in Physical Sciences** in the branch of Geophysics
Space Research Centre of the Polish Academy of Sciences (CBK PAN), Warsaw, Poland
Thesis: *Prospects for studying the heliosphere and its vicinity based on observations of energetic neutral atoms of heavy elements*
Supervisor: Dr. Maciej Bzowski

July 2013 **M.Sc. in Physics** with major in Theoretical physics**, *summa cum laude***
Faculty of Physics, University of Warsaw, Poland
Thesis: *Dark Matter effects in the Inert Doublet Model in the light of the newest LHC data (in Polish)*
Supervisor: Prof. Maria Krawczyk

September 2011 **B.Sc. in Physics**
Faculty of Physics, University of Warsaw, Poland
Thesis: *Dark Matter in the Thermal History of the Universe (in Polish)*
Supervisor: Prof. Stefan Pokorski

## POSITIONS

2024 – present **Associate Professor (Profesor instytutu)**
Space Research Centre of the Polish Academy of Sciences (CBK PAN), Warsaw, Poland

2023 – 2024 **Assistant Professor (Adiunkt)**
Space Research Centre of the Polish Academy of Sciences (CBK PAN), Warsaw, Poland

2020 – 2023 **Associate Research Scholar**
Department of Astrophysical Sciences, Princeton University, USA

2018 – 2020 **Postdoctoral Research Associate**
Department of Astrophysical Sciences, Princeton University, USA

2016 – 2018 **Research Assistant (Asystent)**
Space Research Centre of the Polish Academy of Sciences (CBK PAN), Warsaw, Poland

## SHORT-TERM RESEARCH VISITS

University of New Hampshire, Durham, NH, USA (February 2022, March 2023)
Southwest Research Institute, San Antonio, TX, USA (March 2022)

## RESEARCH PROJECTS

2024 – 2027 **PI,** *Evolution of the outer heliosphere seen in neutral atom fluxes*
(Grant No. 2023/51/D/ST9/01261)
Polish National Science Centre (NCN) SONATA 19

2023 – 2027 **PI,** *The outer heliosphere and its interstellar surrounding revealed in neutral atom and pickup ion observations*
(Grant No. BPN/PPO/2022/1/00017 NAWA, 2023/02/1/ST9/00004 NCN)
Polish National Agency for Academic Exchange (NAWA) Polish Returns 2022
with a research component from NCN

2021 – 2023 **PI,** *Separation and Time-evolution of the Ribbon ENA Source Observed by IBEX*
(Grant No. 80NSSC21K0582)
NASA Heliophysics Guest Investigator "Open" Program (ROSES-2020)

2020 – 2023 **PI,** *Angular Scattering of Neutral Atoms: Observations and Interpretation from IBEX and Consequences for IMAP* (Grant No. 80NSSC20K0781)
NASA Outer Heliosphere Guest Investigators Program (ROSES-2019)

## INVOLVEMENT IN NASA SPACE MISSIONS

- **Interstellar Boundary Explorer (IBEX)** – Postdoctoral Researcher (2018-2020), Guest Investigator (2020-2023), **Science Team Member (2022–present)**
- **Interstellar Mapping and Acceleration Probe (IMAP)** – Associate Scientist for SWAPI & GLOWS; Instrument Scientist for IMAP-Lo; **Science Team Member (2018–present)**
- **New Horizons** – Postdoctoral Researcher (2019–2022), **Affiliate Science Team Member (2024–present)**

## OTHER INTERNATIONAL COLLABORATIONS

- **Team leader of ISSI International Team #541** *Distribution of Interstellar Neutral Hydrogen in the Sun's Neighborhood* (2021–2024). The team consisted of 13 members from 9 institutions in 6 countries, https://teams.issibern.ch/interstellarneutralhydrogen/
- Member of Working Group on Interstellar Neutrals for the **Interstellar Probe Mission Concept Study** (2019-2021), https://interstellarprobe.jhuapl.edu/

## AWARDS AND HONORS

- Scholarship of the Polish Minister of Science for Young Scientists, Warsaw, 2024-2027.
- START stipend from the Foundation for Polish Science (FNP) with distinction from the Prof. Adam Sobiczewski Fund, Warsaw, May 2017.
- Outstanding Student Paper Award for the talk presented at the 2015 American Geophysical Union (AGU) Fall Meeting, San Francisco, December 2016.
- Polish Physical Society Arkadiusz Piekara Award for an outstanding master's thesis, Warsaw, December 2014.
- Joanna and Jerzy Glazer Award for the best master's thesis prepared in the academic year 2012/2013 at the Faculty of Physics, University of Warsaw, March 2014.
- Outstanding Student Poster Award for the poster presented at the European Geosciences Union 2014 General Assembly, Vienna, October 2014.
- Scholarship of the Minister of Science and Higher Education for outstanding achievement for the academic year 2012/2013, Warsaw, December 2012.

## SERVICE AND OTHER ACTIVITIES

- Co-convenor of session *The Past, Present, and Future of Heliophysics Through In-situ Observations of the Outer Heliosphere and the Interstellar Medium* at **AGU Fall Meeting 2023**.
- Primary convenor of session *Interstellar Medium Traces in the Time-Varying Heliosphere* at **AGU Fall Meeting 2022**.
- Chair of the Ph.D. Students' Government in CBK PAN (Oct. 2014 – Sept. 2016).
- Voluntary tutor on science workshops in Astronomy and Physics for gifted high school students organized by the Polish Children's Fund.
- Reviewer for The Astrophysical Journal, The Astrophysical Journal Letters, The European Physical Journal Plus, Astronomy, Remote Sensing.
- Reviewer and member of NASA ROSES proposal evaluation panels.

## INVITED TALKS AND LECTURES

- P. Swaczyna, *Our Interstellar Neighborhood: Observations of Interstellar Matter in the Heliosphere*, **Warsaw Observatory Tuesday Seminar**, 21 Nov 2023, Warsaw, Poland.
- P. Swaczyna et al., *Interstellar Neutrals and Pickup Ions from IBEX and New Horizons*, **New Horizons Science Team Meeting #54**, 26 – 27 Oct 2023, Boston, MA, USA.
- P. Swaczyna, *Uncovering Interstellar Neighborhood of the Sun with Neutral Helium Observed by IBEX-Lo*, **Outer Heliosphere – Very Local Interstellar Medium Online Seminar**, 20 Sept 2023.
- P. Swaczyna, *Interstellar medium surrounding the heliosphere*, **41st Meeting of the Polish Astronomical Society**, 11 – 15 Sept 2023, Toruń, Poland.
- P. Swaczyna, *Mixing Interstellar Clouds Around the Heliosphere from Observations of Interstellar Neutral Atoms*, **New Horizons Science Team Meeting #53**, 24 – 25 May 2023, Boulder, CO, USA.
- P. Swaczyna, *Interstellar Neutral Atom Observations from 1 au to the Very Local Interstellar Medium*, **AGU Fall Meeting 2021**, 13 – 17 Dec 2021, New Orleans, LA, USA.
- P. Swaczyna, *Local Interstellar Medium Probed by Neutral Atom Observations*, **40th Meeting of the Polish Astronomical Society**, 13 – 17 Sept 2021, Virtual.
- P. Swaczyna, *The heliosphere and the very local interstellar medium revealed by neutral atom observations with IBEX*, **43rd COSPAR Assembly**, 28 Jan – 4 Feb 2021, Hybrid.
- P. Swaczyna, D. J. McComas, E. J. Zirnstein, J. M. Sokół, H. A. Elliott, M. Bzowski, M. A. Kubiak, J. D. Richardson, I. Kowalska-Leszczynska, S. A. Stern, H. A. Weaver, C. B. Olkin, K. N. Singer, J. R. Spencer, *SWAP Measurement of Interstellar Hydrogen Density from Pickup Ion Observations*, **New Horizons Science Team Meeting #45**, 19 May 2020, Virtual.
- P. Swaczyna, S. Grzedzielski, M. Bzowski, *Helium Energetic Neutral Atoms – a New Perspective for Heliospheric and Extraheliospheric Observations with IMAP*, **AGU Fall Meeting 2015**, 14 – 18 Dec 2015, San Francisco, CA, USA.

## MEDIA HIGHLIGHTS

- *New Evidence Our Neighborhood in Space Is Stuffed With Hydrogen* (October 30, 2020)
  https://www.nasa.gov/feature/goddard/2020/new-evidence-our-neighborhood-in-space-is-stuffed-with-hydrogen
- *Tajemnicza Ciepła Bryza potwierdza deformację heliosfery* (April 27, 2016)
  (in Polish, *Mysterious Warm Breeze Confirms Deformation of the Heliosphere*)
  https://naukawpolsce.pap.pl/aktualnosci/news%2C409418%2Ctajemnicza-ciepla-bryza-potwierdza-deformacje-heliosfery.html

## PUBLICATIONS

The first author of 20 peer-reviewed papers published in the Astrophysical Journal (ApJ), ApJ Letters (ApJL), and ApJ Supplement Series (ApJS), co-author of 38 other papers published in ApJ, ApJL, ApJS, Astronomy & Astrophysics, Space Science Reviews, Nature Astronomy, Journal of High Energy Physics, and Acta Geophysica. Total citations: 1718, H-index: 24 (source: SAO/NASA ADS as of 2024-10-10).

**– 2024 –**

[58] E. J. Zirnstein, T. K. Kim, J. S. Rankin, M. A. Dayeh, D. J. McComas, P. Swaczyna, L. J. Beesley, & D. B. Reisenfeld, *Evolving Outer Heliosphere: Tracking Solar Wind Transients from 1 au to the VLISM with IBEX and Voyager 1*, **Astrophys. J.**, 974 (2024) 213.

[57] A. Galli, P. Wurz, N. A. Schwadron, E. Möbius, S. A. Fuselier, J. M. Sokół, P. Swaczyna, M. Bzowski, & D. J. McComas, *The Plasma Pressure Contribution from Low-energy (0.05–2 keV) Energetic Neutral Atoms in the Heliosheath*, **Astrophys. J.**, 971 (2024), 2.

[56] P. Swaczyna, M. Bzowski, K. Dialynas, L. Dyke, F. Fraternale, A. Galli, J. Heerikhuisen, M. Z. Kornbleuth, D. Koutroumpa, I. Kowalska-Leszczyńska, M. A. Kubiak, A. T. Michael, H.-R. Müller, M. Opher, & F. Rahmanifard, *Interstellar Neutral Hydrogen in the Heliosphere: New Horizons Observations in the Context of Models*, **Astrophys. J. Lett.**, 969 (2024), L20.

**– 2023 –**

[55] F. Rahmanifard, P. Swaczyna, E. J. Zirnstein, J. Heerikhuisen, A. Galli, J. M. Sokół, N. A. Schwadron, E. Möbius, D. J. McComas, S. A. Fuselier, *The Effect of Angular Scattering Imposed by Charge Exchange and Elastic Collisions on Interstellar Neutral Hydrogen Atoms*, **Astrophys. J.**, 959 (2023), 129.

[54] M. A. Kubiak, M. Bzowski, P. Swaczyna, E. Möbius, N. A. Schwadron, D. J. McComas, *Science Opportunities for IMAP-Lo Observations of Interstellar Neutral Helium, Neon, and Oxygen during a Maximum of Solar Activity*, **Astrophys. J. Suppl, Ser.** 269 (2023), 23.

[53] P. Swaczyna, M. Bzowski, J. Heerikhuisen, M. A. Kubiak, F. Rahmanifard, E. J. Zirnstein, S. A. Fuselier, A. Galli, D. J. McComas, E. Möbius, N. A. Schwadron, *Interstellar Conditions Deduced from Interstellar Neutral Helium Observed by IBEX and Global Heliosphere Modeling*, **Astrophys. J.**, 953 (2023), 107.

[52] M. A. Dayeh, E. J. Zirnstein, P. Swaczyna, D. J. McComas, *Investigating the IBEX Ribbon Structure a Solar Cycle Apart*, **Astrophys. J.**, 952 (2023), 19.

[51] P. Swaczyna, M. A. Dayeh, E. J. Zirnstein, *Spherical Harmonic Representation of Energetic Neutral Atom Flux Components Observed by IBEX*, **Astrophys. J. Suppl, Ser.**, 266 (2023), 26.

[50] E. J. Zirnstein, P. Swaczyna, M. A. Dayeh, J. Heerikhuisen, *Constraints on the IBEX Ribbon's Origin from Its Evolution over a Solar Cycle*, **Astrophys. J.**, 949 (2023), 45.

[49] P. Swaczyna, M. Bzowski, S. A. Fuselier, A. Galli, J. Heerikhuisen, M. A. Kubiak, D. J. McComas, E. Möbius, F. Rahmanifard, N. A. Schwadron, *Relative In-flight Response of IBEX-Lo to Interstellar Neutral Helium Atoms*, **Astrophys. J. Suppl, Ser.**, 266 (2023), 2.

[48] P. C. Brandt, E. Provornikova, S. D. Bale, A. Cocoros, R. DeMajistre, K. Dialynas, H. A. Elliott, S. Eriksson, B. Fields, A. Galli, M. E. Hill, M. Horanyi, T. Horbury, S. Hunziker, P. Kollmann, J. Kinnison, G. Fountain, S. M. Krimigis, W. S. Kurth, J. Linsky, C. M. Lisse, K. E. Mandt, W. Magnes, R. L. McNutt, J. Miller, E. Moebius, P. Mostafavi, M. Opher, L. Paxton, F. Plaschke, A. R. Poppe, E. C. Roelof, K. Runyon, S. Redfield, N. A. Schwadron, V. Sterken, P. Swaczyna, J. Szalay, D. Turner, H. Vannier, R. Wimmer-Schweingruber, P. Wurz, E. J. Zirnstein, *Future Exploration of the Outer Heliosphere and Very Local Interstellar Medium by Interstellar Probe*, **Space Sci. Rev.**, 219 (2023), 18.

[47] P. Swaczyna, F. Rahmanifard, E. J. Zirnstein, J. Heerikhisen, *Filtration of Interstellar Neutral Helium by Elastic and Charge Exchange Collisions in Heliospheric Boundaries*, **Astrophys. J.**, 943 (2023), 74.

**– 2022 –**

[46] E. J. Zirnstein, B. L. Shrestha, D. J. McComas, M. A. Dayeh, J. Heerikhuisen, D. B. Reisenfeld, J. M. Sokół, P. Swaczyna, *Oblique and rippled heliosphere structures from the Interstellar Boundary Explorer*, **Nat. Astron.**, 6 (2022), 1398.

[45] E. J. Zirnstein, T. K. Kim, M. A. Dayeh, J. S. Rankin, D. J. McComas, P. Swaczyna, *Explanation of Heliospheric Energetic Neutral Atom Fluxes Observed by the Interstellar Boundary Explorer*, **Astrophys. J. Lett.**, 937 (2022), L38.

[44] P. Swaczyna, N. A. Schwadron, E. Möbius, M. Bzowski, P. C. Frisch, J. L. Linsky, D. J. McComas, F. Rahmanifard, S. Redfield, R. M. Winslow, B. E. Wood, G. P. Zank, *Mixing Interstellar Clouds Surrounding the Sun*, **Astrophys. J. Lett.**, 937 (2022), L32.

[43] A. Galli, P. Wurz, N. A. Schwadron, K. Fairchild, D. Heirtzler, E. Möbius, H. Kucharek, R. Winslow, M. Bzowski, M. A. Kubiak, I. Kowalska-Leszczyńska, S. A. Fuselier, J. M. Sokół, P. Swaczyna, D. J. McComas, *One Solar Cycle of Heliosphere Observations with the Interstellar Boundary Explorer: Energetic Neutral Hydrogen Atoms Observed with IBEX-Lo from 10 eV to 2 keV*, **Astrophys. J. Suppl. Ser.**, 261 (2022), 18.

[42] D. J. McComas, B. L. Shrestha, P. Swaczyna, J. S. Rankin, S. E. Weidner, E. J. Zirnstein, H. A. Elliott, K. N. Singer, J. Spencer, S. A. Stern, H. A. Weaver, *First High-resolution Observations of Interstellar Pickup Ion Mediated Shocks in the Outer Heliosphere*, **Astrophys. J.**, 934 (2022), 147.

[41] A. Galli, I. I. Baliukin, M. Bzowski, V. V. Izmodenov, M. Kornbleuth, H. Kucharek, E. Möbius, M. Opher, D. Reisenfeld, N. A. Schwadron, P. Swaczyna, *The Heliosphere and Local Interstellar Medium from Neutral Atom Observations at Energies Below 10 keV*, **Space Sci. Rev.**, 218 (2022), 31.

[40] E. J. Zirnstein, E. Möbius, M. Zhang, J. Bower, H. A. Elliott, D. J. McComas, N. V. Pogorelov, P. Swaczyna, *In Situ Observations of Interstellar Pickup Ions from 1 au to the Outer Heliosphere*, **Space Sci. Rev.**, 218 (2022), 28.

[39] P. Swaczyna, M. A. Kubiak, M. Bzowski, J. Bower, S. A. Fuselier, A. Galli, D. Heirtzler, D. J. McComas, E. Möbius, F. Rahmanifard, N. A. Schwadron, *Very Local Interstellar Medium Revealed by Complete Solar Cycle of Interstellar Neutral Helium Observations with IBEX*, **Astrophys. J. Suppl. Ser.**, 259 (2022), 42.

[38] N. A. Schwadron, E. Möbius, D. J. McComas, J. Bower, M. Bzowski, S. A. Fuselier, D. Heirtzler, M. A. Kubiak, M. A. Lee, F. Rahmanifard, J. M. Sokół, P. Swaczyna, R. Winslow, *Interstellar Neutral He Parameters from Crossing Parameter Tubes with the Interstellar Mapping and Acceleration Probe Informed by 10 yr of Interstellar Boundary Explorer Observations*, **Astrophys. J. Suppl. Ser.**, 258 (2022), 7.

[37] P. Swaczyna, T. J. Eddy, E. J. Zirnstein, M. A. Dayeh, D. J. McComas, H. O. Funsten, N. A. Schwadron, *IBEX Ribbon Separation Using Spherical Harmonic Decomposition of the Globally Distributed Flux*, **Astrophys. J. Suppl. Ser.**, 258 (2022), 6.

**– 2021 –**

[36] D. J. McComas, P. Swaczyna, J. R. Szalay, E. J. Zirnstein, J. S. Rankin, H. A. Elliott, K. Singer, J. Spencer, S. A. Stern, H. Weaver, *Interstellar Pickup Ion observations halfway to the Termination Shock*, **Astrophys. J. Suppl. Ser.**, 254 (2021), 19.

[35] P. Swaczyna, F. Rahmanifard, E. J. Zirnstein, D. J. McComas, J. Heerikhuisen, *Slowdown and Heating of Interstellar Neutral Helium by Elastic Collisions beyond the Heliopause*, **Astrophys. J. Lett.**, 911 (2021), L36.

[34] E. J. Zirnstein, M. A. Dayeh, J. Heerikhuisen, D. J. McComas, P. Swaczyna, *Heliosheath Proton Distribution in the Plasma Reference Frame*, **Astrophys. J. Suppl. Ser.**, 252 (2021), 26.

**– 2020 –**

[33] P. Swaczyna, D. J. McComas, E. J. Zirnstein, J. M. Sokół, H. A. Elliott, M. Bzowski, M. A. Kubiak, J. D. Richardson, I. Kowalska-Leszczynska, S. A. Stern, H. A. Weaver, C. B. Olkin, K. N. Singer, J. R. Spencer, *Density of Neutral Hydrogen in the Sun's Interstellar Neighborhood*, **Astrophys. J.**, 903 (2020), 48.

**– 2019 –**

[32] P. Swaczyna, D. J. McComas, E. J. Zirnstein, J. Heerikhuisen, *Angular Scattering in Charge Exchange: Issues and Implications for Secondary Interstellar Hydrogen*, **Astrophys. J.**, 887 (2019), 223.

[31] D. J. McComas, J. S. Rankin, N. A. Schwadron, P. Swaczyna, *Termination Shock Measured by Voyagers and IBEX*, **Astrophys. J.**, 884 (2019), 145.

[30] M. Bzowski, A. Czechowski, P. C. Frisch, S. A. Fuselier, A. Galli, J. Grygorczuk, J. Heerikhuisen, M. A. Kubiak, H. Kucharek, D. J. McComas, E. Möbius, N. A. Schwadron, J. Slavin, J. M. Sokół, P. Swaczyna, P. Wurz, E. J. Zirnstein, *Interstellar Neutral Helium in the Heliosphere from IBEX Observations. VI. The $He^+$ Density and the Ionization State in the Very Local Interstellar Matter*, **Astrophys. J.**, 882 (2019), 60.

[29] E. J. Zirnstein, P. Swaczyna, D. J. McComas, J. Heerikhuisen, *Parallax of the IBEX Ribbon Indicates a Spatially-Retained Source*, **Astrophys. J.**, 879 (2019), 106.

[28] E. J. Zirnstein, D. J. McComas, N. A. Schwadron, M. A. Dayeh, J. Heerikhuisen, P. Swaczyna, *Strong Scattering of ~keV Pickup Ions in the Local Interstellar Magnetic Field Draped Around Our Heliosphere: Implications for the IBEX Ribbon's Source and IMAP*, **Astrophys. J.**, 876 (2019), 92.

[27] P. Swaczyna, D. J. McComas, E. J. Zirnstein, *$He^+$ Ions Co-moving with the Solar Wind in the Outer Heliosphere*, **Astrophys. J.**, 875 (2019), 36.

[26] P. Swaczyna, D. J. McComas, N. A. Schwadron, *Non-equilibrium Distributions of Interstellar Neutrals and the Temperature of the Local Interstellar Medium*, **Astrophys. J.**, 871 (2019), 254.

[25] A. Galli, P. Wurz, F. Rahmanifard, E. Möbius, N. A. Schwadron, H. Kucharek, D. Heirtzler, K. Fairchild, M. Bzowski, M. A. Kubiak, I. Kowalska-Leszczyńska, J. M. Sokół, S. A. Fuselier, P. Swaczyna, D. J. McComas, *Model-free maps of interstellar neutral hydrogen measured with IBEX between 2009 and 2018*, **Astrophys. J.**, 871 (2019), 52.

**– 2018 –**

[24] N. A. Schwadron, F. Allegrini, M. Bzowski, E. R. Christian, M. A. Dayeh, M. I. Desai, K. Fairchild, P. C. Frisch, H. O. Funsten, S. A. Fuselier, A. Galli, P. Janzen, M. A. Kubiak, D. J. McComas, E. Moebius, D. B. Reisenfeld, J. M. Sokół, P. Swaczyna, J. R. Szalay, P. Wurz, E. J. Zirnstein, *Time Dependence of the IBEX Ribbon and the Globally Distributed Energetic Neutral Atom Flux Using the First 9 Years of Observations*, **Astrophys. J. Suppl. Ser.**, 239 (2018), 1.

[23] D. J. McComas, E. R. Christian, N. A. Schwadron, N. Fox, J. Westlake, F. Allegrini, D. N. Baker, D. Biesecker, M. Bzowski, G. Clark, C. M. S. Cohen, I. Cohen, M. A. Dayeh, R. Decker, G. A. de Nolfo, M. I. Desai, R. W. Ebert, H. A. Elliott, H. Fahr, P. C. Frisch, H. O. Funsten, S. A. Fuselier, A. Galli, A. B. Galvin, J. Giacalone, M. Gkioulidou, F. Guo, M. Horanyi, P. Isenberg, P. Janzen, L. M. Kistler, K. Korreck, M. A. Kubiak, H. Kucharek, B. A. Larsen, R. A. Leske, N. Lugaz, J. Luhmann, W. Matthaeus, D. Mitchell, E. Möbius, K. Ogasawara, D. B. Reisenfeld, J. D. Richardson, C. T. Russell, J. M. Sokół, H. E. Spence, R. Skoug, Z. Sternovsky, P. Swaczyna, J. R. Szalay, M. Tokumaru, M. E. Wiedenbeck, P. Wurz, G. P. Zank, E. J. Zirnstein, *Interstellar Mapping and Acceleration Probe (IMAP): A New NASA Mission*, **Space Sci. Rev.**, 214 (2018), 116.

[22] P. Swaczyna, M. Bzowski, M. A. Kubiak, J. M. Sokół, S. A. Fuselier, A. Galli, D. Heirtzler, H. Kucharek, D. J. McComas, E. Möbius, N. A. Schwadron, P. Wurz, *Interstellar neutral helium in the heliosphere from IBEX observations. V. Observations in IBEX-Lo ESA steps 1, 2, & 3*, **Astrophys. J.**, 854 (2018), 119.

**– 2017 –**

[21] P. Swaczyna & M. Bzowski, *Modeling Emission of Heavy Energetic Neutral Atoms from the Heliosphere*, **Astrophys. J.**, 846 (2017), 128.

[20] P. Swaczyna, S. Grzedzielski, M. Bzowski, *Helium Energetic Neutral Atoms from the Heliosphere: Perspectives for Future Observations*, **Astrophys. J.**, 840 (2017), 75.

**– 2016 –**

[19] P. Swaczyna, M. Bzowski, J. M. Sokół, *The Energy-dependent Position of the IBEX Ribbon Due to the Solar Wind Structure*, **Astrophys. J.**, 827 (2016), 71.

[18] P. Swaczyna, M. Bzowski, E. R. Christian, H. O. Funsten, D. J. McComas, N. A. Schwadron, *Distance to the IBEX Ribbon Source Inferred from Parallax*, **Astrophys. J.**, 823 (2016), 119.

[17] M. A. Kubiak, P. Swaczyna, M. Bzowski, J. M. Sokół, S. A. Fuselier, A. Galli, D. Heirtzler, H. Kucharek, T. W. Leonard, D. J. McComas, E. Möbius, J. Park, N. A. Schwadron, P. Wurz, *Interstellar Neutral Helium in the Heliosphere from IBEX Observations. IV. Flow Vector, Mach Number, and Abundance of the Warm Breeze*, **Astrophys. J. Suppl. Ser.**, 223 (2016), 25.

**– 2015 –**

[16] A. Galli, P. Wurz, J. Park, H. Kucharek, E. Möbius, N. A. Schwadron, J. M. Sokół, M. Bzowski, M. A. Kubiak, P. Swaczyna, S. A. Fuselier, D. J. McComas, *Can IBEX Detect Interstellar Neutral Helium or Oxygen from Anti-ram Directions?*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 30.

[15] J. M. Sokół, M. Bzowski, M. A. Kubiak, P. Swaczyna, A. Galli, P. Wurz, E. Möbius, H. Kucharek, S. A. Fuselier, D. J. McComas, *The Interstellar Neutral He Haze in the Heliosphere: What Can We Learn?*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 29.

[14] M. Bzowski, P. Swaczyna, M. A. Kubiak, J. M. Sokół, S. A. Fuselier, A. Galli, D. Heirtzler, H. Kucharek, T. W. Leonard, D. J. McComas, E. Möbius, N. A. Schwadron, P. Wurz, *Interstellar Neutral Helium in the Heliosphere from IBEX Observations. III. Mach Number of the Flow, Velocity Vector, and Temperature from the First Six Years of Measurements*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 28.

[13] J. M. Sokół, M. A. Kubiak, M. Bzowski, P. Swaczyna, *Interstellar Neutral Helium in the Heliosphere from IBEX Observations. II. The Warsaw Test Particle Model (WTPM)*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 27.

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[11] N. A. Schwadron, E. Möbius, T. Leonard, S. A. Fuselier, D. J. McComas, D. Heirtzler, H. Kucharek, F. Rahmanifard, M. Bzowski, M. A. Kubiak, J. M. Sokół, P. Swaczyna, P. Frisch, *Determination of Interstellar He Parameters Using Five Years of Data from the IBEX – Beyond Closed Form Approximations*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 25.

[10] E. Möbius, M. Bzowski, P. C. Frisch, S. A. Fuselier, D. Heirtzler, M. A. Kubiak, H. Kucharek, M. A. Lee, T. Leonard, D. J. McComas, N. A. Schwadron, J. M. Sokół, P. Swaczyna, P. Wurz, *Interstellar Flow and Temperature Determination with IBEX: Robustness and Sensitivity to Systematic Effects*, **Astrophys. J. Suppl. Ser.**, 220 (2015), 24.

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**– 2014 –**

[6] M. A. Kubiak, M. Bzowski, J. M. Sokół, P. Swaczyna, S. Grzedzielski, D. B. Alexashov, V. V. Izmodenov, E. Möbius, T. Leonard, S. Fuselier, P. Wurz, D. J. McComas, *Warm Breeze from the starboard bow: a new population of neutral helium in the heliosphere*, **Astrophys. J. Suppl. Ser.**, 213 (2014), 29.

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**– 2013 –**

[3] M. Krawczyk, D. Sokolowska, P. Swaczyna, B. Świeżewska, *Constraining Inert Dark Matter by Rγγ and WMAP data*, **J. High Energy Phys.**, 09 (2013), 055.

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**– 2012 –**

[1] I. S. Stachlewska, M. Piądłowski, S. Migacz, A. Szkop, A. J. Zielińska, P. Swaczyna, *Ceilometer observations of the boundary layer over Warsaw, Poland*, **Acta Geophys.**, 60 (2012) 5, 1386.

## CONFERENCE TALKS AND POSTERS – PRESENTING AUTHOR

**– 2024 –**

P. Swaczyna, *Opportunities and Challenges of Energetic Neutral Atom Observations on IMAP*, **AGU Annual Meeting 2024**, 9 – 13 Dec, Washington, DC, USA.

P. Swaczyna et al., *Production and Loss Processes of ENAs from 5 eV to 500 keV*, **IBEX/IMAP Science Team Meeting**, 29 July – 2 Aug, Boulder, CO, USA.

P. Swaczyna, M. Bzowski, J. Heerikhuisen, M. A. Kubiak, F. Rahmanifard, E. J. Zirnstein, S. A. Fuselier, A. Galli, D. J. McComas, E. Möbius, N. A. Schwadron, *Interstellar Conditions around the Heliosphere*, talk PIR.1-0006-24, **COSPAR 2024: 45th Scientific Assembly**, 13- 21 July 2024, Busan, Korea.

P. Swaczyna, M. Bzowski, K. Dialynas, L. Dyke, F. Fraternale, A. Galli, J. Heerikhuisen, M. Kornbleuth, D. Koutroumpa, I. Kowalska-Leszczyńska, M. A. Kubiak, H-R Müller, M. Opher, F. Rahmanifard, *Interstellar Neutral Hydrogen in the Heliosphere*, talk D1.2-0005-24, **COSPAR 2024: 45th Scientific Assembly**, 13- 21 July 2024, Busan, Korea.

P. Swaczyna, M. Bzowski, M. A. Kubiak, E. J. Zirnstein, A. Galli, E. Möbius, J. Heerikhuisen, F. Rahmanifard, S. A. Fuselier, D. J. McComas, N. A. Schwadron, *Constraining Interstellar Conditions around the Heliosphere Using IBEX Observations of Interstellar Neutral Helium and Global Heliosphere Modeling*, eLightning SH51H-03, AGU Annual Meeting 2023, 11 – 15 Dec, San Francisco, CA, USA.

**– 2023 –**

P. Swaczyna, M. Bzowski, M. A. Kubiak, E. J. Zirnstein, A. Galli, E. Möbius, J. Heerikhuisen, F. Rahmanifard, S. A. Fuselier, D. J. McComas, N. A. Schwadron, *Constraining Interstellar Conditions around the Heliosphere Using IBEX Observations of Interstellar Neutral Helium and Global Heliosphere Modeling*, eLightning SH51H-03, **AGU Annual Meeting 2023**, 11 – 15 Dec, San Francisco, CA, USA.

P. Swaczyna et al., *Interstellar Neutrals and Pickup Ions from IBEX and New Horizons*, invited talk, **New Horizons Science Team meeting #54**, 26 – 27 Oct, Boston, MA, USA.

P. Swaczyna, *Improved analysis of IBEX-Lo interstellar neutral helium atom observations with derivation of the relative energy response and inclusion of angular scattering effects*, talk, **IBEX/IMAP Science Team Meeting**, 14 – 18 Aug, Laurel, MD, USA.

P. Swaczyna, *Mixing Interstellar Clouds Around the Heliosphere from Observations of Interstellar Neutral Atoms*, invited talk, **New Horizons Science Team Meeting #53**, 24 – 25 May, Boulder, CO, USA.

P. Swaczyna, N. A. Schwadron, E. Möbius, M. Bzowski, P. C. Frisch, J. L. Linsky, D. J. McComas, F. Rahmanifard, S. Redfield, R. M. Winslow, B. E. Wood, G. P. Zank, *Interaction of Interstellar Clouds in the Solar Neighborhood*, talk 129.01, **AAS Meeting #241**, 8 – 12 Jan, Seattle, WA, USA.

**– 2022 –**

P. Swaczyna, N. A. Schwadron, E. Möbius, M. Bzowski, P. C. Frisch, J. L. Linsky, D. J. McComas, F. Rahmanifard, S. Redfield, R. M. Winslow, B. E. Wood, G. P. Zank, *Charting Interstellar Medium near the Heliosphere*, poster SH45G-2400, **AGU Fall Meeting 2022**, 12 – 16 Dec, Chicago, IL, USA.

P. Swaczyna, M. A. Dayeh, E. J. Zirnstein, David J. McComas, H. O. Funsten, N. A. Schwadron, *Temporal Evolution of Separated Energetic Neutral Atom Flux Components Observed by IBEX*, talk, **20th Annual International Astrophysics Conference**, 31 Oct - 4 Nov, Santa Fe, NM, USA.

P. Swaczyna, H. O. Funsten, N. A. Schwadron, M. A. Dayeh, E. J. Zirnstein, D. J. McComas, *Spherical Harmonic Decomposition of Energetic Neutral Atom Sources Observed by IBEX*, talk D1.4-0004-22, **44th COSPAR Assembly**, 16 – 24 July 2022, Athens, Greece.

P. Swaczyna, N. A. Schwadron, E. Möbius, M. Bzowski, P. C. Frisch, J. L. Linsky, D. J. McComas, F. Rahmanifard, S. Redfield, R. M. Winslow, B. E. Wood, G. P. Zank, *Mixed interstellar clouds surrounding the Sun*, talk, **IBEX/IMAP Science Team Meeting**, 13 – 17 June 2022, Laurel, MD, USA.

P. Swaczyna, et al., *Spherical harmonic representation and decomposition of ENA flux maps*, talk, **IBEX/IMAP Science Team Meeting**, 13 – 17 June 2022, Laurel, MD, USA.

P. Swaczyna, M. Bzowski, S. A. Fuselier, A. Galli, J. Heerikhuisen, M. A. Kubiak, D. J. McComas, E. Möbius, F. Rahmanifard, N. A. Schwadron, E. J. Zirnstein, *Filtration and Scattering of Interstellar Neutral Helium beyond the Heliopause*, talk EGU22-6502, **EGU General Assembly 2022**, 23 – 27 May 2022, Vienna, Austria.

**– 2021 –**

P. Swaczyna, J. Bower, M. Bzowski, S. A. Fuselier, A. Galli, J. Heerikhuisen, D. Heirtzler, M. A. Kubiak, D. J. McComas, E. Möbius, F. Rahmanifard, N. A. Schwadron, E. J. Zirnstein, *Complete Solar Cycle Observations of Interstellar Neutral Helium with IBEX: Consequences of Modulation in Heliospheric Boundaries*, talk SH21B-07, **AGU Fall Meeting 2021**, 13 – 17 Dec 2021, New Orleans, LA, USA.

P. Swaczyna, *Interstellar Neutral Atom Observations from 1 au to the Very Local Interstellar Medium*, invited talk SH11B-03, **AGU Fall Meeting 2021**, 13 – 17 Dec 2021, New Orleans, LA, USA.

P. Swaczyna, *Local Interstellar Medium Probed by Neutral Atom Observations*, invited talk, **40th Polish Astronomical Society Meeting**, 13 – 17 Sept 2021, Virtual.

P. Swaczyna, T. J. Eddy, E. J. Zirnstein, M. A. Dayeh, D. J. McComas, H. O. Funsten, N. A. Schwadron, *The Ribbon Separation with Spherical Harmonic Decomposition of the GDF*, talk, **IBEX/IMAP Science Team Meeting**, 17 – 18 Aug 2021, Laurel, MD, USA.

P. Swaczyna, J. Bower, M. Bzowski, S. A. Fuselier, A. Galli, J. Heerikhuisen, D. Heirtzler, M. A. Kubiak, D. J. McComas, E. Möbius, F. Rahmanifard, N. A. Schwadron, E. J. Zirnstein, *Observations of Interstellar Neutral Helium over the Full Solar Cycle*, talk, **IBEX/IMAP Science Team Meeting**, 17 – 18 Aug 2021, Laurel, MD, USA.

P. Swaczyna, *Interstellar Neutrals Atoms from the Very Local Interstellar Medium to 1 au*, talk, **Outer Heliosphere Workshop**, 21 – 23 July 2021, Hybrid, Boulder, CO, USA.

P. Swaczyna, *Helium Energetic Neutral Atoms as a Tool to Study the Structure of the Heliosphere and the Local Interstellar Medium*, poster C.23, **Heliophysics 2050 Workshop**, 3 – 7 May 2021, Virtual.

P. Swaczyna, *The heliosphere and the very local interstellar medium revealed by neutral atom observations with IBEX*, invited talk D1.2-0007-21, **43rd COSPAR Assembly 2021**, 28 Jan. – 4 Feb. 2021, Hybrid.

P. Swaczyna, D. J. McComas, J. M. Sokół, E. J. Zirnstein, *Interstellar hydrogen density from pickup ion observations in the outer heliosphere*, talk D1.3-0002-21, **43rd COSPAR Assembly 2021**, 28 Jan. – 4 Feb. 2021, Hybrid.

**– 2020 –**

P. Swaczyna, D. J. McComas, E. J. Zirnstein, J. M. Sokół, H. A. Elliott, M. Bzowski, M. A. Kubiak, J. D. Richardson, I. Kowalska-Leszczynska, S. A. Stern, H. A. Weaver, C. B. Olkin, K. N. Singer, J. R. Spencer, *Higher Density of Interstellar Hydrogen from Pickup Ion Observations in the Outer Heliosphere*, talk SH026-03, **AGU Fall Meeting 2020**, 1 – 17 Dec. 2020, Virtual.

P. Swaczyna, *Imaging heliotail and Local Interstellar Medium with Helium ENAs*, poster, **3rd Interstellar Probe Workshop**, 15 – 20 Nov. 2020, Virtual.

P. Swaczyna, D. J. McComas, E. J. Zirnstein, J. M. Sokół, H. A. Elliott, M. Bzowski, M. A. Kubiak, J. D. Richardson, I. Kowalska-Leszczynska, S. A. Stern, H. A. Weaver, C. B. Olkin, K. N. Singer, J. R. Spencer, *SWAP Measurement of Interstellar Hydrogen Density from Pickup Ion Observations*, invited talk, **New Horizons Science Team Meeting #45**, 19 May 2020, Virtual.

**– 2019 –**

P. Swaczyna, D. J. McComas, E. Zirnstein, J. Heerikhuisen, *Angular Scattering in Charge Exchange: Issues and Implications for Secondary Interstellar Hydrogen*, poster SH51C-3344, **AGU Fall Meeting 2019**, 9 – 13 Dec. 2019, San Francisco, CA, USA.

P. Swaczyna, *Angular Scattering in Charge Exchange Collisions: Consequences for Interstellar Neutral Atoms Produced in the Outer Heliosheath*, talk, **23rd IBEX / 2nd IMAP Science Working Team Meeting**, 18 – 20 June 2018, Santa Fe, NM, USA.

P. Swaczyna, D. J. McComas, N. A. Schwadron, *Temperature and Non-equilibrium Distributions of Interstellar Neutrals*, talk, **18th Annual International Astrophysics Conference**, 18 – 22 Feb. 2019, Pasadena, CA, USA.

**– 2018 –**

P. Swaczyna, D. J. McComas, E. Zirnstein, *Population of $He^+$ Ions Co-moving with the Solar Wind in the Outer Heliosphere*, poster SH13C-2963, **AGU Fall Meeting 2018**, 10 – 14 Dec. 2018, Washington, DC, USA.

P. Swaczyna, *Prospect for observations of heavy ENAs from the heliosphere and the LISM on IMAP*, talk, **22nd IBEX / 1st IMAP Science Working Team Meeting**, 28 – 29 Aug. 2018, Princeton, NJ, USA.

M. Bzowski, A. Czechowski, P. C. Frisch, S.A. Fuselier, A. Galli, J. Grygorczuk, J. Heerikhuisen, D. Heirtzler, M. A. Kubiak, H. Kucharek, D. J. McComas, E. Möbius, N. A. Schwadron, J. Slavin, J. M. Sokół, P. Swaczyna, P. Wurz, E. Zirnstein, *The Local Interstellar Medium revealed by IBEX observations of interstellar neutral atoms*, talk D1.2-0011-18, **42nd COSPAR Assembly**, 14 – 22 July 2018, Pasadena, CA, USA.

P. Swaczyna, M. Bzowski, J. M. Sokół *Modeling the time evolution of the IBEX Ribbon over the solar cycle*, talk D1.2-0009-18, **42nd COSPAR Assembly**, 14 – 22 July 2018, Pasadena, CA, USA.

P. Swaczyna, M. Bzowski, J. M. Sokół, *Modeling the Evolution of the IBEX Ribbon's Position due to the Solar Cycle Variation of the Solar Wind Structure*, talk, **17th Annual International Astrophysics Conference**, 5 – 9 Mar. 2018, Santa Fe, NM, USA.

**– 2017 –**

P. Swaczyna, M. Bzowski, J. M. Sokół, *Time-dependent models of ENA emission and comparison to the IBEX observations*, poster SH51D-2526, **AGU Fall Meeting 2017**, 11 – 15 Dec. 2017, New Orleans, LA, USA.

P. Swaczyna, M. Bzowski, M. A. Kubiak, J. M. Sokół, S. A. Fuselier, A. Galli, D. Heirtzler, H. Kucharek, D. J. McComas, E. Möbius, N. A. Schwadron, P. Wurz, *Interstellar neutrals observed by IBEX-Lo in ESA 1-3*, talk, **21st IBEX Science Working Team Meeting**, 28 – 30 June 2017, Warsaw, Poland.

P. Swaczyna, M. Bzowski, J. M. Sokół, E. R. Christian, H. O. Funsten, D. J. McComas, N. A. Schwadron, *Position of the IBEX ribbon as a key to understand its origin*, poster EGU2017-687, **EGU General Assembly 2017**, 23 – 28 Apr. 2017, Vienna, Austria.

P. Swaczyna, S. Grzedzielski, M. Bzowski, *Imaging heliosphere with energetic neutral atoms of heavy species – perspectives for ENA detectors on IMAP*, talk, **16th Annual International Astrophysics Conference**, 6 – 10 Mar. 2017, Santa Fe, NM, USA.

**– 2016 –**

P. Swaczyna, M. Bzowski, J. M. Sokół, E. R. Christian, H. O. Funsten, D. J. McComas, N. A. Schwadron, *The parallax and the energy-dependent position of the IBEX Ribbon – implications for its origin*, poster SH31A-2541, **AGU Fall Meeting 2016**, 10 – 16 Dec. 2016, San Francisco, CA, USA.

P. Swaczyna, M. Bzowski, J. M. Sokół, E. R. Christian, H. O. Funsten, D. J. McComas, N. A. Schwadron, *Implications for the origin of the ribbon from parallax and energy-dependent position in the sky*, talk, **20th IBEX Science Working Team Meeting**, 9 – 12 Aug. 2016, Princeton, NJ, USA.

**– 2015 –**

P. Swaczyna, S. Grzedzielski, M. Bzowski, Helium *Energetic Neutral Atoms - a New Perspective for Heliospheric and Extraheliospheric Observations with IMAP*, invited talk SH53C-05, **AGU Fall Meeting 2015**, 14 – 18 Dec. 2015, San Francisco, CA, USA.

P. Swaczyna et al., *The IBEX Ribbon ridge position in the ram and antiram directions*, talk, **19th IBEX Science Working Team Meeting**, 18 – 20 Aug. 2015, Boulder, CO, USA.

P. Swaczyna, J. M. Sokół, M. Bzowski, M. A. Kubiak, S. A. Fuselier, D. Heirtzler, H. Kucharek, T. W. Leonard, D. J. McComas, E. Möbius, N. A. Schwadron, *Intestellar neutral helium in the heliosphere from IBEX. Data corrections, uncertainties, and backgrounds, Warsaw Test Particle Model, and fitting method*, talk, **19th IBEX Science Working Team Meeting**, 18 – 20 Aug. 2015, Boulder, CO, USA.

P. Swaczyna, S. Grzedzielski, M. Bzowski, *Energetic neutral helium atoms as a tool to study the heliosphere and the Local Interstellar Medium*, poster EGU2015-723, **EGU General Assembly 2015**, 12 – 17 Apr. 2015, Vienna, Austria.

**– 2014 –**

P. Swaczyna, S. Grzedzielski, M. Bzowski, *Potential of Energetic Neutral Helium Atoms to Resolve Structure of the Local Interstellar Medium within 0.1 parsec*, talk SH21D-02, **AGU Fall Meeting 2014**, 15 – 19 Dec. 2014, San Francisco, CA, USA.

M. Bzowski, M. A. Kubiak, J. M. Sokół, P. Swaczyna, E. Möbius, T. Leonard, D. Heirtzler, M. Hlond, M. Banaszkiewicz, M. Witte, P. Wurz, D. Rodriguez, N. Schwadron, S. Fuselier, D. J. McComas, H. Kucharek, *Interstellar He parameters in front of the heliosphere: view from IBEX and Ulysses*, poster SH11C-4056, **AGU Fall Meeting 2014**, 15 – 19 Dec. 2014, San Francisco, CA, USA.

P. Swaczyna, S. Grzedzielski, M. Bzowski, *Expected fluxes of energetic neutral helium atoms from the heliosheath and the IBEX Ribbon*, talk, **18th IBEX Science Working Team Meeting**, 14 – 18 July 2014, Durham, NH, USA.

P. Swaczyna, M. Bzowski, M. A. Kubiak, *Investigating uncertainties in the IBEX-Lo interstellar neutral helium measurements and including them in the Warsaw Test Particle Model*, talk, **18th IBEX Science Working Team Meeting**, 14 – 18 July 2014, Durham, NH, USA.

P. Swaczyna, S. Grzedzielski, M. Bzowski, *Fluxes of energetic neutral helium atoms from the heliosheath and the IBEX Ribbon*, poster EGU2014-223, **EGU General Assembly 2014**, 27 Apr. – 2 May 2014, Vienna, Austria.

**– 2012 –**

P. Swaczyna, S. Grzedzielski, *Possible source of ENA fluxes from Galactic Center direction*, talk, **14th IBEX Science Team Meeting**, 28 – 31 Mar. 2012, Bad Honnef, Germany.

*Co-author of 70+ other talks and posters.*