Drew Coffin

Postdoktor i evolutionen av primordiala magnetfält

Ref nr: SU FV-4638-25-51

Datum för ansökan: 2026-01-20 20:29

Födelsedatum	1992-01-23
E-post	dralcoffin@gmail.com
Kön	Man

Frågor

1. *Nuvarande sysselsättning (ange huvudsaklig sysselsättning)*
Anställd vid lärosäte utanför Sverige

2. *Högsta examen*
Doktors-/licentiatsexamen

3. *Från vilket land har du din högsta examen?*
Förenta staterna

4. *Har du din högsta examen från Stockholms universitet?*
Nej

5. *Ange datum när du tog din doktorsexamen*
2023-05-07

6. *NUVARANDE ANSTÄLLNING. Ange arbetsplats och jobbtitel samt när anställningen påbörjades..*
Boston University, post-doctoral researcher, February 2023 to May 2026

7. *REFERENSER. Ange namn, telefon och e-post för 2–3 referenspersoner som kan komma att kontaktas.*
Paul Withers, +1 617-353-1531, withers@bu.edu

Peter Delamere, +1 907-474-6442, padelamere@uaf.edu

Luke Moore, +1 617-358-3906, moore@bu.edu

8. *SPRÅKKUNSKAPER. Beskriv kort dina språkkunskaper.*
English - native

French - intermediate

Russian - basic

Programming: IDL, Python

9. *FORSKNINGSPLAN/PROJEKTPLAN. Bifoga din plan som beskriver det tilltänkta projektet.*
SwedenResearchPhilosophy.pdf

10. *DOKTORSEXAMEN ELLER MOTSVARANDE. Ange doktorsexamen med ämne och lärosäte.*
PhD, Space Physics, University of Alaska Fairbanks, May 2023

11. *EXAMENSBEVIS ELLER MOTSVARANDE. Bifoga examensbevis.*
UAFDoctoral Transcript.pdf

Drew Coffin

Postdoktor i evolutionen av primordiala magnetfält

Ref nr: SU FV-4638-25-51

Datum för ansökan: 2026-01-20 20:29

Eget uppladdat CV

To the members of the search committee at Nordita:

I am Drew Coffin, an early career astronomer focusing on the Jupiter system and a teacher of the wonders of astronomy quickly gaining experience with multiple universities. I am drawn to the Postdoctoral Fellow position in Primordial magnetic field evolution due to the focus on simulating magnetic field development, as I have strong magnetic modeling experience from my jovian planetary background and have a personal interest in the evolution of the early universe. As well, the location in Stockholm is a personal draw as I like the climate of the Nordic countries and wish to spend a significant portion of my career in Europe to build on European connections.

My specific thesis and post-doctoral research interests are the magnetosphere-ionosphere coupling at Jupiter and the transfer of energy and momentum between the planet and the Io plasma torus. While I come from a planetary background, I do have cosmological experience from my lecturer position at Tufts University where I am teaching a course on cosmology. I have written codes in IDL and Python to model magnetic fields and the resulting plasma dynamics, research directly applicable to the position's emphasis on understanding the nature of magnetic fields during the phase transition and recombination eras of the early universe.

My career is still in its early stages, as my doctorate was May of 2023. But I have gained modeling experience in simulating the chaotic environment of a powerful magnetic field. I have gained teaching experience, leading courses on the fascinating early stages of our universe and the physics concepts necessary to understand them. These pieces are coming together to craft me into a well-rounded researcher in exploring the mysteries and intricacies of the variety of electromagnetic environments through space and time. I look forward to joining Nordita as a postdoctoral scholar, to help provide another viewpoint through my research on the guiding role of magnetism in the development of the early universe.

Thank you,

Dr. Drew Coffin

Curriculum Vitae

Drew Alexander Coffin, PhD
He/him
Research Scientist
Center for Space Physics
Boston University, Boston, MA, 02215
Phone: 907-987-4234
Email: dralcoffin@gmail.com

Drew Coffin is a post-doctoral researcher at Boston University with an interest in planetary science, particularly atmosphere/plasma environment interactions at the giant planets, as well as experience in teaching astronomy-related courses. He defended a doctoral thesis in fall 2022 that examined the origin and consequences of the System IV periodicity in the Io plasma torus.

Education

PhD - Space Physics. University of Alaska Fairbanks, Spring 2023.

BS - Astronomy. University of Iowa, Spring 2014.

Research Experience

February 2023 on: Post-doctoral researcher, Boston University, studying the ionosphere of Jupiter via Juno radio occultations. Overseer: Paul Withers

May 2017 to December 2022: Research assistant, University of Alaska Fairbanks, studying moon-plasma interactions at Jupiter, particularly dynamics of the Io plasma torus. Advisor: Dr. Peter Delamere.

May 2012 to May 2014: Undergraduate research assistant, University of Iowa, studying radio signals of Wolf-Rayet stars. Advisor: Dr. Robert Mutel.

First-Author Publications

Coffin, D., P. Withers, D. Buccino, et al. (2025), “Juno-derived insights to the Alvenic coupling

between Jupiter and its magnetosphere", in prep.

Coffin, D., P. Withers, O. Agiwal, D. Buccino, M. Parizi, et al. (2025), "Juno-derived electron density profiles of the high-latitude Jovian ionosphere", *Journal of Geophysical Research (Space Physics)*, doi:10.1029/2025JA033754.

Coffin, D (2023), "A Wiggle Around a Giant: Exploring the System IV Periodicity of the Io Plasma Torus." Thesis, 2023.

Coffin, D., P. Delamere, P. Damiano, J. Johnson, and C-S.. Ng (2022), "Broadband energization of superthermal electrons in Jupiter's inner magnetosphere," *Journal of Geophysical Research (Space Physics)*, doi:10.1029/2022JA030528.

Coffin, D., P. Delamere, and P. Damiano (2020), "Implications for Magnetosphere-Ionosphere Coupling From Jupiter's System IV Quasi-Period", *Journal of Geophysical Research (Space Physics)*, doi:10.1029/2019JA027347.

Workshops

Stallard, T., et al. Jupiter's Non-Auroral Ionosphere, Team 23-592. International Space Science Institute, Bern, 2024-5.

Presentations

Coffin, D. A., and P. Withers, A multi-method examination of the Io-Jupiter Alfvénic connection, Magnetospheres of the Outer Planets meeting, 2024.

Coffin, D. A., and P. Withers, A multi-method examination of the Io-Jupiter Alfvénic connection, Dublin Moon-Magnetosphere Workshop, 2024.

Coffin, D. A., and P. Withers, Understanding the ionospheric anchor of the Jovian Alfvén current loop, AGU Fall Meeting, 2023.

Coffin, D. A., P. Withers, P. A. Delamere, and P. A. Damiano. Alfvénic coupling between the Jovian ionosphere and the Io plasma torus, GEM Summer Workshop, 2023.

Coffin, D. A., P. Delamere, F. Bagenal, and E. Nerney, Examining the Europa plasma environment via a multi-dimensional physical chemistry model, AGU Fall Meeting, 2022.

Coffin, D. A., P. Delamere, F. Bagenal, and E. Nerney, Examining the Europa plasma environment via a multi-dimensional physical chemistry model, Magnetospheres of the Outer

Planets meeting, 2022.

Coffin, D. A., P. A. Damiano, P. A. Delamere, and J. Johnson, Sourcing energized electrons in the Io-Jupiter flux tube via Alfven waves, AGU Fall Meeting, 2021.

Coffin, D. A., P. A. Damiano, P. A. Delamere, and J. Johnson, Energizing suprathermal electron populations via dispersive scale Alfven waves at Jupiter, in AGU Fall Meeting Abstracts, vol. 2020, SM057–08, 2020.

Coffin, D. A., P. A. Damiano, P. A. Delamere, and J. Johnson, Electron energization by dispersive scale Alfvén waves at Jupiter: Results of 2D kinetic simulations in a dipolar geometry, in AGU Fall Meeting Abstracts, vol. 2019, SM33G-3297, 2019.

Coffin, D. A., P. A. Delamere, F. Tsuchiya, and P. A. Damiano, The effect of subcorotation on Jupiter's System IV periodicity, Magnetospheres of the Outer Planets meeting, 2019.

Coffin, D. A., P. A. Delamere, and F. Tsuchiya, Implications for MI coupling from a subcorotation-driven System IV model, in AGU Fall Meeting Abstracts, vol. 2018, SM23E-3229, 2018.

Coffin, D. A. and P. A. Delamere, Modeling the evolution of the System IV period of the Io torus, in AGU Fall Meeting Abstracts, vol. 2017, SM33C-2671, 2017.

Coffin, D. A., P. A. Delamere, and T. Kimura, Two-dimensional modeling of the response of the Io plasma torus to a volcanic event, in AGU Fall Meeting Abstracts, vol. 2016, P23C-2178, 2016.

Teaching Experience

Astronomy 10: Wanderers in Space, main instructor, Tufts University, Fall 2025.

Astronomy 101: The Solar System, main instructor, Boston University, Summer 2025.

Core 111: The Origins of Humanity, co-instructor, Boston University, Fall 2024.

Astronomy 101: The Solar System, main instructor, Boston University, Summer 2024.

Physics 165: Astronomy, teaching assistant, University of Alaska Fairbanks, Fall 2022

Physics 212: Thermodynamics/Electromagnetism, teaching assistant, University of Alaska

Fairbanks, Spring 2022

Physics 213: Modern Physics, teaching assistant, University of Alaska Fairbanks, Spring 2017

Physics 211: Classical Mechanics, teaching assistant, University of Alaska Fairbanks, Fall 2016

Research References

Dr. Paul Withers
Center for Space Physics, Boston University
617-353-1531
withers@bu.edu
Research supervisor

Dr. Peter Delamere
Geophysical Institute, University of Alaska Fairbanks
907-474-6442
padelamere@alaska.edu
Doctoral advisor

Dr. Fran Bagenal
University of Colorado Boulder
Fran.Bagenal@lasp.colorado.edu
Research Collaborator

Teaching References

Robin Stevens
Boston University
rjs@bu.edu
Co-instructor, Fall 2024

Anna Sajima
Tufts University
Anna.Sajina@tufts.edu
Teaching supervisor, Fall 2025

To the members of the search committee at Nordita:

I am Drew Coffin, an early career planetary researcher with a key interest in the role of electromagnetism in organizing astronomical processes. My research experience is in the interplay of Jupiter's complex atmosphere with its intense magnetosphere, giving me a strong background in space plasma processes and simulating interactions between dense matter and electromagnetic forces. Both my graduate thesis work at the University of Alaska Fairbanks and my post-doctoral appointment at Boston University (ending June of 2026) tackle different aspects of the same overarching question: *How do the magnetic field and ionosphere of Jupiter interact at scales both global and local to auroral processes?* My thesis focused on modeling the role of the active innermost major moon, Io, in producing magnetic dynamics (the System IV periodicity) and as a trigger for Alfven waves that propagate to the planet. In writing this thesis I produced two first-author papers. Then at BU I transitioned to another perspective on the same system: data analysis from the Juno spacecraft, whose unique polar orbit permits quantification of the high-latitude ionosphere via induced Doppler shifts during radio occultations. My first paper from this effort has been published and I am writing another first-author paper that is nearing submission as I write this letter. Thus I have experience in both theoretical and observational writing.

My role as a post-doctoral fellow at Nordita would be to bring this background knowledge of magnetospheric dynamics in dense plasmas to the position's emphasis on modelling the magnetospheric development of the early cosmos. In particular, I am drawn to the recombination era, when charged particles combining into neutral atoms dramatically alters the magnetic susceptibility of the universe, alters the characteristic length scales of ionic motion, and gives rise to new dynamics that I would like to explore.

I have close research ties with multiple institutions: the auroral work at the University of Alaska Fairbanks, the Alfven wave group at University of Minnesota, the comparative ionospheric group at Boston University, and the Juno Science Team. I welcome the opportunity to be a potential bridge for collaboration and synergy between Nordita and these groups from my previous connections.

My research background and intentions will provide a key viewpoint to analyzing the complex electrodynamic environment of the universe as a charged soup of particles gives way to the neutral matter to forge stars, planets, and us. I am eager to help further Nordita's goals of exploring the wonders of the early universe, to further our insight into the fundamental question of how our cosmos has evolved.

Thank you,

Dr. Drew Coffin

Doktorsbevis

Filen kunde ej inkluderas.
Detta kan bero på att filen är ett lösenordsskyddat intyg.
Vänligen kontrollera originalfilen!