

Supporting documentation for my salary review: case and merits

Axel Brandenburg (Nordita)

September 14, 2026

1 Major grants (2026)

- ERC Synergy Grant, COSMOMAG “Probe of the first microseconds of the Universe with cosmological magnetic fields” No 227952, April 2026 – March 2032, 2.82 MEUR (31.7 MSEK for Nordita node)
- VR project grant, “Probing the first microseconds of the Universe with magnetic fields and gravitational waves” 2025-05957, January 2026 – December 2028, 4.05 MSEK

From April 2028 onwards, I will be fully self-employed on these grants.

This is in 18 months from now.

For the COSMOMAG tasks of the Nordita node and the 5 papers already based on them, see <https://norlx65.nordita.org/~brandenb/AstroDyn/tasks.html>.

2 Organization of conferences and programs (2024–2027)

- 2027 Program on Cosmic Magnetic Fields: Primordial vs. Astrophysical Origins (2-20 Aug, Nordita)
2026 Winter School on Cosmological Magnetic Fields: Generation, Observation, and Modeling (Nordita)
2024 Program on Turbulence in Astrophysical Environments (2.5 months, KITP, Santa Barbara)

The upcoming Nordita Program on Cosmic Magnetic Fields: Primordial vs. Astrophysical Origins and the Nordita Winter School on Cosmological Magnetic Fields: Generation, Observation, and Modeling are strongly related to the COSMOMAG Synergy Grant. The COSMOMAG project further advertises Nordita in the broader European context. The 2024 program at the Kavli Institute for Theoretical Physics (Santa Barbara) was organized jointly by myself, G. Howes, Y. Li, A. Tchekhovskoy, and S. Xu; see <https://www.kitp.ucsb.edu/activities/uniturb24>. This involvement underlines not only my international standing, but it also demonstrates my experience in running major program activity.

3 Pencil Code

Together with Wolfgang Dobler (my postdoc in Newcastle upon Tyne), I initiated the PENCIL CODE in 2001 as a public domain program for solving partial differential equations on massively parallel supercomputers; see <https://github.com/pencil-code>. It has been used in (as of now) 806 scientific publications; see <https://pencil-code.nordita.org/doc/citations.pdf>.

Of the now 43702 commits, 6120 were done by myself; see <https://github.com/pencil-code/pencil-code/graphs/contributors?from=10%2F1%2F2001&to=9%2F6%2F2026>. Between January 2025 and September 2026, I have done 498 commits. In particular, I coded the solvers for axion inflation and cosmic recombination dynamics.

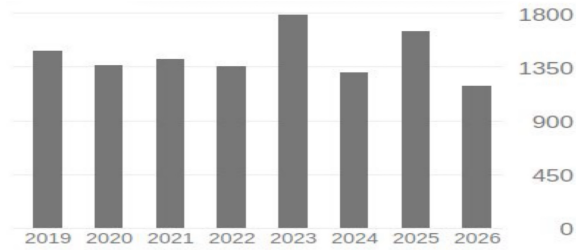
4 Publications

Number of papers in refereed journals: 479 + 6 submitted.

Total number of citations: 32866, h -index: 91 (on Google Scholar).

<https://scholar.google.se/citations?user=ufyMKPQAAAAJ>.

Sustained citations (note that the current year is not over yet).



5 Recent publications (2026 and 2025)

My goal is to strengthen collaborations both within Nordita, in particular those supported by my VR and COSMOMAG ERC grants, and between Nordita and our customers (Nordita programs, Corresponding Fellows, visiting PhD and MSc students, visiting professors, and TDLI collaboration); see table below.

Here and below, the 3-digit numbering of the papers coincides with that of my full list of publications on <https://axelbrandenburg.github.io/pub/node1.html>.

Table 1:

collaboration	papers
inhouse & COSMOMAG:	485, 482, 479, 474, 472, 471, 467, 462
Nordita programs:	483, 475, 466, 465, 461
Corresponding Fellows & visitors:	478, 476, 470, 469
visiting PhD students:	484, 481, 460
visiting MSc students:	473, 459
visiting professors:	480, 477
TDLI collaboration:	468
Programs elsewhere:	464, 463

Submitted:

485. Iarygina, O., & Brandenburg, A.: 2026, “Primordial turbulence from inflation: a new inflaton-driven turbulent regime,” *Phys. Rev. Lett.*, submitted (arXiv:2609.10326)

- 484. Ortiz-Rodríguez, C., [Brandenburg, A.](#), & Käpylä, P. J.: 2026, “Mean-field interpretation of star-in-a-box simulations of red giants,” *Astron. Astrophys.*, submitted (arXiv:2607.12608)
- 483. [Brandenburg, A.](#), Ntormousi, E., & Schober, J.: 2026, “No evidence of vorticity production from irrotational turbulent gravitational collapse yet,” *Astrophys. J.*, submitted (arXiv:2607.01207)
- 482. [Brandenburg, A.](#), Cielo, M., Iarygina, O., & Vazza, F.: 2026, “Isochrones in primordial magnetic field evolution,” *Astron. Astrophys.*, submitted (arXiv:2606.10863)
- 481. Kumar, V., & [Brandenburg, A.](#): 2026, “Magnetic Prandtl number dependence of plasmoid-mediated reconnection,” *J. Plasma Phys.*, submitted (arXiv:2605.18946)
- 480. Iizawa, M., Narita, Y., Alberti, T., Bale, S. D., [Brandenburg, A.](#), Chian, A. C.-L., Comisel, H., Matsukiyo, S., & Yokoi, N.: 2026, “Evidence for an Inverse Cascade of Magnetic Helicity in the Inner Heliosphere,” *Astrophys. J. Lett.*, submitted (arXiv:2507.13213)

In press:

- 479. Iarygina, O., Sfakianakis, E. I., & [Brandenburg, A.](#): 2026, “Schwinger effect in axion inflation on a lattice,” *Phys. Rev. D*, in press (arXiv:2506.20538)

Published with DOI number:

- 478. Haugen, N. E. L. [Brandenburg, A.](#), Friede, B., Birkeland, R. G.: 2026, “Silicon-monoxide flames: the nucleation and condensation of silica fume,” *Combust. Sci. Technol.*, DOI:10.1080/00102202.2026.2640471

Published:

- 477. Abramowicz, M. A., [Brandenburg, A.](#), Horák, J., Lančová, D., Miller, J. C., Szuszkiewicz, E. & Wielgus, M.: 2026, “Universal behaviour of α -viscosity in black hole accretion discs,” *Astron. Astrophys.* **713**, A131
- 476. Haugen, N. E. L., [Brandenburg, A.](#), Karchniwy, E., Meyer, O. H. H., Ervik, Å., Fyhn, H., Samaei, L., & Bringedal, B.: 2027, “High-resolution numerical simulations of turbulent non-catalytic reverse water gas shift,” *Chem. Eng. Sci.* **338**, 124647
- 475. Gurgendze, M., Long, A. J., Roper Pol, A., [Brandenburg, A.](#), & Kahniashvili, T.: 2026, “Primordial magnetic field from chiral plasma instability with sourcing,” *Phys. Rev. D* **114**, 023542
- 474. [Brandenburg, A.](#), Ghosh, O., Vazza, F., & Neronov, A.: 2026, “Magnetic field spreading from stellar and galactic dynamos into the exterior,” *Astrophys. J.* **1002**, 165
- 473. Zhang, J., & [Brandenburg, A.](#): 2026, “Resistive scaling in the magnetic helicity-driven inverse cascade,” *Astrophys. J.* **997**, 308
- 472. Ghosh, O., [Brandenburg, A.](#), Caprini, C., Neronov, A., & Vazza, F.: 2026, “Can astrophysical sources magnetize the voids?” *Phys. Rev. D* **113**, 023523
- 471. [Brandenburg, A.](#), Larsson, G., Del Sordo, F. & Käpylä, P. J.: 2025, “Magneto-rotational instability in a solar near-surface mean-field dynamo,” *Astrophys. J.* **993**, 22

470. [Brandenburg, A.](#), & Ntormousi, E.: 2025, “Magnetic field amplification during a turbulent collapse,” *Astrophys. J.* **990**, 223
469. Shchutskyi, N., Schaller, M., Karapiperis, O. A., Stasyszyn, F. A., & [Brandenburg, A.](#): 2025, “Kinematic dynamos and resolution limits for Smoothed Particle Magnetohydrodynamics,” *Mon. Not. Roy. Astron. Soc.* **541**, 3427–3444
468. [Brandenburg, A.](#), Yi, L., & Wu, X.: 2025, “Inverse cascade from helical and nonhelical decaying columnar magnetic fields,” *J. Plasma Phys.* **91**, E113 arXiv:2501.12200
467. Sharma, R., [Brandenburg, A.](#), Subramanian, K., & Vikman, A.: 2025, “Lattice simulations of axion-U(1) inflation: gravitational waves, magnetic fields, and scalar statistics,” *J. Cosmol. Astropart. Phys.* **05**, 01
466. Rogachevskii, I., Kleeorin, N., & [Brandenburg, A.](#): 2025, “Theory of the kinetic helicity effect on turbulent diffusion of magnetic and scalar fields,” *Astrophys. J.* **985**, 18
465. [Brandenburg, A.](#), Käpylä, P. J., Rogachevskii, I., & Yokoi, N.: 2025, “Helicity effect on turbulent passive and active scalar diffusivities,” *Astrophys. J.* **984**, 88
464. [Brandenburg, A.](#), & Vishniac, E. T.: 2025, “Magnetic helicity fluxes in dynamos from rotating inhomogeneous turbulence,” *Astrophys. J.* **984**, 78
463. [Brandenburg, A.](#), & Scannapieco, E.: 2025, “Magnetically assisted vorticity production in decaying acoustic turbulence,” *Astrophys. J.* **983**, 105
462. Neronov, A., Vazza, F., [Brandenburg, A.](#), Caprini, C.: 2025, “Magnetic fields in a gamma-ray beam as a model of Porphyron,” *Astron. Astrophys.* **696**, L8
461. Vachaspati, T., & [Brandenburg, A.](#): 2025, “Spectra of magnetic fields from electroweak symmetry breaking,” *Phys. Rev. D* **111**, 043541
460. Dehman, C., & [Brandenburg, A.](#): 2025, “Reality of inverse cascading in neutron star crusts,” *Astron. Astrophys.* **694**, A39
459. [Brandenburg, A.](#), & Banerjee, A.: 2025, “Turbulent magnetic decay controlled by two conserved quantities,” *J. Plasma Phys.* **91**, E5

Note: 3 first-author papers in 2026 and 6 first-author papers in 2025.

6 Other academic achievements (2024–2025)

Master’s student Gustav Larsson successfully defended his thesis on 16 June 2025

PhD student Yutong He has successfully defended his PhD thesis on 4 June 2024.

Out of these supervisions, papers #471 and #446 (published in 2023) arose.

7 Notable recognition

2014 Elected foreign member of the Royal Swedish Academy of Sciences

<https://www.kva.se/en/news/ny-ledamot-invalid-i-akademien-2-3/>

Astronomy Class.