Publication List

My full listing on INSPIRE-HEP is available here.
White Papers that I have contributed to are listed at the end of this document.
Papers lead by PhD students under my supervision are marked with a dagger (†).

Publications and pre-prints

1. †*A Fast Earth-scattering Formalism for Light Dark Matter with Dark Photon Mediators*
A. Lantero-Barreda, C. Centeno, **B. J. Kavanagh**, N. Castelló-Mor
Submitted to PRD, arXiv:2511.10589

2. *Hints of Dark Matter Spikes in Low-mass X-ray Binaries: a critical assessment*
F. Scarcella, **B. J. Kavanagh**
Submitted to PRD, arXiv:2510.11635

3. *First Production of Skipper-CCD Modules for the DAMIC-M Experiment*
H. Lin, M. Traina, S. Paul et al. (DAMIC-M Collaboration, including **B. J. Kavanagh**)
arXiv:2509.06943

4. †*Signatures of Fuzzy Dark Matter Inside Radial Critical Curves*
J. M. Palencia et al. (including **B. J. Kavanagh**)
Astronomy & Astrophysics 701, A24 (2025), arXiv:2505.24373

5. †*Microlensing at Cosmological Distances: Event Rate Predictions in the Warhol Arc of MACS 0416*
J. M. Palencia, J. M. Diego, L. Dai et al. (including **B. J. Kavanagh**)
Astronomy & Astrophysics 699, A295 (2025), arXiv:2504.07039

6. *Probing Benchmark Models of Hidden-Sector Dark Matter with DAMIC-M*
K. Aggarwal et al. (DAMIC-M Collaboration, including **B. J. Kavanagh**)
Phys. Rev. Lett. 135, 071002 (2025), arXiv:2503.14617

7. †*The cosmic history of Primordial Black Hole accretion and its uncertainties*
P. Jangra, D. Gaggero, **B. J. Kavanagh**, J. M. Diego
JCAP 08 (2025) 006, arXiv:2412.11921

8. *Unexplained correlation between the Cosmic Microwave Background temperature and the local matter density distribution*
M. Cruz, E. Martínez-González, C. Gimeno-Amo, **B. J. Kavanagh**, M. Tucci
JCAP 04 (2025) 079, arXiv:2407.17599

9. *Axions in Andromeda: Searching for Minicluster – Neutron Star Encounters with the Green Bank Telescope*
L. Walters, J. Shroyer, M. Edenton, P. Agrawal, B. Johnson, **B. J. Kavanagh**, D. J. E. Marsh, L. Visinelli
Phys. Rev. D 110, 123002 (2024), arXiv:2407.13060

10. *Dark Matter Mounds: towards a realistic description of dark matter overdensities around black holes*
G. Bertone, A. R. A. C. Wierda, D. Gaggero, **B. J. Kavanagh**, M. Volonteri, N. Yoshida
Phys. Rev. D 112, 043537 (2025), arXiv:2404.08731

11. *Sharpening the dark matter signature in gravitational waveforms II: Numerical simulations with the NbodyIMRI code*
B. J. Kavanagh, T. K. Karydas, G. Bertone, P. Di Cintio, M. Pasquato
Phys. Rev. D 111, 063071 (2025), arXiv:2402.13762
Code available here (archived on Zenodo)

12. *Sharpening the dark matter signature in gravitational waveforms I: Accretion and eccentricity evolution*
T. K. Karydas, **B. J. Kavanagh**, G. Bertone
Phys. Rev. D 111, 063070 (2025), arXiv:2402.13053

13. *Phonon dynamics for light dark matter detection*
M. Raya-Moreno, **B. J. Kavanagh**, L. Fàbrega, R. Rurali
Phys. Rev. D 110, 112007 (2024), arXiv:2311.11930

14. †*Statistics of magnification for extremely lensed high redshift stars*
J. M. Palencia, J. M. Diego, **B. J. Kavanagh**, J. Martinez
Astronomy & Astrophysics 687, A81 (2024), arXiv:2307.09505

15. *Search for Daily Modulation of MeV Dark Matter Signals with DAMIC-M*
I. Arnquist et al. (DAMIC-M Collaboration, including **B. J. Kavanagh**)
Phys. Rev. Lett. 132, 101006 (2024), arXiv:2307.07251

16. †*Impact of dark matter spikes on the merger rates of Primordial Black Holes*
P. Jangra, **B. J. Kavanagh**, J. M. Diego
JCAP 11 (2023) 069, arXiv:2304.05892

17. *Tagging and localisation of ionizing events using NbSi transition edge phonon sensors for Dark Matter searches*
EDELWEISS Collaboration and **B. J. Kavanagh**
Phys. Rev. D 108, 022006, arXiv:2303.02067

18. *Disks, spikes, and clouds: distinguishing environmental effects on BBH gravitational waveforms*
P. S. Cole, G. Bertone, A. Coogan, D. Gaggero, T. Karydas, **B. J. Kavanagh**, T. F. M. Spieksma, G. M. Tomaselli
Nature Astronomy 7, 943–950 (2023), arXiv:2211.01362

19. *Measuring dark matter spikes around primordial black holes with Einstein Telescope and Cosmic Explorer*
P. S. Cole, A. Coogan, **B. J. Kavanagh**, G. Bertone
Phys. Rev. D 107, 083006 (2023), arXiv:2207.07576
Highlighted in **Nature Astronomy 7, 511 (2023)**

20. *The Canfranc Axion Detection Experiment (CADEx): Search for axions at 90 GHz with Kinetic Inductance Detectors*
B. Aja et al., including **B. J. Kavanagh** (CADEx collaboration)
JCAP 11 (2022) 044, arXiv:2206.02980

21. *Dancing in the dark: detecting a population of distant primordial black holes*
M. Martinelli, F. Scarcella, N. B. Hogg, **B. J. Kavanagh**, D. Gaggero, P. Fleury
JCAP 08 (2022) 006, arXiv:2205.02639

22. *Complementarity of direct detection experiments in search of light Dark Matter*
J. R. Angevaare, G. Bertone, A. P. Colijn, M. P. Decowski, **B. J. Kavanagh**
JCAP 10 (2022) 004, arXiv:2204.01580

23. *Godzilla, a monster lurks in the Sunburst galaxy*
J. M. Diego, M. Pascale, **B. J. Kavanagh**, P. Kelly, L. Dai, B. Frye, T. Broadhurst
Astron. & Astrophys., 665 (2022) A134, arXiv:2203.08158
Highlighted in **Nature 610, 10 (2022)**

24. *Search for sub-GeV Dark Matter via Migdal effect with an EDELWEISS germanium detector with NbSi TES sensors*
EDELWEISS Collaboration and **B. J. Kavanagh**
Phys. Rev. D 106, 062004 (2022), arXiv:2203.03993

25. *Cosmology and direct detection of the Dark Axion Portal*
J. Cortabitarte Gutiérrez, **B. J. Kavanagh**, N. Castelló-Mor, F. J. Casas, J. M. Diego, E. Martínez-González, R. Vilar Cortabitarte
Submitted to PRD, arXiv:2112.11387
Code available here (archived on Zenodo)

26. *Scattering searches for dark matter in subhalos: neutron stars, cosmic rays, and old rocks*
J. Bramante, **B. J. Kavanagh**, N. Raj
Phys. Rev. Lett. 128, 231801 (2022), arXiv:2109.04582

27. *Measuring the dark matter environments of black hole binaries with gravitational waves*
A. Coogan, G. Bertone, D. Gaggero, **B. J. Kavanagh**, D. A. Nichols
Phys. Rev. D 105, 043009 (2022), arXiv:2108.04154
Code available here
Featured on NewScientist.nl

28. *The Effect of Mission Duration on LISA Science Objectives*
P. Amaro-Seoane et al.
Gen. Relativ. Gravit. 54, 3 (2022), arXiv:2107.09665

29. *Transient Radio Signatures from Neutron Star Encounters with QCD Axion Miniclusters*
T. D. P. Edwards, **B. J. Kavanagh**, L. Visinelli, C. Weniger
Phys. Rev. Lett. 127, 131103 (2021), arXiv:2011.05378
Code available here (archived on Zenodo)
Featured in the blog Ça Se Passe Là-Haut

30. *Stellar Disruption of Axion Miniclusters in the Milky Way*
B. J. Kavanagh, T. D. P. Edwards, L. Visinelli, C. Weniger
Phys. Rev. D 104, 063038 (2021), arXiv:2011.05377
Code available here (archived on Zenodo)

31. *Integral X-ray constraints on sub-GeV Dark Matter*
M. Cirelli, N. Fornengo, **B. J. Kavanagh**, E. Pinetti
Phys. Rev. D 103, 063022 (2021), arXiv:2007.11493

32. *Primordial Black Holes as a dark matter candidate*
A. M. Green, **B. J. Kavanagh**
J. Phys. G 48 (2021) 4, 043001, arXiv:2007.10722
Code and constraints available here

33. *Measuring the local Dark Matter density in the laboratory*
B. J. Kavanagh, T. Emken, R. Catena
Phys. Rev. D 104, 083023 (2021), arXiv:2004.01621
Code available here (archived on Zenodo) and here

34. *Detecting dark matter around black holes with gravitational waves: Effects of dark-matter dynamics on the gravitational waveform*
B. J. Kavanagh, D. A. Nichols, G. Bertone, D. Gaggero
Phys. Rev. D 102, 083006 (2020), arXiv:2002.12811
Code available here (archived on Zenodo), movies available here

35. *Impact of substructure on local dark matter searches*
A. Ibarra, **B. J. Kavanagh**, A. Rappelt
JCAP 12 (2019) 013, arXiv:1908.00747

36. *Gravitational wave probes of dark matter: challenges and opportunities*
G. Bertone, D. Croon, M. A. Amin, K. K. Boddy, **B. J. Kavanagh**, K. J. Mack, P. Natarajan, T. Opferkuch, K. Schutz, V. Takhistov, C. Weniger, T.-T. Yu
SciPost Phys. Core 3, 007 (2020), arXiv:1907.10610
White paper on Dark Matter and Gravitational Waves

37. *Paleo-Detectors for Galactic Supernova Neutrinos*
S. Baum, T. D. P. Edwards, **B. J. Kavanagh**, P. Stengel, A. K. Drukier, K. Freese, M. Górski, C. Weniger
Phys. Rev. D 101, 103017 (2020), arXiv:1906.05800
Code available here (archived on Zenodo)

38. *Discovery prospects of dwarf spheroidal galaxies for indirect dark matter searches*
S. Ando, **B. J. Kavanagh**, O. Macias, et al.
JCAP 10 (2019) 040, arXiv:1905.07128
Completed as part of the ITFA Amsterdam bachelors' workshop (Jan 2019)

39. *A Unique Multi-Messenger Signal of QCD Axion Dark Matter*
T. D. P. Edwards, M. Chianese, **B. J. Kavanagh**, S. M. Nissanke, C. Weniger
Phys. Rev. Lett. 124, 161101 (2020), arXiv:1905.04686
Featured in University of Amsterdam News

40. *Primordial Black Holes as Silver Bullets for New Physics at the Weak Scale*
G. Bertone, A. Coogan, D. Gaggero, **B. J. Kavanagh**, C. Weniger
Phys. Rev. D 100, 123013 (2019), arXiv:1905.01238
Code available here (archived on Zenodo)

41. *Searching for low-mass dark matter particles with a massive Ge bolometer operated above-ground*
EDELWEISS Collaboration and **B. J. Kavanagh**
Phys. Rev. D 99, 082003 (2019), arXiv:1901.03588

42. *Digging for Dark Matter: Spectral Analysis and Discovery Potential of Paleo-Detectors*
T. D. P. Edwards, **B. J. Kavanagh**, C. Weniger, S. Baum, A. K. Drukier, K. Freese, M. Górski, P. Stengel
Phys. Rev. D 99, 043541 (2019), arXiv:1811.10549
Code available here and here (archived on Zenodo)

43. *Faint Light from Dark Matter: Classifying and Constraining Dark Matter-Photon Effective Operators*
B. J. Kavanagh, P. Panci, R. Ziegler
J. High Energ. Phys. (2019) 2019: 89, arXiv:1810.00033

44. *Statistical challenges in the search for dark matter*
S. Algeri et al. (Editors: T. D. P. Edwards, **B. J. Kavanagh**, P. Scott, A. Vincent)
arXiv:1807.09273

45. *Bracketing the impact of astrophysical uncertainties on local dark matter searches*
A. Ibarra, **B. J. Kavanagh**, A. Rappelt
JCAP 12 (2018) 018, arXiv:1806.08714

46. *Black Holes' Dark Dress: On the merger rate of a subdominant population of primordial black holes*
B. J. Kavanagh, D. Gaggero, G. Bertone
Phys. Rev. D 98, 023536 (2018), arXiv:1805.09034
Code available here (archived on Zenodo), movies available here

47. *Dark Matter Model or Mass, but Not Both: Assessing Near-Future Direct Searches with Benchmark-free Forecasting*
T. D. P. Edwards, **B. J. Kavanagh**, C. Weniger
Phys. Rev. Lett. 121, 181101 (2018), arXiv:1805.04117
Code available here and here
Featured in University of Amsterdam News

48. *Prospects for exploring New Physics in Coherent Elastic Neutrino-Nucleus Scattering*
J. Billard, J. Johnston, **B. J. Kavanagh**
JCAP 11 (2018) 016, arXiv:1805.01798
Illustrative code available here (archived on Zenodo)

49. *Precision constraints on radiative neutrino decay with CMB spectral distortion*
J. L. Aalberts, S. Ando, W. M. Borg, E. Broeils, J. Broeils, S. Broeils, **B. J. Kavanagh**, G. Leguijt, M. Reemst, D. R. van Arneman, H. Vu
Phys. Rev. D 98, 023001 (2018), arXiv:1803.00588
Completed as part of the ITFA Amsterdam bachelors' workshop (Jan 2018)

50. *Earth-Scattering of super-heavy Dark Matter: updated constraints from detectors old and new*
B. J. Kavanagh
Phys. Rev. D 97, 123013 (2018), arXiv:1712.04901
Code available here

51. *Time-integrated directional detection of dark matter*
C. A. J. O'Hare, **B. J. Kavanagh**, A. M. Green
Phys. Rev. D 96, 083011 (2017), arXiv:1708.02959

52. *Prospects for determining the particle/antiparticle nature of WIMP dark matter with direct detection experiments*
B. J. Kavanagh, F. S. Queiroz, W. Rodejohann, C. E. Yaguna
J. High Energ. Phys. (2017) 2017: 59, arXiv:1706.07819
Code available here

53. *Probing Leptophilic Dark Sectors with Hadronic Processes*
F. D'Eramo, **B. J. Kavanagh**, P. Panci
Phys. Lett. B 771 (2017) 339-348, arXiv:1702.00016

54. *Signatures of Earth-scattering in the direct detection of Dark Matter*
B. J. Kavanagh, R. Catena, C. Kouvaris
JCAP 01 (2017) 012, arXiv:1611.05453
Code available here

55. *Reconstructing the three-dimensional local dark matter velocity distribution*
B. J. Kavanagh, C. A. J. O'Hare
Phys. Rev. D 94, 123009 (2016), arXiv:1609.08630

56. *You can hide but you have to run: direct detection with vector mediators*
F. D'Eramo, **B. J. Kavanagh**, P. Panci
JHEP 08 (2016) 111, arXiv:1605.04917
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57. *A review of the discovery reach of directional Dark Matter detection*
F. Mayet, A. M. Green, J. B. R. Battat, J. Billard, N. Bozorgnia, G. B. Gelmini, P. Gondolo, **B. J. Kavanagh** , S. K. Lee, D. Loomba J. Monroe, B. Morgan, C. A. J. O'Hare, A. H. G. Peter, N. S. Phan, S. E. Vahsen
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Highlighted in Physics Reports

58. *Re-examining the significance of the 750 GeV diphoton excess at ATLAS*
B. J. Kavanagh
arXiv pre-print (2016), arXiv:1601.07330
Featured on Syymmetries and Résonaances

59. *New directional signatures from the non-relativistic effective field theory of dark matter*
B. J. Kavanagh
Phys. Rev. D 92, 023513 (2015), arXiv:1505.07406

60. *Discretising the velocity distribution for directional dark matter experiments*
B. J. Kavanagh
JCAP 07 (2015) 019, arXiv:1502.04224

61. *Probing WIMP particle physics and astrophysics with direct detection and neutrino telescope data*
B. J. Kavanagh, M. Fornasa, A. M. Green
Phys. Rev. D. 91, 103533 (2015), arXiv:1410.8051

62. *Parametrizing the local dark matter speed distribution: a detailed analysis*
B. J. Kavanagh
Phys. Rev. D 89, 085026 (2014), arXiv:1312.1852

63. *WIMP physics with ensembles of direct-detection experiments*
A. H. G. Peter, V. Gluscevic, A. M. Green, **B. J. Kavanagh**, S. K. Lee
Phys. Dark Universe 5-6 (2014) 45-74, arXiv:1310.7039

64. *Model independent determination of the dark matter mass from direct detection experiments*
B. J. Kavanagh and A. M. Green
Phys. Rev. Lett. 111, 031302 (2013), arXiv:1303.6868
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65. *Improved determination of the WIMP mass from direct detection data*
B. J. Kavanagh and A. M. Green
Phys. Rev. D 86, 065027 (2012), arXiv:1207.2039

White Papers

1. *The Lunar Gravitational-wave Antenna: Mission Studies and Science Case*
P. Ajith et al. (LGWA Collaboration, including **B. J. Kavanagh**)
Submitted to JCAP, arXiv:2404.09181

2. *Mineral Detection of Neutrinos and Dark Matter. A Whitepaper*
S. Baum et al. (including **B. J. Kavanagh**)
Phys. Dark Univ. 41 (2023) 101245, arXiv:2301.07118

3. *New Horizons for Fundamental Physics with LISA*
K. G. Arun at al. (including **B. J. Kavanagh**)
Living Reviews in Relativity, 25, 4 (2022), arXiv:2205.01597

4. *Dark Matter In Extreme Astrophysical Environments*
M. Baryakhtar et al. (including **B. J. Kavanagh**)
White paper for the SNOWMASS 2022 Summer Study, arXiv:2203.07984

5. *EuCAPT White Paper: Opportunities and Challenges for Theoretical Astroparticle Physics in the Next Decade*
R. Alves Batista et al. (including **B. J. Kavanagh**, edited by G. Bertone & A. Riotto)
White paper of the European Consortium for Astroparticle Theory (EuCAPT), arXiv:2110.10074

6. *AEDGE: Atomic Experiment for Dark Matter and Gravity Exploration in Space*
Y. A. El-Neaj et al.
EPJ Quantum Technology 7, 6 (2020), arXiv:1908.00802
Signed as a supporting author

7. *Black holes, gravitational waves and fundamental physics: a roadmap*
L. Barack at al. (**B. J. Kavanagh**, Section coordinator: "Primordial Black Holes and Dark Matter")
Class. Quantum Grav. 36 143001 (2019), arXiv:1806.05195
White Paper for the COST action "Gravitational Waves, Black Holes, and Fundamental Physics"
Featured in Physics World