

## 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. *Dark matter mounds from the collapse of supermassive stars: a general-relativistic analysis*  
R. Caiozzo, G. Bertone, P. Ullio, R. Vicente, **B. J. Kavanagh**, D. Gaggero  
Submitted to PRD, [arXiv:2512.09985](#)
2. *Caustic crossings in giant arcs with extended dark matter objects*  
D. Croon, B. Crossey, J. M. Diego, **B. J. Kavanagh**, J. M. Palencia  
Submitted to PRD, [arXiv:2511.20761](#)
3. † *Daily Modulation Constraints on Light Dark Matter with DAMIC-M*  
K. Aggarwal et al. (DAMIC-M Collaboration, including **B. J. Kavanagh**)  
Submitted to PRD, [arXiv:2511.13962](#)
4. † *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](#)
5. *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](#)
6. *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](#)
7. † *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](#)
8. † *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](#)
9. *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](#)
10. † *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](#)
11. *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](#)
12. *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](#)
13. *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](#)

14. *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](#))
15. *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](#)
16. *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](#)
17. †*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](#)
18. *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](#)
19. †*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](#)
20. *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](#)
21. *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](#)
22. *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 \(2023\)](#)
23. *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](#)
24. *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](#)
25. *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](#)
26. *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 \(2022\)](#)

27. *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](#)
28. *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](#))
29. *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](#)
30. *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](#)
31. *The Effect of Mission Duration on LISA Science Objectives*  
P. Amaro-Seoane et al.  
[Gen. Relativ. Gravit. 54, 3 \(2022\)](#), [arXiv:2107.09665](#)
32. *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](#)
33. *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](#))
34. *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](#)
35. *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](#)
36. *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](#)
37. *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](#)
38. *Impact of substructure on local dark matter searches*  
A. Ibarra, **B. J. Kavanagh**, A. Rappelt  
[JCAP 12 \(2019\) 013](#), [arXiv:1908.00747](#)
39. *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
40. *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](#))
  41. *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 \(Jan 2019\)](#)
  42. *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](#)
  43. *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](#))
  44. *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](#)
  45. *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](#))
  46. *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](#)
  47. *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](#)
  48. *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](#)
  49. *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](#)
  50. *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](#)
  51. *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](#))

52. *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 Arneeman, H. Vu  
[Phys. Rev. D 98, 023001 \(2018\)](#), [arXiv:1803.00588](#)  
Completed as part of the [ITFA Amsterdam bachelors' workshop \(Jan 2018\)](#)
53. *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](#)
54. *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](#)
55. *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](#)
56. *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](#)
57. *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](#)
58. *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](#)
59. *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](#)  
Code available [here](#)
60. *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  
[Physics Reports 627 \(2016\) 1](#), [arXiv:1602.03781](#)  
Highlighted in [Physics Reports](#)
61. *Re-examining the significance of the 750 GeV diphoton excess at ATLAS*  
**B. J. Kavanagh**  
arXiv pre-print (2016), [arXiv:1601.07330](#)  
Featured on [Symmetries](#) and [Résonances](#)
62. *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](#)
63. *Discretising the velocity distribution for directional dark matter experiments*  
**B. J. Kavanagh**  
[JCAP 07 \(2015\) 019](#), [arXiv:1502.04224](#)
64. *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](#)

65. *Parametrizing the local dark matter speed distribution: a detailed analysis*  
**B. J. Kavanagh**  
[Phys. Rev. D 89, 085026 \(2014\)](#), [arXiv:1312.1852](#)
66. *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](#)
67. *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](#)  
Featured in [Phys.org](#)
68. *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. (LGBA 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 et 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 et 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](#)