

PUBLICATION LIST

- [1] A. Weber, **J. Feldbrugge**, E. Pisanty, “A universal approach to saddle-point methods in attosecond science”, (2025), [arXiv:arXiv:2510.12545 \[quant-ph\]](#)
- [2] B. Hertzsch, **J. Feldbrugge**, Maé Rodriguez and Rien van de Weygaert, “A New Recipe for Caustic Pancakes: On the Reality of Walls in the Cosmic Web”, *JCAP* (2025) (R & R), [arXiv:2510.02419 \[astro-ph.CO\]](#)
- [3] **J. Feldbrugge** and U-L Pen, “The real-time Feynman path integral for step potentials”, *Physical Review D* (2025) (R & R), [arXiv:2508.17578 \[quant-ph\]](#)
- [4] **J. Feldbrugge** and J. Y. L. Jones, “Efficient evaluation of real-time path integrals”, *Physical Review D* (2025) Volume 111. [arXiv:2501.16323 \[quant-ph\]](#)
- [5] B. Bonga, **J. Feldbrugge** and A. Metidieri, “Wave optics for rotating stars”, *Physical Review D* (2024) Volume 111, Issue 6.. [arXiv:2410.03828 \[astro-ph.CO\]](#)
- [6] **J. Feldbrugge** and R. van de Weygaert, “What makes a cosmic filament? The dynamical origin and identity of filaments I. fundamentals in 2D”, *Monthly Notices of the Royal Astronomical Society* (2024, Accepted). [arXiv:2405.20475 \[astro-ph.CO\]](#)
- [7] **J. Feldbrugge**, “Phase-Space Delaunay Tessellation Field Estimator”, *Monthly Notices of the Royal Astronomical Society* (2025) nr. 1, 536. [arXiv:2402.16234 \[astro-ph.CO\]](#)
- [8] **J. Feldbrugge**, D. L. Jow, U.-L. Pen, “Crossing singularities in the saddle point approximation”, *Physical Review Letters* (2023, R&R). [arXiv:2309.12427 \[quant-ph\]](#)
- [9] **J. Feldbrugge**, D. L. Jow, U.-L. Pen, “Complex classical paths in quantum reflections and tunneling”, *Physical Review D* (2025) Volume 111, Issue 8, id.085027, 29 pp.. [arXiv:2309.12420 \[quant-ph\]](#)
- [10] **J. Feldbrugge**, N.M.D. Niezink, “Orthogonality relations for conical functions of imaginary order”, (2023). [arXiv:2309.05616 \[math\]](#)
- [11] **J. Feldbrugge**, “Complex evaluation of angular power spectra: Going beyond the Limber approximation”, *Physical Review D* (2023) nr. 108, 103007. [arXiv:2304.13064 \[astro-ph.CO\]](#)
- [12] **J. Feldbrugge**, Y. Yan, and R. van de Weygaert, “Statistics of tidal and deformation eigenvalue fields in the primordial Gaussian matter distribution: the two-dimensional case”, *Monthly Notices of the Royal Astronomical Society* (2023, R&R). [arXiv:2301.07200 \[astro-ph.CO\]](#)
- [13] **J. Feldbrugge**, and R. van de Weygaert, “Cosmic web & caustic skeleton: non-linear constrained realizations - 2D case studies”, *Journal of Cosmology and Astroparticle Physics* (2013) no.2, 58. [arXiv:2212.07840 \[astro-ph.CO\]](#)
- [14] **J. Feldbrugge**, U.-L. Pen, and N. Turok, “Oscillatory path integrals for radio astronomy,” *Annals of Physics* (2023) no.451, 169255. [arXiv:1909.04632 \[astro-ph.HE\]](#)

- [15] **J. Feldbrugge**, “Multi-plane lensing in wave optics,” *Monthly Notices of the Royal Astronomical Society* (2023) nr.250, 2995–3006. [arXiv:2010.03089 \[astro-ph.CO\]](#)
- [16] **J. Feldbrugge**, and N. Turok, “Existence of real time quantum path integrals”, *Annals of Physics* (2023, R&R) [arXiv:2207.12798 \[hep-th\]](#)
- [17] D. Jow, U.-L. Pen, and **J. Feldbrugge**, “Regimes in astrophysical lensing: refractive optics, diffractive optics, and the Fresnel scale”, *Monthly Notices of the Royal Astronomical Society* (2022). [arXiv:2204.12004 \[astro-ph.CO\]](#)
- [18] G. Wilding, K. Nevenzeel, R. van de Weygaert, G. Vegter, P. Pranav, B.J.T. Jones, K. Efstathiou, and **J. Feldbrugge**, “Persistent homology of the cosmic web. I: Hierarchical topology in Λ CDM cosmologies”, *Monthly Notices of the Royal Astronomical Society*, 507 (2021) no.2, 2968–2990. [arXiv:2011.12851 \[astro-ph.CO\]](#)
- [19] **J. Feldbrugge** and N. Turok, “Gravitational lensing of binary systems in wave optics,” *Physical Review Letters* (2020, R&R). [arXiv:2008.01154 \[gr-qc\]](#)
- [20] **J. Feldbrugge**, M. van Engelen, R. van de Weygaert, P. Pranav, and G. Vegter, “Stochastic homology of Gaussian vs. non-Gaussian random fields: Graphs towards Betti numbers and persistence diagrams, *Journal of Cosmology and Astroparticle Physics* (2019) no.9, 52–100. [arXiv:1908.01619 \[astro-ph.CO\]](#)
- [21] A. Di Tucci, **J. Feldbrugge**, J.-L. Lehnert, N. Turok, “Quantum incompleteness of inflation,” *Physical Review D*, 100 (2019) no.6, 63517. [arXiv:1906.09007 \[hep-th\]](#)
- [22] P. Pranav, R. van de Weygaert, G. Vegter, B.J.T. Jones, R.J. Adler, **J. Feldbrugge**, C. Park, T. Buchert, and M. Kerber, “Topology and geometry of Gaussian random fields I: on Betti numbers, Euler characteristic, and Minkowski functionals” *Monthly Notices of the Royal Astronomical Society*, 485 (2019) no.3, 4167–4208. [arXiv:1812.07310 \[astro-ph.CO\]](#)
- [23] **J. Feldbrugge**, J.-L. Lehnert, and N. Turok, “Inconsistencies of the new no-boundary proposal,” *Universe*, 4 (2018), no.10, 100–115. [arXiv:1805.01609 \[hep-th\]](#)
- [24] **J. Feldbrugge**, R. van de Weygaert, J. Hidding, and J. Feldbrugge, “Caustic skeleton & cosmic web,” *Journal of Cosmology and Astroparticle Physics* (2018) no.05, 27–81. [arXiv:1703.09598 \[astro-ph.CO\]](#)
- [25] **J. Feldbrugge**, J. Lehnert, and N. Turok, “No rescue for the no boundary proposal: Pointers to the future of quantum cosmology,” *Physical Review D*, 97 (2018), no.2, 23509 [arXiv:1708.05104 \[hep-th\]](#)
- [26] **J. Feldbrugge**, J.-L. Lehnert, and N. Turok, “No smooth beginning for spacetime,” *Physical Review Letters*, 119 (2017), no.17, 171301. [arXiv:1705.00192 \[hep-th\]](#)
- [27] **J. Feldbrugge**, J.L. Lehnert, and N. Turok, “Lorentzian quantum cosmology,” *Physical Review D*, 95 (2017), no.10, 103508. [arXiv:1703.02076 \[hep-th\]](#)
- [28] **J. Feldbrugge**, J. Hidding, and R. van de Weygaert “Statistics of caustics in large-scale structure formation,” *The Zeldovich Universe: Genesis and Growth of the Cosmic Web*,

Proceedings of the International Astronomical Union, IAU Symposium, 308 (2016), 107–114. [arXiv:1412.5121](#) [[astro-ph.CO](#)]

- [29] R. van de Weygaert, G. Vegter, H. Edelsbrunner, B.J.T. Jones, P. Pranav, C. Park, W. Hellwing, B. Eldering, N. Kruithof, E.G.P. Bos, J. Hidding, **J. Feldbrugge**, E. ten Have, M. van Engelen, M. Caroli, and M. Teillaud, “Alpha, Betti and the megaparsec universe: On the topology of the cosmic web,” *Transactions on Computational Science XIV: Special Issue on Voronoi Diagrams and Delaunay Triangulation. Lecture Notes in Computer Science, Vol. 6970. Springer Berlin Heidelberg* (2013). [arXiv:1306.3640](#) [[astro-ph.CO](#)]

THESES

- [30] **J. Feldbrugge**, “Path integrals in the sky: Classical and quantum problems with minimal assumptions,” PhD thesis, Perimeter Institute, University of Waterloo, supervised by N. Turok (2019). [Available online.](#)
- [31] **J. Feldbrugge**, “Primordial non-Gaussianity and large-scale structure,” Part III Essay, University of Cambridge, supervised by P. Shellard and T. Giannantonio (2015). [Available online.](#)
- [32] **J. Feldbrugge**, “Statistics of caustics in large-scale structure formation,” Master thesis, University of Groningen, supervised by R. van de Weygaert, D. Roest, A.E. van Enter (2014). [Available online.](#)
- [33] **J. Feldbrugge** and M. van Engelen, “Analysis of Betti numbers and persistence diagrams of two-dimensional Gaussian random fields,” Bachelor thesis, University of Groningen, supervised by R. van de Weygaert, E. Pallante, G. Vegter (2012). [Available online.](#)