Itay Lavie — Curriculum Vitae

itaylavie@g.harvard.edu

Education

2025-present	PhD student, Applied Math, Harvard University Advised by Prof. Cengiz Pehlevan Current GPA: 4/4
2022-2024	M.Sc., Physics Hebrew University of Jerusalem Advised by Prof. Zohar Ringel GPA: 96/100, Magna cum laude
2019-2022	B.Sc., Physics major, Philosophy minor, "Amirim" honors program Hebrew University of Jerusalem GPA: 97/100, *Summa cum laude*

Research Experience

2024	Research Intern, Decision Optimization Group, IBM Research Research on generalization properties of transformers for solution of combinatorial optimization problems.
2023	Helmholtz Visiting Researcher, Prof. Moritz Helias's Group, Forschungszentrum Jülich. Collaborating on representation learning in transformers (ongoing).
2021-2022	Bachelor's thesis, Prof. Yonit Hochberg's & Prof. Eric Kuflik's Group, Racah institute of physics, Hebrew University of Jerusalem Thesis title: "Roadmap to Thermal Dark Matter Beyond the WIMP Unitarity Bound".
2020-2021	Research student, Prof. Yonit Hochberg's & Prof. Eric Kuflik's Group, Racah institute of physics, Hebrew University of Jerusalem Research project: Out of equilibrium dynamics in the early universe for a suggested solution to the hierarchy problem.

Publications

2026	**Itay Lavie**, Kirsten Fischer, Andrey Lekov, Frederic Van Maele, Zohar Ringel, Moritz Helias (2026), Phase Transitions in Attention: A Bayesian Theory of Copy Head Emergence. In submission
2026	**Itay Lavie**, Noam Levi, Yonatan Kahn (2026), Statistical Properties of Training & Generalization. In submission
2024	**Itay Lavie** and Zohar Ringel (2024), Demystifying Spectral Bias on Real-World Data. In submission
2024	**Itay Lavie**, Guy Gur-Ari, Zohar Ringel (2024), Towards Understanding Inductive Bias in Transformers: A View from Infinity. **Proceedings of the 41st International Conference on Machine Learning (ICML)**, PMLR
2023	Ronny Frumkin, Eric Kuflik, **Itay Lavie**, and Tal Silverwater (2023), Roadmap to Thermal Dark Matter beyond the Weakly Interacting Dark Matter Unitarity Bound. **Physical Review Letters** 130, 171001.

(*Authors are listed alphabetically*, per the high energy phenomenology community standard)

Talks

2025	Invited talk, ML seminar, Technion - Israel Institute of Technology
2024	Contributed talk, Israeli Physics for Deep Learning Conference

Awards & Fellowships

2025	Open Philanthropy Career Development and Transition Grant. To dedicate time to learn more on AI safety and interpretability
11/23-1/24	Helmholtz Visiting Researcher Grant, Helmholtz Information and Data Science Academy Usually awarded to PhD students and postdocs, 10k Euros.
2020-2022	"Amirim" Scholarship, Full tuition during bachelor's degree, Faculty of sciences, Hebrew University of Jerusalem. 3 years award to the top 3% of student body across the faculty of sciences.

Community Service

Reviewer: Physical Review X, ICML, ICLR, NeurIPS

Organizer, Phys4ML social, The 41st International Conference on Machine Learning (ICML 2024).
200+ attendees.

Teaching Experience

2024	Lab instructor, Course: Physics Lab III: Advanced Experiments in Quantum and Modern Physics
2023	Lab instructor, Courses: Physics Lab I (Talpiot), Physics Lab II: Waves, Dynamical Systems and Materials Properties (Talpiot)