

JAMES AMAREL

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EDUCATION

	2017-2022	University of Oregon
Ph.D. in Physics	<u>Dissertation:</u> On a spectral method for calculating the electrical resistivity of a low temperature metal from the linearized Boltzmann equation. Advisor: Dietrich Belitz	
	2014-2017	Cal Poly, San Luis Obispo
B.Sc. in Physics (Summa Cum Laude), Minor in Maths	<u>Research:</u> Inferred material parameters from a regression analysis of the birefringence of smectic liquid crystals under the influence of both an external heat bath and an applied electric field. Numerically simulated the motion of ciliates using a model for biological squirmers in the low Reynolds number regime. <u>Coursework:</u> Learned Python for scientific computing. Analyzed data obtained by way of advanced instrumentation techniques, including both analog and digital electronics, to study the quantum properties of atoms and nuclei.	

SKILLS

Theory	Statistical field theory, dynamical systems, distribution theory, stochastic processes, linear analysis, Bayesian inference.
Computer	PYTHON, Jupyter Notebook, NumPy, SciPy, scikit-learn, TensorFlow, PyTorch, pandas, SQL, Matplotlib, Cython, Mathematica, MATLAB, L ^A T _E X, Git, Linux.
Laboratory	Employed trackpy to characterize the motion of Brownian particles as observed through an optical microscope.

EMPLOYMENT

	Summer 2021	Graduate Research Assistant
University of Oregon	Developed a rigorous method for calculating the transport coefficients of a metallic ferromagnet by proving that, for relatively clean low temperature metals, one need not determine the full spectrum of the collision operator, as it is sufficient to consider only the five dimensional sector associated with the continuity equations for particle number, energy, and momentum.	
	AY 2017-2022	Graduate Teaching Fellow
University of Oregon	Graded exercises, held office hours, and covered lectures for both undergraduate and graduate physics courses.	
	Summer 2015	Research Scholar
University of Colorado Boulder	Used image classification software to investigate the motion of aqueous droplets that were deposited onto a freely suspended liquid crystal film.	

PUBLICATIONS

Physical Review B	J. Amarel, D. Belitz, and T. R. Kirkpatrick, "Thermal transport and non-mechanical forces in metals," Phys. Rev. B 106, 125105 (2022).
Journal of Mathematical Physics	J. Amarel, D. Belitz, and T. R. Kirkpatrick, "Rigorous results for the electrical conductivity due to electron-phonon scattering," Journal of Mathematical Physics 62, 023301 (2021).
Physical Review B	J. Amarel, D. Belitz, and T. R. Kirkpatrick, "Exact solution of the Boltzmann equation for low temperature transport coefficients in metals II: Scattering by ferromagnons", Phys. Rev. B 102, 214307 (2020).
Physical Review B	J. Amarel, D. Belitz, and T. R. Kirkpatrick, "Exact solution of the Boltzmann equation for low temperature transport coefficients in metals I: Scattering by phonons, antiferromagnons, and helimagnons", Phys. Rev. B 102, 214306 (2020).

OTHER INFORMATION

- Awards*
- 2020 · Weiser Senior Teaching Assistant Award, Department of Physics, University of Oregon
 - 2018 · Physics Qualifier Exam Prize, Department of Physics, University of Oregon
 - 2018 · Thomas B. Cooper Memorial Scholarship, University of Oregon
 - 2017 · Certificate of Excellence, Department of Physics, California Polytechnic State University, San Luis Obispo
 - 2016 · LAM Research Scholarship, Department of Physics, California Polytechnic State University, San Luis Obispo
- Talks*
- 2021 · **March Meeting Session J38.00013:** Magnetism Quantum Theory and Computation Studies - Exact solution of the linearized Boltzmann equation for the low-temperature resistivity in metallic ferromagnets.
 - 2020 · Seminar, University of Oregon, Institute of Fundamental Science - Results on the resistivity due to phonons, magnons, and impurities.

October 27, 2022