

ROMAN BERENS

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EMPLOYMENT

Vanderbilt University Department of Physics and Astronomy September 2023 – Present
Postdoctoral Research Scholar in the Initiative for Gravity, Waves, and Fluids

EDUCATION

Columbia University *August 2016 – December 2022*
Doctor of Philosophy candidate, High Energy Theoretical Physics
Advisor: Prof. Rachel Rosen
Thesis: *Perspectives on Black Holes: Astrophysical, Geometric, and Beyond General Relativity*

Harvard University *August 2012 – May 2016*
Master of Arts, Physics
Bachelor of Arts, cum laude in Physics and Classics

PUBLICATIONS

- R. Berens, T. Gravely, and A. Lupsasca, “Gravitational Waves on Kerr Black Holes III: Extremal and Near-Extremal Metric Perturbations”, in preparation
 - R. Berens, L. Hui, D. McLoughlin, A. Solomon, and J. Staunton, “Ladder Symmetries of Higher Dimensional Black Holes”, [[arxiv:2510.18952](#)].
 - R. Berens, L. Hui, D. McLoughlin, R. Penco, and J. Staunton, “Geometric Symmetries for the Vanishing of the Black Hole Tidal Love Numbers”, [[arxiv:2510.18952](#)].
 - R. Berens, T. Gravely, and A. Lupsasca, “Gravitational Waves on Kerr Black Holes II: Metric Reconstruction with Cosmological Constant”, [[arXiv:2510.07712](#)], submitted to Classical and Quantum Gravity.
 - P. Galison, M. Johnson, A. Lupsasca, T. Gravely, R. Berens, “The Black Hole Explorer: Using the Photon Ring to Visualize Spacetime Around the Black Hole”, [Proceedings Volume 13092, Space Telescopes and Instrumentation 2024: Optical, Infrared, and Millimeter Wave; 130926R \(2024\)](#) [[arXiv:2406.11671](#)].
 - R. Berens, T. Gravely, and A. Lupsasca, “Gravitational Waves on Kerr Black Holes I: Reconstruction of Linearized Metric Perturbations”, [Class. Quant. Grav. 41 \(2024\) 19, 195004](#) [[arXiv:2403.20311](#)].
 - R. Berens, L. Hui, and Z. Sun, “Ladder Symmetries of Black Holes and de Sitter Space: Love Numbers and Quasinormal Modes”, [JCAP 06 \(2023\) 056](#) [[arxiv:2212.09367](#)].
 - P. Adari, R. Berens and J. Levin, “Charging up Boosted Black Holes”, [Phys. Rev. D 107 \(2023\) 044055](#) [[arXiv:2111.15027](#)].
 - R. Berens, L. Krauth and R.A. Rosen, “Gravitational Collapse in Massive Gravity on de Sitter Spacetime”, [Phys. Rev. D 105 \(2022\) 064057](#) [[arXiv:2109.10411](#)].

INVITED TALKS

Carnegie Mellon Theory Seminar: “Analytic Advances in Black Hole Perturbation Theory” **11/5/2025**
SEAPS Meeting: “Reconstructing the Rippling Geometry around Spinning Black Holes” **10/24/2024**
Princeton Gravity Initiative Seminar: “Metric Reconstruction on Kerr Black Holes” **4/1/2024**

CONFERENCES/WORKSHOPS ATTENDED

11th Gulf Coast Gravity Meeting
University of Mississippi 4/11 – 4/12/2025

American Physical Society Global Physics Summit <i>Anaheim</i>	3/16 – 3/21/2025
University of Miami Physics Conference <i>Fort Lauderdale</i>	12/12 – 12/19/2024
Southeastern Section of the American Physical Society Annual Meeting <i>University of North Carolina at Charlotte</i>	10/24 – 10/25/2024
American Physical Society April Meeting <i>Sacramento</i>	4/2 – 4/6/2024
Black Hole Explorer Photon Ring Workshop <i>Vanderbilt University</i>	2/12 – 2/16/2024
Probing Effective Theories of Gravity in Strong Fields and Cosmology <i>Kavli Institute for Theoretical Physics at University of California, Santa Barbara</i>	8/17 – 9/4/2020
East Coast High Energy Theory Student Meeting <i>New York University</i>	5/17/2019
Many Body Quantum Dynamics: Perspectives From Field Theory and Gravity <i>Initiative for Theoretical Science at The City University of New York</i>	5/9/2019

OTHER TALKS

Gulf Coast Gravity Meeting: “Visualizing Black Hole Spacetime with the Photon Ring”	4/12/2025
APS Global Physics Summit: “Visualizing Black Hole Spacetime with the Photon Ring ”	3/17/2025
U of Miami Physics Conference: “Gravitational Waves on Kerr Black Holes”	12/13/2024
APS April Meeting: “Metric Reconstruction on Kerr Black Holes”	4/5/2024
Vanderbilt VandyGRAF Seminar: “Metric Reconstruction on Kerr Black Holes”	3/22/2024
High Energy Theory Group Meeting: “Building to dRGT Massive Gravity”	10/19/2021
High Energy Theory Group Meeting: “Gravitational Collapse in Massive Gravity”	10/5/2021
Theoretical Astrophysics Group Meeting: “Charge Accretion on a Boosted Black Hole”	6/10/2021
High Energy Theory Group Meeting: “The Mathematics of Juggling”	3/18/2021
High Energy Theory Group Meeting: “An Introduction to Knot Theory”	3/7/2019
Physics 8012 (Astrophysics II) Seminar: “Signals of Scalar-Tensor Theories”	3/19/2018
High Energy Theory Group Meeting: “An Introduction to Massive Gravity”	2/15/2018

TEACHING EXPERIENCE

Columbia Science Fellow in the Frontiers of Science Program	January 2023 – May 2023
Columbia University Teaching Assistant	August 2016 – December 2022
· General Physics I Lab (1291)	Fall 2016
· General Physics II Lab (1292)	Spring 2017, Summer 2017 and 2018
· General Physics I (1201)	Fall 2018
· General Physics II (1202)	Summer 2017, 2020, and 2021; Spring 2019* and 2022
· Intro to Experimental Physics Lab (1494)	Fall 2017, Spring 2018
· Physics I: Mechanics and Relativity (1601)	Fall 2019
· Physics II: Thermodynamics and Electromagnetism (1602)	Spring 2020
· Physics for Poets (1001)	Spring 2017*
· Basic Physics (S0065)	Summer 2018, 2019, 2021
· Intro to Mechanics and Thermodynamics (1401)	Fall 2018
· Intro to Electromagnetism and Optics (1402)	Summer 2017, Spring 2019* and 2022

· Mathematical Methods (4019)	<i>Fall 2017* and 2019*</i>
· Advanced Electromagnetism (3007)	<i>Fall 2018*</i>
· Advanced Mechanics (3003)	<i>Spring 2018*, 2019*, 2020*, 2021*, and 2022</i>
· Quantum Mechanics (4021)	<i>Fall 2022</i>
· Intro to General Relativity (4040)	<i>Fall 2020</i>
· Physics Help Room	<i>Fall 2016, Summer 2017 and 2018*, Spring 2017</i>
<i>*indicates additional voluntary teaching</i>	
Allan M. Sachs Teaching Award for outstanding graduate student instruction	<i>2019</i>

SERVICE/OUTREACH

Columbia Physics Graduate Council (Founding Member)	<i>January 2017 – May 2020</i>
President	<i>March 2019 – May 2020</i>
Reading Team Math (after-school math instruction in Harlem)	<i>March 2018 – December 2022</i>
Team Leader	<i>September 2019 – December 2022</i>
Columbia Undergraduate Society of Physics Students Seminar	<i>4/2/2020</i>
Democracy Prep Outreach (presentation to students at local high school)	<i>11/16/2020</i>
“Singularities, Schwarzschild Radii, and Spaghettification: The Extreme Physics of Black Holes”	
Vanderbilt QuarkNet Workshop	<i>6/17/2024</i>
“Singularities, Schwarzschild Radii, and Spaghettification: The Extreme Physics of Black Holes”	

TECHNICAL SKILLS

- Advanced proficiency with *LaTeX* and *Mathematica*, including the *xAct* suite of packages.
- Basic knowledge of C++.