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].**

CONFERENCES/WORKSHOPS ATTENDED

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

American Physical Society Global Physics Summit *3/16 – 3/21/2025*
Anaheim

University of Miami Physics Conference *12/12 – 12/19/2024*
Fort Lauderdale

Southeastern Section of the American Physical Society Annual Meeting *10/24 – 10/25/2024*
University of North Carolina at Charlotte

American Physical Society April Meeting *4/2 – 4/6/2024*
Sacramento

Black Hole Explorer Photon Ring Workshop *2/12 – 2/16/2024*
Vanderbilt University

Probing Effective Theories of Gravity in Strong Fields and Cosmology *8/17 – 9/4/2020*
Kavli Institute for Theoretical Physics at University of California, Santa Barbara

East Coast High Energy Theory Student Meeting *5/17/2019*
New York University

Many Body Quantum Dynamics: Perspectives From Field Theory and Gravity *5/9/2019*
Initiative for Theoretical Science at The City University of New York

TALKS GIVEN

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*

SESAPS Meeting: "Reconstructing the Rippling Geometry around Spinning Black Holes" *10/24/2024*

APS April Meeting: "Metric Reconstruction on Kerr Black Holes" *4/5/2024*

Princeton Gravity Initiative Seminar: "Metric Reconstruction on Kerr Black Holes" *4/1/2024*

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)** *Fall 2017* and 2019**
- **Advanced Electromagnetism (3007)** *Fall 2018**
- **Advanced Mechanics (3003)** *Spring 2018*, 2019*, 2020*, 2021*, and 2022*
- **Quantum Mechanics (4021)** *Fall 2022*

· **Intro to General Relativity (4040)** ***Fall 2020***
· **Physics Help Room** ***Fall 2016, Summer 2017 and 2018*, Spring 2017***
****indicates additional voluntary teaching***

Allan M. Sachs Teaching Award for outstanding graduate student instruction ***2019***

SERVICE/OUTREACH

Columbia Physics Graduate Council (Founding Member) ***January 2017 – May 2020***
President ***March 2019 – May 2020***

Reading Team Math (after-school math instruction in Harlem) ***March 2018 – December 2022***
Team Leader ***September 2019 – December 2022***

Columbia Undergraduate Society of Physics Students Seminar ***4/2/2020***

Democracy Prep Outreach (presentation to students at local high school) ***11/16/2020***
"Singularities, Schwarzschild Radii, and Spaghettification: The Extreme Physics of Black Holes"

Vanderbilt QuarkNet Workshop ***6/17/2024***
"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++ and Python.**