

Justin L. Ripley

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Academic Employment

Research Associate, DAMTP, University of Cambridge **October 2020-present**

Research and Teaching Assistant, Princeton University **September 2014-July 2020**

Education

PhD, Physics, Princeton University **September 2014-July 2020**

Advisor: Frans Pretorius

B.A., Physics, Columbia University **September 2010-May 2014**

Minor in Mathematics

Departmental honors in Physics, *summa cum laude*, Phi Beta Kappa

Awards/Grants

Hartle award, ISGRG (GR 22/Amaldi 13 conference) **December 2019**

Erwin H. Leiwant Scholarship, Columbia University **September 2013-May 2014**

John Jay Scholar, Columbia University **September 2010-May 2014**

Professional Activities

Seminar organizer Friday GR seminar, DAMTP, University of Cambridge **October 2020-present**

Committee member Climate and Inclusion, Department of Physics, Princeton University **September 2019-May 2020**

Referee Physical Review D, Physical Review Letters

Computational Experience

I have programming experience with C/C++, Fortran (77/90), Python, Mathematica. My Github account: JLRipley314, list some of the computational projects I have worked on/am working on.

Teaching

Assistant Instructor, Princeton University

EGR/PHY 191, An integrated introduction to engineering, math, physics **Fall 2019**

PHY 103/105, General Physics I Lab **Fall 2018**

PHY 304, Advanced Electromagnetism **Spring 2018**

AST 203, The Universe **Spring 2017, 2018**

PHY 523, General Relativity **Fall 2017**

AST 204, Topics in Modern Astronomy **Spring 2016**

PHY 301, Thermal Physics **Fall 2015, Spring 2016**

Teaching Assistant, Columbia University

Math V2000, Introduction to higher mathematics **Spring 2014**

Outreach

Princeton Citizen Scientists

The Princeton Citizen Scientists (PCS) is a graduate student led group at Princeton University that is dedicated to science policy and outreach at the local, state, and federal level.

President

June 2018–July 2019

Co-organizer for science advocacy trip to Washington, D.C (article)

December 2018

Co-organizer for science “teach-in” event at Princeton Public Library (article)

October 2017

Open Labs

Open Labs is a graduate student group at Princeton University that organizes “science cafes” where local high and middle school students hear talks given by graduate students about their research.

Treasurer and presenter

May 2018–February 2019

Department of Physics, Princeton University

I participated in several science outreach events organized through the Department of Physics at Princeton University throughout my time as a graduate student. Events where I helped plan/organize some of programming are listed below.

Trenton science summer camp (helped plan and run several lessons over 2 weeks)

July 2018

Interviews on “These Vibes are Too Cosmic”

These Vibes are Too Cosmic is a radio program run through Princeton University.

Interview on exotic compact objects

January 2019

Interview on antigravity

March 2016

Invited Talks/Seminars

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| 11. Sapienza University of Rome, Rome, IT (virtual)
<i>Computing the second order gravitational perturbation of Kerr black holes</i> | May 2021 |
| 10. University of Oxford, Oxford, UK (virtual)
<i>The classical evolution of binary black hole systems in scalar-tensor theories</i> | February 2021 |
| 9. University of Virginia, Charlottesville, VA (virtual)
<i>The classical evolution of binary black hole systems in scalar-tensor theories</i> | February 2021 |
| 8. Kyoto University, Kyoto, JP (virtual)
<i>The classical evolution of binary black hole systems in scalar-tensor theories</i> | February 2021 |
| 7. University of Southampton, Southampton, UK (virtual)
<i>The classical evolution of binary black hole systems in scalar-tensor theories</i> | January 2021 |
| 6. University of Cambridge, Cambridge, UK (virtual)
<i>Computing the second order gravitational perturbation of Kerr black holes</i> | November 2020 |
| 5. Johns Hopkins University, Baltimore, MD (virtual)
<i>Numerical computation of second order vacuum perturbations of Kerr black holes</i> | November 2020 |
| 4. Princeton University, Princeton, NJ (virtual)
<i>Classical modifications to Einstein’s General Relativity around black holes</i> | October 2020 |
| 3. Perimeter Institute, Waterloo, ON (virtual)
<i>Exploring the nonlinear dynamics of Einstein dilaton Gauss-Bonnet gravity</i> | April 2020 |
| 2. University of Illinois, Urbana-Champaign, IL
<i>Testing General Relativity and the nonlinear dynamics of modified gravity theories</i> | January 2020 |
| 1. Black Hole Initiative, Harvard University, Cambridge, MA
<i>Nonlinear dynamics of Horndeski theories in spherical collapse</i> | December 2019 |

Contributed Talks/Seminars (selected)

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| 7. APS April Meeting, Sacramento, CA (virtual)
<i>Application of the modified generalized harmonic formulation to scalar-tensor gravity theories</i> | April 2021 |
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| 6. BritGrav21, UCD, Dublin, Ireland (virtual)
<i>Computing the second order vacuum perturbation of Kerr black holes</i> | April 2021 |
| 5. APS April Meeting, Washington, DC (virtual)
<i>Second order perturbation of a Kerr black hole</i> | April 2020 |
| 4. Massachusetts Institute of Technology, Cambridge, MA
<i>Second order vacuum perturbation of a Kerr black hole</i> | December 2019 |
| 3. GR 22/Amaldi 13, Valencia, Spain
<i>Nonlinear dynamics of Horndeski theories in spherical collapse</i> | July 2019 |
| 2. APS April Meeting, Denver, CO
<i>Hyperbolicity in gravitational collapse in a modified gravity theory</i> | April 2019 |
| 1. Numerical Relativity beyond General Relativity, Benasque, Spain
<i>Gravitational collapse in a modified gravity theory</i> | June 2018 |

Refereed Publications

Link to all papers, including preprints: InSpire Hep

11. **Justin L. Ripley**, Nicholas Loutrel, Elena Giorgi, and Frans Pretorius *Numerical computation of second-order vacuum perturbations of Kerr black holes*. Phys. Rev. D 103 (10), 104018 arXiv:2010.00162
10. Nicholas Loutrel, **Justin L. Ripley**, Elena Giorgi, and Frans Pretorius *Second Order Perturbations of Kerr Black Holes: Reconstruction of the Metric*. Phys. Rev. D 103, 104017 arXiv:2008.11770
9. William E. East, **Justin L. Ripley** *Evolution of Einstein-scalar-Gauss-Bonnet gravity using a modified harmonic formulation*. Phys.Rev.D 103 (2021) 4, 044040. arXiv:2011.03547
8. **Justin L. Ripley**, Frans Pretorius *Dynamics of a \mathbb{Z}_2 symmetric EdGB gravity in spherical symmetry*. Class. Quant. Grav. 37 (15), 155003 (2020). arXiv:2005.05417
7. **Justin L. Ripley**, Frans Pretorius *Scalarized black hole dynamics in Einstein-dilaton-Gauss-Bonnet gravity*. Phys. Rev. D 101 (4), 044015 (2019). arXiv:1911.11027
6. **Justin L. Ripley**, *Excision and avoiding the use of boundary conditions in numerical relativity*. Class. Quantum Grav. 36 (23) 237001 (2019). arXiv:1908.04234
5. **Justin L. Ripley**, Frans Pretorius, *Gravitational collapse in Einstein dilaton Gauss-Bonnet gravity* Class. Quantum Grav. 36 (13) 134001 (2019). arXiv:1903.07543
4. **Justin L. Ripley**, Frans Pretorius, *Hyperbolicity in Spherical Collapse of a Horndeski Theory*. Phys. Rev. D 99 (8), 084014 (2019). arXiv:1902.01468
3. **Justin L. Ripley**, Kent Yagi, *Black hole perturbation under a 2+2 decomposition in the action*. Phys. Rev. D 97 (2), 024009 (2017). arXiv:1705.03068
2. Anna Ijjas, **Justin L. Ripley**, Paul J. Steinhardt, *NEC violation in mimetic cosmology revisited*. Phys.Lett. B760 132-138 (2016). arXiv:1604.08586
1. **Justin L. Ripley**, Brian D. Metzger, Almudena Arcones, and Gabriel Martinez-Pinedo, *X-ray Decay Lines from Heavy Nuclei in Supernova Remnants as a Probe of the r-Process Origin and the Birth Periods of Magnetars*. Mon. Not. Roy. Astron. Soc. 438 (4), 3243-3254 (2013). arXiv:1310.2950