

1 Curriculum Vitae

1.1 Personal Data

Name	Jan Steinhoff
Address	Max Planck Institute for Gravitational Physics (Albert Einstein Institute, AEI) Am Mühlenberg 1, D-14476 Potsdam-Golm, Germany
WWW	http://jan-steinhoff.de/physics/
E-Mail	jan.steinhoff@aei.mpg.de
Phone	+49 331 567 7236
Birthday/place	31.03.1981, Buxtehude, Germany
Personal status	married, one child

1.2 Summary

Publications	32 refereed publications since December 2007, including 3 PRLs, a Research Highlight in Nature, an Editor's Suggestion in PRD, and a CQG Highlight
Talks	various talks, see: http://jan-steinhoff.de/physics/talks/ 20 invited talks, including the international MG14, GR21, and GR20 conferences, the 524. WE-Heraeus-Seminar, a main talk on the 2010 German Physical Society (DPG) meeting, and one as a candidate for the Thesis Price 2012 of the DPG
Awards	“James B. Hartle Award” for a talk on the GR19 conference

1.3 Lectures

June 2017	four lectures on Einstein's field equations, spherical stars, and special relativity joint International Max Planck Research School (IMPRS) and geo-Q (SFB 1128, Leibniz Universität Hannover) lecture week
March 2017	Jürgen Ehlers Spring School, three lectures on gravitational waves
Oct. 2016 – Feb. 2017	course on gravitational waves (23 × 90 min.), Humboldt University Berlin
June 2016	two lectures on electrodynamics and special relativity, geo-Q lecture week
June 2016	two lectures on generation of gravitational waves and spherical stars, IMPRS
March 2016	five lectures on special and general relativity, IMPRS and geo-Q lecture week
March 2015	three lectures on general relativity, IMPRS lecture week
January 2011	one lecture, relativity seminar for students, Charles University, Prague on “Post-Newtonian Hamiltonians and spin effects in general relativity”
July 2006	one lecture on representations of semidirect products (Mackey theory)

1.4 Teaching Assistant Activity

Oct. 2017 – Feb. 2018	statistical physics, Humboldt University Berlin, Germany
Oct. 2009 – Feb. 2010	classical mechanics, Friedrich-Schiller-Universität (FSU) Jena, Germany
April 2009 – July 2009	continuum mechanics for high-school teachers, FSU Jena
Oct. 2008 – Feb. 2009	gravitational waves, FSU Jena
April 2008 – July 2008	thermodynamics and statistical physics, FSU Jena
Oct. 2007	mathematics for first-year physics students, FSU Jena

1.5 Successful Proposals

2011	FCT postdoc fellowship, SFRH/BPD/74786/2010, 3+3 years (declined)
2011	DFG postdoc fellowship STE 2017/1, 18 months
2014	FCT postdoc fellowship, SFRH/BPD/94700/2013, 3+3 years (declined)
2014	CNPq-BJT fellowship Nível A, 407562/2013-3, 3 years (declined)

1.6 Organization of scientific meetings

18. – 20. May 2015 | workshop: (Non-)Universal Properties of Neutron Stars
funded by NewCompStar, COST Actions

1.7 Scientific Activity

Sep. 2014 – present | postdoc at the Max Planck Institute for Gravitational Physics (AEI)
July 2013 – Aug. 2014 | postdoc at the Instituto Superior Técnico (IST), Lisbon, Portugal
Multidisciplinary Centre for Astrophysics (CENTRA), GRIT group
March – June 2013 | postdoc at the Center of Applied Space Technology
and Microgravity (ZARM), University of Bremen, Germany
June 2011 – Feb. 2013 | postdoc at the IST, CENTRA, GRIT group, Lisbon, Portugal
DFG research fellowship STE 2017/1 (from Aug. 2011 to Feb. 2013)
Feb. 2007 – May 2011 | Theoretisch-Physikalisches Institut, Friedrich-Schiller-Universität Jena
PhD student until Nov. 2010, postdoc afterwards,
in the SFB/TR7 “Gravitational Wave Astronomy”

1.8 Education

Oct. 2016 – present | Habilitation, Humboldt University Berlin, Germany
supervisor: Prof. Dr. Jan Plefka
Feb. 2007 – Nov. 2010 | PhD student at Friedrich-Schiller-Universität Jena, Germany
degree: Dr. rer. nat.
thesis title: “Canonical Formulation of Spin in General Relativity”
thesis published in *Ann. Phys. (Berlin)* **523** (2011) 919
supervisor: Prof. Dr. Gerhard Schäfer
Oct. 2001 – Dec. 2006 | student in physics at Friedrich-Schiller-Universität Jena, Germany
degree: German diploma in physics
translated thesis title: “Supersymmetric Lattice Field Theories”
supervisor: Prof. Dr. Andreas Wipf
July 2000 – April 2001 | compulsory military/community service
Aug. 1993 – June 2000 | German “Abitur” certificate at Gymnasium Athenaeum Stade
(general higher education entrance qualification, high school)
Aug. 1991 – July 1993 | Orientierungsstufe Harsefeld (middle school)
Aug. 1987 – July 1991 | Grundschule Harsefeld (primary school)

1.9 Outreach Contributions

May 2017 | Talk on neutron stars and black holes in computers, Potsdam Science Day
May 2016 | Interview for Development Company for Television Program (dctp)
about the work on neutron star dynamical tides
Feb. 2016 | Interviews on the first gravitational wave detection by LIGO for:
Antenne Brandenburg, Babelsberg Hitradio, Radio Frei, Reuters (TV)
Feb. 2016 | Contributed to an article in “Welt der Physik”:
Die Suche nach Gravitationswellen
Aug. 2015 | Interview for Deutschlandfunk:
Delle auf Reisen — Die Fahndung nach den Gravitationswellen
May 2015 | Interview for Deutschlandfunk:
Neutronensterne — Mehr als ausgebrannte Sternleichen

1.10 Miscellanea

Memberships | LIGO scientific collaboration, ISGRG, DPG
Software development | Linux kernel, <http://jan-steinhoff.de/linux/synaptics-usb.html>

2 List of Publications

The most recent list and citation metrics can be found on INSPIRE-HEP:
<http://inspirehep.net/search?p=author%3AJ.Steinhoff.1>

2.1 Refereed Articles

- [1] J. Vines and J. Steinhoff, “Spin-multipole effects in binary black holes and the test-body limit,” *Phys. Rev. D* (2017) (accepted), [arXiv:1606.08832 \[gr-qc\]](#).
- [2] M. Levi and J. Steinhoff, “EFTofPNG: A package for high precision computation with the Effective Field Theory of Post-Newtonian Gravity,” *Class. Quant. Grav.* **34** (2017) 244001, [arXiv:1705.06309 \[gr-qc\]](#). **CQG Highlight**.
- [3] N. Sennett, L. Shao, and J. Steinhoff, “Effective action model of dynamically scalarizing binary neutron stars,” *Phys. Rev. D* **96** (2017) 084019, [arXiv:1708.08285 \[gr-qc\]](#).
- [4] N. Sennett, T. Hinderer, J. Steinhoff, A. Buonanno, and S. Ossokine, “Distinguishing Boson Stars from Black Holes and Neutron Stars from Tidal Interactions in Inspiring Binary Systems,” *Phys. Rev. D* **96** (2017) 024002, [arXiv:1704.08651 \[gr-qc\]](#).
- [5] J. Steinhoff, T. Hinderer, A. Buonanno, and A. Taracchini, “Dynamical Tides in General Relativity: Effective Action and Effective-One-Body Hamiltonian,” *Phys. Rev. D* **94** (2016) 104028, [arXiv:1608.01907 \[gr-qc\]](#).
- [6] T. Hinderer, A. Taracchini, F. Foucart, A. Buonanno, J. Steinhoff, M. Duez, L. E. Kidder, H. P. Pfeiffer, M. A. Scheel, B. Szilagyi, K. Hotokezaka, K. Kyutoku, M. Shibata, and C. W. Carpenter, “Effects of neutron-star dynamic tides on gravitational waveforms within the effective-one-body approach,” *Phys. Rev. Lett.* **116** (2016) 181101, [arXiv:1602.00599 \[gr-qc\]](#). **Research Highlight** in *Nature* **533** (2016) 294.
- [7] J. Vines, D. Kunst, J. Steinhoff, and T. Hinderer, “Canonical Hamiltonian for an extended test body in curved spacetime: To quadratic order in spin,” *Phys. Rev. D* **93** (2016) 103008, [arXiv:1601.07529 \[gr-qc\]](#). **Editor’s Suggestion**.
- [8] M. Levi and J. Steinhoff, “Next-to-next-to-leading order gravitational spin-squared potential via the effective field theory for spinning objects in the post-Newtonian scheme,” *JCAP* **1601** (2016) 008, [arXiv:1506.05794 \[gr-qc\]](#).
- [9] M. Levi and J. Steinhoff, “Next-to-next-to-leading order gravitational spin-orbit coupling via the effective field theory for spinning objects in the post-Newtonian scheme,” *JCAP* **1601** (2016) 011, [arXiv:1506.05056 \[gr-qc\]](#).
- [10] M. Levi and J. Steinhoff, “Spinning gravitating objects in the effective field theory in the post-Newtonian scheme,” *JHEP* **09** (2015) 219, [arXiv:1501.04956 \[gr-qc\]](#).
- [11] M. Levi and J. Steinhoff, “Leading order finite size effects with spins for inspiralling compact binaries,” *JHEP* **06** (2015) 059, [arXiv:1410.2601 \[gr-qc\]](#).
- [12] M. Levi and J. Steinhoff, “Equivalence of ADM Hamiltonian and effective field theory approaches at next-to-next-to-leading order spin1-spin2 coupling of binary inspirals,” *JCAP* **1412** (2014) 003, [arXiv:1408.5762 \[gr-qc\]](#).
- [13] S. Chakrabarti, T. Delsate, N. Gürlebeck, and J. Steinhoff, “The I-Q relation for rapidly rotating neutron stars,” *Phys. Rev. Lett.* **112** (2014) 201102, [arXiv:1311.6509 \[gr-qc\]](#).
- [14] S. Chakrabarti, T. Delsate, and J. Steinhoff, “Effective action and linear response of compact objects in Newtonian gravity,” *Phys. Rev. D* **88** (2013) 084038, [arXiv:1306.5820 \[gr-qc\]](#).

- [15] J. Hartung, J. Steinhoff, and G. Schäfer, “Next-to-next-to-leading order post-Newtonian linear-in-spin binary Hamiltonians,” *Ann. Phys. (Berlin)* **525** (2013) 359–394, [arXiv:1302.6723 \[gr-qc\]](#).
- [16] M. Tessmer, J. Steinhoff, and G. Schäfer, “Canonical angles in a compact binary star system with spinning components: Approximative solution through next-to-leading-order spin-orbit interaction for circular orbits,” *Phys. Rev. D* **87** (2013) 064035, [arXiv:1301.3665 \[gr-qc\]](#).
- [17] J. Steinhoff and D. Puetzfeld, “Influence of internal structure on the motion of test bodies in extreme mass ratio situations,” *Phys. Rev. D* **86** (2012) 044033, [arXiv:1205.3926 \[gr-qc\]](#).
- [18] T. Delsate and J. Steinhoff, “New insights on the matter-gravity coupling paradigm,” *Phys. Rev. Lett.* **109** (2012) 021101, [arXiv:1201.4989 \[gr-qc\]](#).
- [19] S. Hergt, J. Steinhoff, and G. Schäfer, “Elimination of the spin supplementary condition in the effective field theory approach to the post-Newtonian approximation,” *Ann. Phys. (N.Y.)* **327** (2012) 1494–1537, [arXiv:1110.2094 \[gr-qc\]](#).
- [20] H. Wang, J. Steinhoff, J. Zeng, and G. Schäfer, “Leading-order spin-orbit and spin(1)-spin(2) radiation-reaction Hamiltonians,” *Phys. Rev. D* **84** (2011) 124005, [arXiv:1109.1182 \[gr-qc\]](#).
- [21] J. Hartung and J. Steinhoff, “Next-to-next-to-leading order post-Newtonian spin(1)-spin(2) Hamiltonian for self-gravitating binaries,” *Ann. Phys. (Berlin)* **523** (2011) 919–924, [arXiv:1107.4294 \[gr-qc\]](#).
- [22] J. Hartung and J. Steinhoff, “Next-to-next-to-leading order post-Newtonian spin-orbit Hamiltonian for self-gravitating binaries,” *Ann. Phys. (Berlin)* **523** (2011) 783–790, [arXiv:1104.3079 \[gr-qc\]](#).
- [23] J. Hartung and J. Steinhoff, “Next-to-leading order spin-orbit and spin(a)-spin(b) Hamiltonians for n gravitating spinning compact objects,” *Phys. Rev. D* **83** (2011) 044008, [arXiv:1011.1179 \[gr-qc\]](#).
- [24] J. Steinhoff, “Canonical formulation of spin in general relativity,” *Ann. Phys. (Berlin)* **523** (2011) 296–353, [arXiv:1106.4203 \[gr-qc\]](#). **PhD thesis**.
- [25] S. Hergt, J. Steinhoff, and G. Schäfer, “The reduced Hamiltonian for next-to-leading-order spin-squared dynamics of general compact binaries,” *Class. Quant. Grav.* **27** (2010) 135007, [arXiv:1002.2093 \[gr-qc\]](#).
- [26] J. Steinhoff and H. Wang, “Canonical formulation of gravitating spinning objects at 3.5 post-Newtonian order,” *Phys. Rev. D* **81** (2010) 024022, [arXiv:0910.1008 \[gr-qc\]](#).
- [27] J. Steinhoff and D. Puetzfeld, “Multipolar equations of motion for extended test bodies in general relativity,” *Phys. Rev. D* **81** (2010) 044019, [arXiv:0909.3756 \[gr-qc\]](#).
- [28] J. Steinhoff and G. Schäfer, “Canonical formulation of self-gravitating spinning-object systems,” *Europhys. Lett.* **87** (2009) 50004, [arXiv:0907.1967 \[gr-qc\]](#).
- [29] J. Steinhoff and G. Schäfer, “Comment on two recent papers regarding next-to-leading order spin-spin effects in gravitational interaction,” *Phys. Rev. D* **80** (2009) 088501, [arXiv:0903.4772 \[gr-qc\]](#).
- [30] J. Steinhoff, S. Hergt, and G. Schäfer, “Spin-squared Hamiltonian of next-to-leading order gravitational interaction,” *Phys. Rev. D* **78** (2008) 101503(R), [arXiv:0809.2200 \[gr-qc\]](#).
- [31] J. Steinhoff, G. Schäfer, and S. Hergt, “ADM canonical formalism for gravitating spinning objects,” *Phys. Rev. D* **77** (2008) 104018, [arXiv:0805.3136 \[gr-qc\]](#).
- [32] J. Steinhoff, S. Hergt, and G. Schäfer, “Next-to-leading order gravitational spin(1)-spin(2) dynamics in Hamiltonian form,” *Phys. Rev. D* **77** (2008) 081501(R), [arXiv:0712.1716 \[gr-qc\]](#).

2.2 Chapters in books

- [33] J. Steinhoff, “Spin and quadrupole contributions to the motion of astrophysical binaries,” in *Equations of Motion in Relativistic Gravity*, D. Pützfeld *et al.*, eds., vol. 179 of *Fundamental Theor. Physics*. Springer International Publishing, Switzerland, 2015. arXiv:1412.3251 [gr-qc].

2.3 Preprints

- [34] M. Levi and J. Steinhoff, “Complete conservative dynamics for inspiralling compact binaries with spins at fourth post-Newtonian order,” arXiv:1607.04252 [gr-qc].
- [35] J. Steinhoff, “Spin gauge symmetry in the action principle for classical relativistic particles,” arXiv:1501.04951 [gr-qc].
- [36] S. Chakrabarti, T. Delsate, and J. Steinhoff, “New perspectives on neutron star and black hole spectroscopy and dynamic tides,” arXiv:1304.2228 [gr-qc].

2.4 Conference Proceedings

- [37] J. Steinhoff, “Spin effects on the dynamics of compact binaries,” in *Proceedings of the 14th Marcel Grossmann Meeting on General Relativity*. World Scientific, Singapore. arXiv:1512.06768 [gr-qc]. (to be published).
- [38] J. Hartung, J. Steinhoff, and G. Schäfer, “Recent progress in spin calculations in the post-Newtonian framework and applications,” in *Proceedings of the 13th Marcel Grossmann Meeting on General Relativity*, pp. 948–950. World Scientific, Singapore, 2015. arXiv:1303.0666 [gr-qc].
- [39] J. Steinhoff and D. Puetzfeld, “Influence of internal structure on the motion of test bodies in extreme mass ratio situations,” in *Proceedings of the 13th Marcel Grossmann Meeting on General Relativity*, pp. 978–980. World Scientific, Singapore, 2015. arXiv:1302.2564 [gr-qc].
- [40] T. Delsate and J. Steinhoff, “Eddington inspired Born Infeld Theory: A new look to the matter-coupling paradigm,” in *Proceedings of the 13th Marcel Grossmann Meeting on General Relativity*, pp. 1228–1230. World Scientific, Singapore, 2015. arXiv:1301.1233 [gr-qc].
- [41] S. Hergt, J. Steinhoff, and G. Schaefer, “On the comparison of results regarding the post-Newtonian approximate treatment of the dynamics of extended spinning compact binaries,” in *Proceedings of the 7th International Conference on Gravitation and Cosmology*, vol. 484 of *J. Phys. Conf. Ser.*, p. 012018. 2014. arXiv:1205.4530 [gr-qc].
- [42] J. Steinhoff, S. Hergt, and G. Schäfer, “ADM canonical formulation with spin and application to post-Newtonian approximations,” in *Proceedings of the 12th Marcel Grossmann Meeting on General Relativity*, pp. 728–730. World Scientific, Singapore, 2010. arXiv:1002.3057 [gr-qc].