Joshua R. Smith

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Appointments

2016–	Dan Black Director of Gravitational-Wave Physics and Astronomy
2018–	Professor of Physics
2014–2018	Associate Professor of Physics
2010–2014	Assistant Professor of Physics
	California State University Fullerton (CSUF)
2007–2009	Postdoctoral Research Associate in Physics
	Syracuse University
2006–2007	Postdoctoral Fellow in Physics
	Albert Einstein Institute Hannover / EGO-Virgo

Education

2002–2006 Ph.D. Physics (*Dr. rer. nat.*), Leibniz Universität Hannover

- Advisor: Karsten Danzmann
- Thesis: "Formulation of Instrument Noise Analysis Techniques and Their Use in the Commissioning of the Gravitational Wave Observatory GEO 600"

1998–2002 B.Sc. Physics, Syracuse University

- Advisor: Peter Saulson
- Thesis: "Thermal Noise Associated with Silicate Bonding"

Leadership

2012–	Director, Gravitational-Wave Physics and Astronomy Center, CSUF
2016–2017	Member, Executive Committee, APS Far West Section
2011–2015	Chair, Detector Characterization Group, LIGO Scientific Collaboration
2011–2015	Member, Executive Committee, LIGO Scientific Collaboration
2008–	Member, Council, LIGO Scientific Collaboration
2008–2010	Co-chair, Glitch Working Group, LIGO Scientific Collaboration

Awards and Recognition

2017 Orange County's 100 Most Influential, Orange County Register, [link]

2016 Outstanding Untenured Faculty Member, College of Natural Sciences and Mathematics, CSUF

2016 Orange County's 100 Most Influential, Orange County Register, [link]

2016 Gruber Cosmology Prize, 1/1000 awardees from the LIGO Discovery Team, [link]

2016 Special Breakthrough Prize, 1/1000 awardees from the LIGO Contributors, [link]

2015 Cottrell Scholar, Research Corporation for Science Advancement, [link]

2014 40 Under 40, OC Metro Magazine, [link]

2013 NSF CAREER Award, [link]

Selected Publications

CSUF co-authors are shown in bold and CSUF student co-authors are indicated with an additional asterisk. A complete list is at the end of this document and on Google Scholar.

1. "Observation of Gravitational Waves from a Binary Black Hole Merger," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* **116** 061102 (2016). [PRL], [arXiv].

2. "LigoDV-web: Providing easy, secure and universal access to a large distributed scientific data store for the LIGO Scientific Collaboration," **J.S. Areeda**, **J.R. Smith**, A.P. Lundgren, E. Maros, D.M. Macleod, J. Zweizig, *Astronomy and Computing* **18** 27–34 (2017). [ASCOM], [arXiv].

3. "A hierarchical method for vetoing noise transients in gravitational-wave detectors," **J. R. Smith**, **T. Abbott***, E. Hirose, N. Leroy, D. MacLeod, J. McIver, P. Saulson, P. Shawhan, *Class. Quantum Grav.* **28** 235005 (2011). [CQG], [arXiv].

4. "Optical scatter of quantum noise filter cavity optics," **D. Vander-Hyde***, C. Amra, M. Lequime, F. Magaña-Sandoval, **J.R. Smith**, *Class. Quantum Grav.* **32** 135019 (2015). [CQG], [arXiv].

5. **C. Padilla***, P. Fritschel, **F. Magaña-Sandoval***, **E. Muniz***, **J.R. Smith**, L. Zhang. "Low scatter and ultra-low reflectivity measured in a fused silica window." *Applied Optics*, **53** 1315-1321 (2014). Included in Spotlight on Optics. [AO], [arXiv].

6. "Large-angle scattered light measurements for quantum-noise filter cavity design studies," **Fabian Magaña-Sandoval***, Rana X. Adhikari, Valera Frolov, Jan Harms, **Jacqueline Lee***, Shannon Sankar, Peter R. Saulson, and **Joshua R. Smith**, *JOSA A*, Vol. 29, Issue 8, pp. 1722-1727 (2012). [JOSAA], [arXiv].

7. "Gravity Spy: Integrating Advanced LIGO Detector Characterization, Machine Learning, and Citizen Science," M Zevin, S Coughlin, S Bahaadini, E Besler, N Rohani, S Allen, M Cabero, K Crowston, A K Katsaggelos, S L Larson, T K Lee, C Lintott, T B Littenberg, A Lundgren, C Oesterlund, **J R Smith**, L Trouille, V Kalogera, *Class. Quantum Grav.* 34 6 (2017). [CQG], [arXiv].

8. "Machine learning for Gravity Spy: Glitch classification and dataset," S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, M. Zevin, **J.R. Smith**, V. Kalogera, A. Katsaggelos, *Information Sciences* **444** 172-186 (2018). [INS].

9. "Identifying correlations between LIGO's astronomical range and auxiliary sensors using lasso regression," M. Walker, A.F. Agnew, J. Bidler*, A.P. Lundgren, A. Macedo*, D. Macleod, T.J. Massinger, O. Patane*, **J.R. Smith**, *Class. Quantum Grav.* **35** 225002 (2018). [CQG], [arXiv].

10. "The path to the enhanced and advanced LIGO gravitational-wave detectors," **J.R. Smith** for the LIGO Scientific Collaboration, *Class. Quantum Grav.* **26** 114013 (2009). [CQG]. A Classical and Quantum Gravity Highlight of 2009-2010.

11. "Improving the data quality of Advanced LIGO based on early engineering run results," L. Nuttall, T. Massinger, **J. Areeda**, J. Betzwieser, S. Dwyer, A. Effler, R. Fisher, P. Fritschel, J. Kissel, A. Lundgren, D. Macleod, D. Martynov, J. McIver, A. Mullavey, **J. Smith**, G. Vajente, A. Williamson, C. Wipf, *Class. Quantum Grav.* **32** 24 245005 (2015). [CQG], [arXiv].

12. "Characterization of the LIGO detectors during their sixth science run," J. Aasi et al. (The LIGO Scientific Collaboration and Virgo Collaboration), *Class. Quantum Grav.* **32** 115012 (2015). [CQG], [arXiv].

13. **Joshua Smith** and Michael Zucker. Chapter 11: "Optical Scatter." Optical Coatings and Thermal Noise in Precision Measurement. Eds. G. M. Harry, T. Bodiya, R. DeSalvo. Cambridge: Cambridge University Press, 2012. Print. ISBN:9781107003385. [CUP].

14. "Measurement and simulation of laser power noise in GEO600," **J.R. Smith**, J. Degallaix, A. Freise, H. Grote, M. Hewitson, S. Hild, H. Lück, K.A. Strain and B. Willke, *Class. Quantum Grav.* **25** 035003-035015 (2008). [CQG].

15. "Linear projection of technical noise for interferometric gravitational-wave detectors," **J.R. Smith**, P. Ajith, H. Grote, M. Hewitson, S. Hild, H. Lück, K.A. Strain, B. Willke, J. Hough and K. Danzmann, *Class. Quantum Grav.* **23** 527-537, (2006). [CQG].

16. "Feedforward correction of mirror misalignment fluctuations for the GEO 600 gravitational wave detector," **J.R. Smith**, H. Grote, M. Hewitson, S. Hild, H. Lück, M. Parsons, K.A. Strain and B. Willke, *Class. Quantum Grav.* **22** 3093-3104, (2005). [CQG].

17. "Commissioning, characterization, and operation of the dual-recycled GEO 600," **J.R. Smith** et al., *Class. Quantum Grav.* **21** S1737-S1745, (2004). [CQG].

18. "Mechanical loss associated with silicate bonding of fused silica," **J.R. Smith**, G.M. Harry, J.C. Betzwieser, A.M. Gretarsson, D.A. Guild, S.E. Kittelberger, M.J. Mortonson, S.D. Penn and P.R. Saulson, *Class. Quantum Grav.* **20** 5039-5047, (2003). [CQG]. A Classical and Quantum Gravity Highlight of 2003-2004.

Technology Transfers

2015 A. Avila Alvarez, J. Rocha, L. Hargreaves, J. Smith, "InstruTech Hornet 402 Vacuum Gauge Control VI," [NI.com].

2015 A. Avila Alvarez, E. Muniz, J. Rocha, J. Smith, "Driver VIs for Innolight Mephisto S Laser Line," [NI.com].

External Grants

2018 (PI) National Science Foundation, PHY-1807069, "RUI: Improving LIGO optics and data quality to increase the rate and accuracy of gravitational-wave observations," **$299,538 awarded 2018-2021.** [link]

2018 (Co-PI) National Science Foundation, PHY-1836734, "Collaborative Research: The Next Generation of Gravitational Wave Detectors," **$211,283 awarded 2018-2021.** [link]

2017 (Co-PI) National Science Foundation, PHY-1708035, "Data Handling and Analysis Infrastructure for Gravitational-wave Astronomy," **$634,196 awarded 2017-2021.** [link]

2017 (Co-PI) National Science Foundation, PHY-1708035, "Collaborative Research: LSC Center for Coatings Research," **$152,650 awarded 2017-2020.** [link]

2015 (Co-PI) National Science Foundation, AST-1559694, "Catching a new wave: the CSUF-Syracuse partnership for inclusion of underrepresented groups in gravitational-wave astronomy," **$937,368 awarded 2016-2021.** [link]

2015 (Co-PI) National Science Foundation (NSF), "INSPIRE: Glitch Zoo: Teaming Citizen Science with Machine Learning to Deepen LIGO's View of the Cosmos," **$67,500 awarded 2015-2018.** [link]

2014 (Co-PI) National Science Foundation (NSF) PHY-1429873, "MRI: Acquisition of a high-performance computer cluster for gravitational-wave astronomy with Advanced LIGO," **$119,791 awarded 2014-2017.** [link]

2013 (PI) NSF PHY-1255650, "CAREER: Gravitational-Wave Detector Characterization and Science Education in the Advanced LIGO Era," **$450,000, awarded 2013-2018.** [link]

2012 (Senior Personnel) NSF PHY-1104371, "Data Handling and Analysis Infrastructure for Advanced LIGO and Beyond," $9,000,000 all institutions, **$675,000 CSUF subcontract, awarded 2012-2017.** [link]

2011 (Senior Personnel) National Science Foundation, PHY-0600953, "Enabling Gravitational-Wave Astronomy on the LIGO Data Grid," **$125,000 one-year subcontract to CSUF, awarded 2011-2012.** [link]

2010 (PI) NSF PHY-0970147, "RUI: LIGO detector characterization and optical scatter research," **$240,000, awarded 2010-2013.** [link]

2010 (PI) Research Corporation for Science Advancement, Cottrell College Science Award # 19838, "Extending the astronomical reach of gravitational-wave detectors with all-reflective interferometry," **$35,000, awarded 2010-2012**

Internal Grants

2012 (Co-PI) Faculty Enhancement and Instructional Development Grant, "Enhancing student learning with improved manuals for advanced physics laboratory classes," with Greg Childers, **$5,247, funded 2012-2013**

2011 (PI) CSUF Office of the Associate Vice President for Graduate Programs and Research, Center and Institute Planning and Expansion Program, "Three-year plan for funding and expansion of the Gravitational-Wave Physics and Astronomy Center (GWPAC)," **$15,000, funded 2011-2012**

Courses Taught

ASTR101	Introduction to Astronomy, Sp18, Sp17, Sp15, Sp14, Fa13
ASTR101L	Introduction to Astronomy Lab, Fa18, Fa13
PHYS120	Introduction to Astronomy, Sp13, Fa12, Fa11
PHYS225	Calculus-based Fundamental Physics: Mechanics, Fa10, Sp10
PHYS315	Computational Physics, Fa15
PHYS380	Methods Experimental Phys, Fa15
PHYS411	Modern Optics, Fa18, Fa16, Fa14
PHYS481	Experimental Physics, Sp12
PHYS482	Modern Optics Laboratory, Sp11

Independent Study / Project Supervision

PHYS499	Undergraduate Independent Study, Fa18, Sp18, Fa17, Sp17, Sp16, Fa15, Sp15, Fa14, Sp14, Fa13, Sp13, Fa12, Sp12, Fa11, Sp11, Fa10, Sp10
PHYS597	Master's Project, Fa18, Sp18, Fa17, Sp17, Sp15, Fa14, Fa13, Sp13, Sp13, Fa12, Sp12, Fa11, Sp11, Fa10
PHYS599	Independent Grad Research, Fa18, Sp18, Fa17, Sp15, Fa14, Sp14, Fa13, Sp13, Fa12, Sp12, Fa11, Fa10, Sp10

Professional Membership

2015–	Member, The Optical Society of America (OSA)
2011–	Member, Society for Advancement of Chicanos and Native Americans in Science (SACNAS)
2011–	Member, American Astronomical Society (AAS)
2007–	Member, American Physical Society (APS), Topical Group on Gravitation, CA/NY Sections
2000–	Member, LIGO Scientific Collaboration

Service

2018–	Advisory panelist, Classical and Quantum Gravity, [link]
2017–	Co-Chair, Speaker's Board, LIGO Scientific Collaboration
2013–	Reviewer, National Science Foundation, Physics
2012–	Referee, Optical Society of America Publishing (*Optics Letters*, *Applied Optics*, *JOSA A*)
2011–	Faculty Advisor, Physics Club, CSUF Department of Physics
2011–	Member, Radiation Safety Committee, CSUF (campus-wide)
2011–	Member, Diversity Working Group, LIGO Scientific Collaboration
2010–	Referee, Institute of Physics Publishing (*Classical and Quantum Gravity*)
2010–	Member, Website Committee (ad hoc), CSUF Department of Physics

2016–2017	Chair, Department Personnel Committee, Department of Physics, CSUF
2016–2017	Member, College of Natural Sciences and Mathematics Faculty Awards Committee, CSUF
2015–2016	Member, Search Committee for Dean of the College of Natural Sciences and Mathematics, CSUF
2013,2015	Member, Faculty Search Committee, Department of Physics, CSUF
2015–2017	PhD Qualifying Exam Committee Member for Robert Stone and Guillermo Valdes, University of Texas Brownsville / Rio Grande Valley and University of Texas at San Antonio
2014–2015	Member, Program Performance Review Committee, CSUF Department of Physics
2014–2015	Reviewer, NASA Postdoctoral Program
2011–2012	Member, Student Research Advisory Committee (formerly PURE), CSUF (campus-wide)
2011–2015	Member, MOU Review Committee, LIGO Scientific Collaboration
2010–2013	Member, Safety Committee, CSUF College of NSM
2010–2011	Member, Curriculum Committee, CSUF Department of Physics
2008–2015	Reviewer, Advanced LIGO Acceptance (2014–2015), Enhanced LIGO Calibration (through 2010), Advanced LIGO Data Acquisition System Design (through 2010), Gingin High Power Test Facility (through 2012)

Invited Presentations

2018	"Observing the universe with waves of gravity," with Geoffrey Lovelace, Fullerton Public Library
2018	"Observing black holes and neutron stars from across the universe with gravity," Physics Department Colloquium, Syracuse University, Syracuse, NY
2017	"Undergraduate research helping to observe black hole mergers from across the universe," 2017 CSU STEM Conference, Los Angeles, CA
2017	"Using precision optics and metrology to measure black hole mergers from across the universe with LIGO," Optical Society of America Optical Design and Fabrication Congress, Denver, CO
2017	"Observing Black Holes From Across the Universe," Public Lecture at the Fullerton Community Center, Fullerton, CA
2017	"The impact of philanthropic support for student engagement in gravitational-wave science," 2017 Ontiveros Legacy Society Recognition Luncheon, CSU Fullerton, Fullerton, CA
2016	"The discovery of gravitational waves from merging black holes," STEM Seminar, Cypress College, Cypress, CA
2016	"Observing black hole mergers from across the universe with LIGO," Physics Colloquium, CSU Northridge, Northridge, CA
2016	"Observing black hole mergers from across the universe with LIGO," Astrophysics Seminar, UC Irvine, Irvine, CA
2016	"Using optics and precision metrology in LIGO to measure black hole mergers from across the universe," 2nd Annual Photonics Society Banquet, UC Santa Barbara, Santa Barbara, CA

2016 "Using optics and precision metrology in LIGO to measure black hole mergers from across the universe," Optical Society of Southern California Meeting, Fullerton, CA

2016 "Current and future gravitational-wave discoveries with the Laser Interferometer Gravitational-Wave Observatory, LIGO," Cal State Long Beach Colloquium, Long Beach, CA

2016 "Current and future gravitational-wave discoveries with LIGO," SLAC experimental seminar, Stanford Linear Accelerator, Menlo Park, CA

2015 "Einstein's Gravitational Waves - Future Discoveries," STEM event, Santiago Canyon College, Orange, CA

2014 "Gravitational-Wave Astronomy with LIGO," Physics Colloquium, CSU Fresno, Fresno, CA

2014 "Einstein's Gravitational Waves," with Jocelyn Read and Geoffrey Lovelace, Fullerton Public Library

2014 "Exploring the gravitational-wave sky with LIGO," California State University Northridge, Physics and Astronomy Colloquium, Northridge, CA

2013 "Detector characterization to prepare for the first gravitational-wave detections," Gravitational Wave Physics and Astronomy Workshop, Pune, India

2013 "Gravitational-Wave Astronomy with LIGO: Opening a New Window on the Universe," Orange County Astronomers General Meeting, Chapman University, Orange CA

2013 "Research in Gravitational-Wave Astronomy and Physics at Cal State Fullerton," Introductory remarks at Discover STEM Event, Cypress College, Cypress, CA

2013 "Gravitational-Wave Astronomy with LIGO: Opening a New Window on the Universe," CSUF Osher Lifelong Learning Institute Science Series, Fullerton, CA

2012 "Gravitational-Wave Astronomy with LIGO," Cal Poly Pomona Physics and Astronomy Seminar, Pomona, CA

2012 "Fighting Noise in the LIGO Interferometers," 2012 SACNAS National Conference, Scientific Symposia Session, Seattle, WA

2012 "Venus, a nice place to live?," public lecture, Fullerton Arboretum Venus Transit Viewing, Fullerton, CA

2012 "Gravitational-wave astronomy with LIGO and Virgo," UC Irvine High-Energy Physics Seminar, Irvine, CA

2011 "Exploring the transient universe with gravitational waves," American Physical Society April Meeting, Anaheim, CA

2010 "Extending the range of gravitational-wave astronomy," Colloquium, Louisiana State University, Baton Rouge, LA

2010 "Searching for gravitational-wave bursts with LIGO, GEO 600 and Virgo," 19th International Conference on General Relativity and Gravitation (GR19), Mexico City, Mexico

2009 "Toward Gravitational-Wave Detection and Astronomy With LIGO," Colloquium, Syracuse University, Syracuse, NY

2008 "Toward Gravitational-Wave Detection and Astronomy With LIGO," Colloquium, California State University, Fullerton, CA

Pending Publications

Manuscripts that have been submitted to journals and are in the review process.

1. Chapter 14: Diagnostic methods for gravitational-wave detectors. J. McIver, TJ. Massinger, F. Robinet, **J. Smith**, **M. Walker**. Book Chapter in Advanced Interferometric Gravitational-Wave Detectors. Eds. P. Saulson, D. Reitze, H. Grote. 100 Years of General Relativity. World Scientific Publishing. July 2019. [WS]
2. "Apparatus to Measure Optical Scatter of Coatings Versus Annealing Temperature," **JR Smith**, RX Adhikari, **KM Aleman***, **A Avila-Alvarez***, G Billingsley, **A Gleckl***, **J Guerrero***, A Markosyan, S Penn, **JA Rocha***, **D Rose***, **R Wright**, Accepted by Optical Society of America Conference, [arXiv].
3. "Classifying the unknown: discovering novel gravitational-wave detector glitches using similarity learning," SB Coughlin, S Bahaadini, N Rohani, M Zevin, **O Patane***, M Harandi, C Jackson, V Noroozi, S Allen, J Areeda, MW Coughlin, P Ruiz, CPL Berry, K Crowston, AK Katsaggelos, A Lundgren, C Osterlund, JR Smith, L Trouille, and V Kalogera, submitted to Physical Review D, 2019. [arXiv]
4. "A collaboration to support novice instructors in research-based astronomy teaching," **H. Chilton***, **S. Li**, **M.E. Loverude**, **J. Read**, **G. Serna***, **J.R Smith**, submitted to *AJP*, August 26, 2015. [arXiv].

All Publications

Within each year, papers are ordered by the degree of CSUF co-author contributions, with the papers most directly contributed to listed first.

2019

1. "Improving astrophysical parameter estimation via offline noise subtraction for Advanced LIGO," J. C. Driggers et al. (The LIGO Scientific Collaboration Instrument Science Authors) *Phys. Rev. D* **99**, 042001 (2019). [PRD], [arXiv].
2. "Properties of the Binary Neutron Star Merger GW170817," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) *Phys. Rev. X* **9** 011001 (2019). [PRX], [arXiv].
3. "Search for Multimessenger Sources of Gravitational Waves and High-energy Neutrinos with Advanced LIGO during Its First Observing Run, ANTARES, and IceCube," A. Albert et al. and (The LIGO Scientific Collaboration and the Virgo Collaboration), The Astrophysical Journal, 870:134 (16pp), (2019). [ApJ], [arXiv]

2018

4. "Identifying correlations between LIGO's astronomical range and auxiliary sensors using lasso regression," **M. Walker**, **A.F. Agnew**, **J. Bidler***, A.P. Lundgren, **A. Macedo***, D. Macleod, T.J. Massinger, **O. Patane***, **J.R. Smith**, *Class. Quantum Grav.* **35** 225002 (2018). [CQG], [arXiv].
5. "Machine learning for Gravity Spy: Glitch classification and dataset," S. Bahaadini, V. Noroozi, N. Rohani, S. Coughlin, M. Zevin, **J.R. Smith**, V. Kalogera, A. Katsaggelos, *Information Sciences* **444** 172-186 (2018). [INS].
6. "Identification and mitigation of narrow spectral artifacts that degrade searches for persistent gravitational waves in the first two observing runs of Advanced LIGO," PB Covas...**JR Smith**, et al. *Phys. Rev. D* 97, 082002 (2018). [PRL], [arXiv].
7. "Search for Subsolar-Mass Ultracompact Binaries in Advanced LIGO's First Observing Run," B. P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Phys. Rev. Lett. 121, 231103 (2018). [PRL], [arXiv].
8. "GW170817: Measurements of Neutron Star Radii and Equation of State," B.P. Abbott et al. (The LIGO Scientific Collaboration and the Virgo Collaboration) Phys. Rev. Lett. 121, 161101(2018). [PRL], [arXiv].

9. "Full band all-sky search for periodic gravitational waves in the O1 LIGO data," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Phys. Rev. D 97, 102003 (2018). [PRD], [arXiv].
10. "Constraints on cosmic strings using data from the first Advanced LIGO observing run," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Phys. Rev. D 97, 102002 (2018). [PRD], [arXiv].
11. "GW170817: Implications for the Stochastic Gravitational-Wave Background from Compact Binary Coalescences," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Phys. Rev. Lett. 120, 091101 (2018). [PRL], [arXiv].
12. "All-sky search for long-duration gravitational wave transients in the first Advanced LIGO observing run," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Classical and Quantum Gravity, Volume 35, Number 6, (2018). [CQG], [arXiv].
13. "Effects of data quality vetoes on a search for compact binary coalescences in Advanced LIGO's first observing run," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), Classical and Quantum Gravity, Volume 35, Number 6 (2018). [CQG], [arXiv].
14. "First Search for Nontensorial Gravitational Waves from Known Pulsars," B. P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) Phys. Rev. Lett. 120, 031104 (2018). [PRL], [arXiv].

2017

15. "GW170817: observation of gravitational waves from a binary neutron star inspiral," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* 119 16 161101 (2017). [PRL], [arXiv].
16. "GW170814: A Three-Detector Observation of Gravitational Waves from a Binary Black Hole Coalescence," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* 119, 141101 (2017). [PRL], [arXiv].
17. "GW170608: Observation of a 19 solar-mass binary black hole coalescence," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), The Astrophysical Journal Letters 851 2 L35 (2017). [ApJL], [arXiv].
18. "GW170104: Observation of a 50-Solar-Mass Binary Black Hole Coalescence at Redshift 0.2," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* 118 221101 (2017). [PRL], [arXiv].
19. "LigoDV-web: Providing easy, secure and universal access to a large distributed scientific data store for the LIGO Scientific Collaboration," **J.S. Areeda**, **J.R. Smith**, A.P. Lundgren, E. Maros, D.M. Macleod, J. Zweizig, *Astronomy and Computing* **18** 27–34 (2017). [ASCOM], [arXiv].
20. "Gravity Spy: Integrating Advanced LIGO Detector Characterization, Machine Learning, and Citizen Science," M Zevin, S Coughlin, S Bahaadini, E Besler, N Rohani, S Allen, M Cabero, K Crowston, A K Katsaggelos, S L Larson, T K Lee, C Lintott, T B Littenberg, A Lundgren, C Oesterlund, **J R Smith**, L Trouille, V Kalogera, *Class. Quantum Grav.* 34 6 (2017). [CQG], [arXiv].
21. "Validating gravitational-wave detections: The Advanced LIGO hardware injection system," C. Biwer, D. Barker, J. C. Batch, J. Betzwieser, R. P. Fisher, E. Goetz, S. Kandhasamy, S. Karki, J. S. Kissel, A. P. Lundgren, D. M. Macleod, A. Mullavey, K. Riles, J. G. Rollins, K. A. Thorne, E. Thrane, T. D. Abbott, B. Allen, D. A. Brown, P. Charlton, S. G. Crowder, P. Fritschel, J. B. Kanner, M. Landry, C. Lazzaro, M. Millhouse, M. Pitkin, R. L. Savage, P. Shawhan, D. H. Shoemaker, **J. R. Smith**, L. Sun, J. Veitch, S. Vitale, A. J. Weinstein, N. Cornish, R. C. Essick, M. Fays, E. Katsavounidis, J. Lange, T. B. Littenberg, R. Lynch, P. M. Meyers, F. Pannarale, R. Prix, R. O'Shaughnessy, D. Sigg, *Phys. Rev. D* 95 062002 (2017). [PRD], [arXiv].
22. "Effects of transients in LIGO suspensions on searches for gravitational waves," M Walker...**JR Smith**, et al. *Review of Scientific Instruments* 88, 124501 (2017). [RSI], [arXiv].
23. "Calibration of the Advanced LIGO detectors for the discovery of the binary black-hole merger GW150914," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. D* 95 062003 (2016). [PRD], [arXiv].

2016

24. "Observation of Gravitational Waves from a Binary Black Hole Merger," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* **116** 061102 (2016). [PRL], [arXiv].
25. "GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Phys. Rev. Lett.* **116** 241103 (2016). [PRL], [arXiv].
26. "Coherent Cancellation of Photothermal Noise in GaAs/Al0.92Ga0.08As Bragg Mirrors," T. Chalermsongsak, E.D. Hall, G.D. Cole, D. Follman, F. Seifert, K. Arai, E.K. Gustafson, **J.R. Smith**, M. Aspelmeyer, R.X. Adhikari, *Metrologia* **53** 2 860 (2016). [Met], [arXiv].
27. "Characterization of transient noise in Advanced LIGO relevant to gravitational wave signal GW150914," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration), *Class. Quant. Grav.* **33** 13 (2016). [CQG], [arXiv].
28. "Sensitivity of the Advanced LIGO detectors at the beginning of gravitational wave astronomy," D.V. Martynov et al. *Phys. Rev. D* **93**, 112004 (2016). [PRD], [arXiv].
29. "Observing gravitational-wave transient GW150914 with minimal assumptions," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) *Phys. Rev. D* **93**, 122004 (2016). [PRD], [arXiv].
30. "Binary Black Hole Mergers in the First Advanced LIGO Observing Run," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) *Phys. Rev. X* 6, 041015 (2016). [PRX], [arXiv].
31. "GW150914: The Advanced LIGO Detectors in the Era of First Discoveries," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) *Phys. Rev. Lett.* **116**, 131103 (2016). [PRL], [arXiv].
32. "GW150914: First results from the search for binary black hole coalescence with Advanced LIGO," B.P. Abbott et al. (LIGO Scientific Collaboration and Virgo Collaboration) *Phys. Rev. D* **93**, 122003 (2016). [PRD], [arXiv].
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