Dipongkar Talukder

Personal Data

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Work Experience

July 2012-*Current*

Postdoctoral Research Associate/Scholar
Department of Physics, University of Oregon
Carry out research in gravitational-wave astrophysics with the Laser Interferometer Gravitational-Wave Observatory (LIGO) according to the needs of the Oregon group in the LIGO Scientific Collaboration (LSC). Develop software codes and analyze LIGO gravitational-wave data, in particular for the scientific targets of searches for gravitational waves associate with gamma-ray bursts and diagnostics to identify faulty electronic channels on the LIGO detectors. Communicate results to the internal and external scientific communities in the form of teleconferences, journal publications, and conference presentations. Provide mentorship to undergraduate and graduate students in the Oregon LSC group, including development of student software skills to enable student research projects with LIGO data.

Fall 2009-Spring 2012
Fall 2008

Research Assistant
Department of Physics and Astronomy, Washington State University
Carried out research in gravitational-wave (GW) astrophysics for the detection of stochastic gravitational-wave backgrounds from cosmological and astrophysical sources and coincident and coherent searches for gravitational-wave ringdown signals from perturbed black holes with LIGO/Virgo detectors. Mentored and co-supervised students.

Fall 2006-Spring 2007
Spring 2009

Teaching Assistant
Department of Physics and Astronomy, Washington State University
Conducted PHYS 102/202 lab sessions to guide and prepare students for lab experiments. Worked with students one-on-one to answer questions and help them understand the material. Graded assignments and exams for PHYS 101/102.

August 2007-July 2008

Visiting Research Assistant
Albert Einstein Institute, Max Planck Institute for Gravitational Physics, Germany
Carried out research on how to combine the data from multiple gravitational-wave detector baselines to improve the sensitivity of a search for long-duration gravitational-waves from localized astrophysical sources in the sky.

Spring 2005- Summer 2006

A-level Teacher| Visiting Lecturer of Physics
Mastermind/Oxford International School | Lalmatia Women's College, Bangladesh
Taught A-level Physics and Mathematics with full responsibilities of preparing materials, grading exams, and teaching classes. Taught Electricity and Magnetism in a fourth year physics major class of Lalmatia Women's Collage as an invited lecturer.

Fall 2002

Teaching Assistant
North South University, Bangladesh
Assisted faculty member in preparing lectures of Physics 107 (Sec 1, 2) for Computer Science undergraduates. Provided tutorial session for students needing extra help out of class. Proctored tests and graded homework's theoretical and programming assignment and quizzes.

Education

May 2012 **Doctor of Philosophy (Physics)**
Department of Physics and Astronomy, Washington State University, Pullman
Thesis: Multi-baseline searches for stochastic sources and black hole ringdown signals in LIGO-Virgo data

December 2008 **Master of Science in Physics**
Department of Physics and Astronomy, Washington State University, Pullman
Thesis: Multi-baseline gravitational wave radiometry

May 2011 **Master of Advanced Study**
June 2004 **Certificate of Advanced Study in Mathematics**
Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK

June 2002 **Master of Science in Physics**
Department of Physics, University of Dhaka, Bangladesh
Thesis: Supersymmetry in field theory and particle physics

August 2000 **Bachelor of Science in Physics**
Department of Physics, University of Dhaka, Bangladesh

Graduate level course

Washington State University
Classical Mechanics, Quantum Theory I and II, Theoretical Physics, Nanoclusters/Nanomaterials and Nanotechnologies, Thermodynamics, Electromagnetic Theory, Electrodynamics, General Relativity, Numerical Analysis, Atomic Physics
University of Cambridge
Quantum Field Theory, General Theory of Relativity, Symmetry and Particle Physics, Standard Model, Supersymmetry and Extra Dimension, Cosmology
University of Dhaka
Quantum Mechanics II, Quantum Field Theory, General Theory of Relativity, Solid State Physics

Award and Certificate

2016 **Shared "Special Breakthrough Prize in Fundamental Physics"** for detection of gravitational waves (LIGO Scientific Collaboration)
2013 **Honorable Mention on the Thesis 2012**, Gravitational Wave International Committee
2012 **Distinguished Graduate Student**, College of Sciences, Washington State University
2012 **College of Sciences Research Assistant**, Washington State University
2011 **GPSA Travel and Registration Grant**, Washington State University
2004 **Fellow of the Cambridge Commonwealth Society**, Cambridge Commonwealth Trust
2003 **Cambridge Commonwealth Scholarship**, University of Cambridge
2001 **Dean's Award**, University of Dhaka

Membership

2007 **LIGO Scientific Collaboration**
2009 **American Physical Society**

Research

Observational Astrophysics/Gravitational-wave Physics and Astronomy

Interest: Physics, Mathematics, Statistics, Computation. Big data science, machine learning, analytical/numerical modeling, software development

Skills: Python, Perl, C, BASH, MATLAB, Mathematica, SQLite, HTML, StatPatternRecognition, HTCondor, LIGO Data Grid, LALSuite, Git, CVS, LaTeX, Linux cluster, System administration (platforms: Unix/Linux, Mac OS X, Windows)

Reference

Available upon request

Conference/Meeting Presentation

January 28-31, 2017 **American Physical Society Meeting**, Washington, DC
Talk: Advanced LIGO searches for gravitational waves associated with gamma-ray bursts

October 24-28, 2016 **8th Huntsville Gamma-Ray Burst Symposium**, Huntsville, AL
Talk: Advanced LIGO searches for gravitational waves associated with gamma-ray bursts

September 22, 2016 **Theoretical Physics Seminar**, University of Dhaka, Dhaka, Bangladesh
Talk: LIGO's observation of merging black holes - the long quest for gravitational waves

August 29-September 01, 2016 **LSC-Virgo Meeting**, University of Glasgow, United Kingdom
Talk: Readiness for O2 (Second Advanced LIGO Observing Run) GRB searches

June 15-18, 2016 **Gravitational-wave Physics and Astronomy Workshop**, Hyannis, MA
Talk: Advanced LIGO prompt searches for gravitational waves associated with gamma-ray bursts

April 22, 2016 **ABSS**, Washington State University, Pullman, WA
Public talk: LIGO's observation of merging black holes - the long quest for gravitational waves

April 16-19, 2016 **American Physical Society Meeting**, Salt Lake City, UT
Talk: Advanced LIGO searches for gravitational waves associated with gamma-ray bursts

March 14-18, 2016 **LSC-Virgo Meeting**, Pasadena, CA
Talk: Hveto for the GRB GW-burst searches

March 11, 2016 **Center of High Energy Physics Seminar**, University of Oregon, Eugene, OR
Talk: The analyses behind the direct detection of gravitational waves

August 17-21, 2015 **GRB mini-hackathon**, University of Wisconsin-Milwaukee, WI

July 30-31, 2015 **LIGO Detector Characterization F2F Meeting**, LIGO Hanford Observatory, WA
Talk: LIGO Channel Activity Monitor for PEM, SUS, ISI and beyond

March 16-19, 2015 **LSC-Virgo Meeting**, Pasadena, CA

March 14-15, 2015 **Second Joint LIGO-Fermi Workshop at Caltech**, Pasadena, CA
Talk: Overview of GW searches associated with GRBs

March 13-14, 2015	**31st Pacific Coast Gravity Meeting**, Eugene, OR Talk: Searches for gravitational waves associated with gamma-ray bursts
August 25-28, 2014	**LSC-Virgo Meeting**, Stanford, CA Talk: Prompt triggered searches for GWs associated with GRBs in advanced detectors
August 17-21, 2014	**High Energy Astrophysics Division 14th Meeting**, Chicago, IL Poster: Searches for gravitational waves associated with gamma-ray bursts
July 15-16, 2014	**LIGO Detector Characterization F2F Meeting**, LIGO Hanford Observatory, WA
June 02-05, 2014	**LIGO Compact Binary Coalescence F2F Meeting**, Syracuse, NY
January 14-15, 2014	**LIGO Detector Characterization F2F Meeting**, LIGO Livingston Observatory, LA Talk: LIGO Channel Activity Monitor
July 22-23, 2013	**LIGO Detector Characterization F2F Meeting**, Fullerton, CA Talk: LIGO Channel Activity Monitor (LigoCAM)
June 27-30, 2013	**LIGO Compact Binary Coalescence F2F Meeting**, Syracuse, NY
April 13-16, 2013	**American Physical Society Meeting**, Denver, CO Talk: Searching for a stochastic gravitational-wave background from a population of neutron stars in the Virgo cluster with data from the LIGO and Virgo detectors
March 23, 2013	**GRB-GW Workshop at George Washington University**, Washington, DC
March 18-22, 2013	**LSC-Virgo Meeting**, Bethesda, MD
March 19-23, 2012	**LSC-Virgo Meeting**, Cambridge, MA Talk: Updates on coherently searching for perturbed black-hole ringdown signals Talk: Status of the search for a stochastic GW background from neutron stars in the Virgo cluster using LIGO-Virgo data
November 11, 2012	**Institute of Theoretical Science Seminar**, University of Oregon, Eugene, OR Talk: LIGO ringdown and stochastic gravitational-wave searches
March 05, 2012	**Center of High Energy Physics Seminar**, University of Oregon, Eugene, OR Talk: Multi-baseline searches for stochastic sources and black hole ringdown signals in LIGO-Virgo data
July 18-21, 2011	**TeraGrid'11 Conference**, Salt Lake City, UT
July 13, 2011	**Amaldi 9**, Cardiff, UK Talk (*presented by Sukanta Bose*): Multi-baseline gravitational wave radiometry for searching stochastic sources with advanced detectors
June 27-30, 2011	**Open Science Grid Summer School**, Madison, WI
April 30-May 03, 2011	**American Physical Society Meeting**, Anaheim, CA Talk: Coherently searching for perturbed black-hole ringdown signals with a network of gravitational-wave detectors
March 12-17, 2011	**LSC-Virgo Meeting**, Arcadia, CA
January 26-29, 2011	**Gravitational-wave Physics and Astronomy Workshop**, Milwaukee, WI Poster: Coherently searching for perturbed black-hole ringdown signals with a network of gravitational-wave detectors
October 01-02, 2010	**12th Annual Meeting of the Northwest Section of the APS**, Walla Walla, WA Talk: Searching for perturbed black-hole ringdown signals with a network of gravitational-wave detectors
June 9-12, 2008	**LSC-Virgo Meeting**, Orsay, France Talk: Multi-baseline LIGO-Virgo radiometry for searching anisotropic stochastic gravitational-wave backgrounds
December 13-16, 2007	**12th Gravitational Wave Data Analysis Workshop**, Cambridge, MA Poster: Multi-baseline gravitational wave radiometry
December 11-12, 2007	**LSC-Virgo Meeting**, Cambridge, MA
October 20-26, 2007	**LSC-Virgo Meeting**, Hannover, Germany
August 20-24, 2007	**International Summer School on Theoretical Gravitational-wave Astronomy**, Bad Honnef, Germany

And more than 50 presentations to LSC internal working groups

Publication

1. B. P. Abbott *et al., All-sky search for short gravitational-wave bursts in the first Advanced LIGO run*, Phys. Rev. D **95**, 042003 (2017).
2. B. P. Abbott *et al., Exploring the sensitivity of next generation gravitational wave detectors*, Class. Quantum Grav. **34**, 044001 (2017).
3. B. P. Abbott *et al., Upper Limits on the Rates of Binary Neutron Star and Neutron Star–black Hole Mergers From Advanced LIGO's First Observing run*, ApJL **832**, L21 (2016).
4. B. P. Abbott *et al., Results of the deepest all-sky survey for continuous gravitational waves on LIGO S6 data running on the EinsteinHome volunteer distributed computing project*, Phys. Rev. D **94**, 102002 (2016).
5. B. P. Abbott *et al., Binary Black Hole Mergers in the First Advanced LIGO Observing Run*, Phys. Rev. X **6**, 041015 (2016).
6. B. P. Abbott *et al., Improved Analysis of GW150914 Using a Fully Spin-Precessing Waveform Model*, Phys. Rev. X **6**, 041014 (2016).
7. B. P. Abbott *et al., First targeted search for gravitational-wave bursts from core-collapse supernovae in data of first-generation laser interferometer detectors*, Phys. Rev. D **94**, 102001 (2016).
8. B. P. Abbott *et al., The Rate of Binary Black Hole Mergers Inferred from Advanced LIGO Observations Surrounding GW150914*, ApJL **833**, L1 (2016).
9. B. P. Abbott *et al., The basic physics of the binary black hole merger GW150914* , Ann. Phys. (Berlin), 1-17 (2016).
10. B. P. Abbott *et al., GW151226: Observation of Gravitational Waves from a 22-Solar-Mass Binary Black Hole Coalescence*, Phys. Rev. Lett. **116**, 241103 (2016).
11. B. P. Abbott *et al., Directly comparing GW150914 with numerical solutions of Einstein's equations for binary black hole coalescence*, Phys. Rev. D **94**, 064035 (2016).
12. B. P. Abbott *et al., Comprehensive all-sky search for periodic gravitational waves in the sixth science run LIGO data*, Phys. Rev. D **94**, 042002 (2016).
13. B. P. Abbott *et al., Search for transient gravitational waves in coincidence with short-duration radio transients during 2007-2013*, Phys. Rev. D **93**, 122008 (2016).
14. B. P. Abbott *et al., Localization and broadband follow-up of the gravitational-wave transient GW150914* , ApJL **826**, L13 (2016).
15. S. Adrián-Martínez *et al., High-energy neutrino follow-up search of gravitational wave event GW150914 with ANTARES and IceCube*, Phys. Rev. D **93**, 122010 (2016).
16. B. P. Abbott *et al., Tests of General Relativity with GW150914*, Phys. Rev. Lett. **116**, 221101 (2016).
17. B. P. Abbott *et al., GW150914: Implications for the Stochastic Gravitational-Wave Background from Binary Black Holes*, Phys. Rev. Lett. **116**, 131102 (2016).
18. B. P. Abbott *et al., Astrophysical Implications of the Binary Black-Hole Merger GW150914*, ApJL **818**, L22 (2016).
19. B. P. Abbott *et al., Characterization of transient noise in Advanced LIGO relevant to gravitational wave signal GW150914*, Class. Quantum Grav. **33**, 134001 (2016).
20. B. P. Abbott *et al., Observing gravitational-wave transient GW150914 with minimal assumptions*, Phys. Rev. D **93**, 122004 (2016).
21. B. P. Abbott *et al., Properties of the Binary Black Hole Merger GW150914* , Phys. Rev. Lett. **116**, 241102 (2016).

22. B. P. Abbott *et al., GW150914: First results from the search for binary black hole coalescence with Advanced LIGO*, Phys. Rev. D **93**, 122003 (2016).
23. B. P. Abbott *et al., GW150914: The Advanced LIGO Detectors in the Era of First Discoveries*, Phys. Rev. Lett. **116**, 131103 (2016).
24. B. P. Abbott *et al., Observation of Gravitational Waves from a Binary Black Hole Merger*, Phys. Rev. Lett. **116**, 061102 (2016).
25. B. P. Abbott *et al., All-sky search for long-duration gravitational wave transients with initial LIGO*, Phys. Rev. D **93**, 042005 (2016).
26. J. Aasi *et al., First low frequency all-sky search for continuous gravitational wave signals*, Phys. Rev. D **93**, 042007 (2016).
27. J. Aasi *et al., A search of the Orion spur for continuous gravitational waves using a "loosely coherent" algorithm on data from LIGO interferometers*, Phys. Rev. D **93**, 042006 (2016).
28. P. T. Baker, S. Caudill, K. A. Hodge, D. Talukder, C. Capano, N. J. Cornish, *Multivariate classification with random forests for gravitational wave searches of black hole binary coalescence*, Phys. Rev. D **91**, 062004 (2015).
29. J. Aasi *et al., Searches for continuous gravitational waves from nine young supernova remnants*, ApJ **813**, 39 (2015).
30. J. Aasi *et al., Directed search for gravitational waves from Scorpius X-1 with initial LIGO data*, Phys. Rev. D **91**, 062008 (2015).
31. J. Aasi *et al., Advanced LIGO*, Class. Quantum Grav. **32**, 074001 (2015).
32. J. Aasi *et al., Narrow-band search of continuous gravitational-wave signals from Crab and Vela pulsars in Virgo VSR4 data*, Phys. Rev. D **91**, 022004 (2015).
33. J. Aasi *et al., Characterization of the LIGO detectors during their sixth science run*, Class. Quantum Grav. **32**, 115012 (2015).
34. J. Aasi *et al., Searching for stochastic gravitational waves using data from the two colocated LIGO Hanford detectors*, Phys. Rev. D **91**, 022003 (2015).
35. D. Talukder, E. Thrane, S. Bose, T. Regimbau, *Measuring neutron-star ellipticity with measurements of the stochastic gravitational-wave background*, Phys. Rev. D **89**, 123008 (2014).
36. J. Aasi *et al., Multimessenger search for sources of gravitational waves and high-energy neutrinos: Initial results for LIGO-Virgo and IceCube*, Phys. Rev. D **90**, 102002 (2014).
37. J. Abadie *et al., Improved Upper Limits on the Stochastic Gravitational-Wave Background from 2009-2010 LIGO and Virgo Data*, Phys. Rev. Lett. **113**, 231101 (2014).
38. J. Aasi *et al., First all-sky search for continuous gravitational waves from unknown sources in binary systems*, Phys. Rev. D **90**, 062010 (2014).
39. J. Aasi *et al., Methods and results of a search for gravitational waves associated with gamma-ray bursts using the GEO 600, LIGO, and Virgo detectors*, Phys. Rev. D **89**, 122004 (2014).
40. J. Aasi *et al., Search for gravitational radiation from intermediate mass black hole binaries in data from the second LIGO-Virgo joint science run*, Phys. Rev. D **89**, 122003 (2014).
41. J. Aasi *et al., Search for gravitational waves associated with γ-ray bursts detected by the interplanetary network*, Phys. Rev. Lett. **113**, 011102 (2014).
42. J. Aasi *et al., Search for gravitational wave ringdowns from perturbed intermediate mass black holes in LIGO-Virgo data from 2005-2010*, Phys. Rev. D **89**, 102006 (2014).
43. J. Aasi *et al., Implementation of an $\mathcal{F}$-statistic all-sky search for continuous gravitational waves in Virgo VSR1 data*, Class. Quantum Grav. **31**, 165014 (2014).

44. J. Aasi *et al., The NINJA-2 project: detecting and characterizing gravitational waveforms modelled using numerical binary black hole simulations,* Class. Quantum Grav. **31**, 115004 (2014).
45. J. Aasi *et al., Application of a Hough search for continuous gravitational waves on data from the fifth LIGO science run,* Class. Quantum Grav. **31**, 085014 (2014).
46. J. Aasi *et al., Constraints on Cosmic Strings from the LIGO-Virgo Gravitational-Wave Detectors,* Phys. Rev. Lett. **112**, 131101 (2014).
47. J. Aasi *et al., First searches for optical counterparts to gravitational-wave candidate events,* ApJS **211**, 7 (2014).
48. D. Talukder, S. Bose, S. Caudill, P. T. Baker, *Improved coincident and coherent detection statistics for searches for gravitational wave ringdown signals,* Phys. Rev. D **88**, 122002 (2013).
49. J. Aasi *et al., Directed search for continuous gravitational waves from the Galactic center,* Phys. Rev. D **88**, 102002 (2013).
50. J. Aasi *et al., Search for long-lived gravitational-wave transients coincident with long gamma-ray bursts,* Phys. Rev. D **88**, 122004 (2013).
51. J. Aasi *et al., Enhanced sensitivity of the LIGO gravitational wave detector by using squeezed states of light,* Nature Photon **7**, 613-619 (2013).
52. J. Aasi *et al., Parameter estimation for compact binary coalescence signals with the first generation gravitational-wave detector network,* Phys. Rev. D **88**, 062001 (2013).
53. J. Aasi *et al., Search for gravitational waves from binary black hole inspiral, merger, and ringdown in LIGO-Virgo data from 2009–2010,* Phys. Rev. D **87**, 022002 (2013).
54. J. Aasi *et al., EinsteinHome all-sky search for periodic gravitational waves in LIGO S5 data,* Phys. Rev. D **87**, 042001 (2013).
55. Adrián-Martínez *et al., A first search for coincident gravitational waves and high energy neutrinos using LIGO, Virgo and ANTARES data from 2007,* JCAP **06**, 008 (2013).
56. J. Abadie *et al., Search for gravitational waves associated with gamma-ray bursts during LIGO science run 6 and Virgo science runs 2 and 3,* ApJ **760**, 12 (2012).
57. P. A. Evans *et al., Swift follow-up observations of candidate gravitational-wave transient events,* ApJ Suppl. **203**, 28 (2012).
58. J. Aasi *et al., The characterization of Virgo data and its impact on gravitational-wave searches,* Class. Quantum Grav. **29**, 155002 (2012).
59. J. Abadie *et al., All-sky search for gravitational-wave bursts in the second joint LIGO-Virgo run,* Phys. Rev. D **85**, 122007 (2012).
60. J. Abadie *et al., Search for Gravitational Waves from Intermediate Mass Binary Black Holes,* Phys. Rev. D **85**, 102004 (2012).
61. J. Abadie *et al., Implications For The Origin Of GRB 051103 From LIGO Observations,* ApJ **755**, 2 (2012).
62. J. Abadie *et al., First low-latency LIGO+Virgo search for binary inspirals and their electromagnetic counterparts,* A&A **541**, A155 (2012).
63. J. Abadie *et al., Upper limits on a stochastic gravitational-wave background using LIGO and Virgo interferometers at 600-1000 Hz,* Phys. Rev. D **85**, 122001 (2012).
64. J. Abadie *et al., Search for Gravitational Waves from Low Mass Compact Binary Coalescence in LIGO's Sixth Science Run and Virgo's Science Runs 2 and 3,* Phys. Rev. D **85**, 082002 (2012).
65. J. Abadie *et al., All-sky Search for Periodic Gravitational Waves in the Full S5 LIGO Data,* Phys. Rev. D **85**, 022001 (2012).

66. J. Abadie *et al.*, *Implementation and testing of the first prompt search for gravitational wave transients with electromagnetic counterparts*, A&A **539**, A124 (2012).

67. S. Bose, T. Dayanga, S. Ghosh, D. Talukder, *A blind hierarchical coherent search for gravitational-wave signals from coalescing compact binaries in a network of interferometric detectors*, Class. Quantum Grav. **28**, 134009 (2011).

68. D. Talukder, S. Mitra, S. Bose, *Multibaseline gravitational wave radiometry*, Phys. Rev. D **83**, 063002 (2011).

69. J. Abadie *et al.*, *A gravitational wave observatory operating beyond the quantum shot-noise limit*, Nature Physics **7**, 962-965 (2011).

70. J. Abadie *et al.*, *Directional limits on persistent gravitational waves using LIGO S5 science data*, Phys. Rev. Lett. **107**, 271102 (2011).

71. J. Abadie *et al.*, *Beating the spin-down limit on gravitational wave emission from the Vela pulsar*, ApJ **737**, 93 (2011).

72. J. Abadie *et al.*, *Search for gravitational wave bursts from six magnetars*, ApJ **734**, L35 (2011).

73. J. Abadie *et al.*, *Search for gravitational waves from binary black hole inspiral, merger and ringdown*, Phys. Rev. D **83**, 122005 (2011).

74. J. Abadie *et al.*, *A search for gravitational waves associated with the August 2006 timing glitch of the Vela pulsar*, Phys. Rev. D **83**, 042001 (2011).

75. J. Abadie *et al.*, *Predictions for the rates of compact binary coalescences observable by ground-based gravitational-wave detectors*, Class. Quantum Grav. **27**, 173001 (2010).

76. B. P. Abbott *et al.*, *Search for gravitational-wave bursts associated with gamma-ray bursts using data from LIGO Science Run 5 and Virgo Science Run 1*, ApJ **715**, 1438 (2010).

77. J. Abadie *et al.*, *Calibration of the LIGO gravitational wave detectors in the fifth science run*, Nucl. Instrum. Meth. A **624**, 223 (2010).

78. J. Abadie *et al.*, *Search for gravitational waves from compact binary coalescence in LIGO and Virgo data from S5 and VSR1*, Phys. Rev. D **82**, 102001 (2010).

79. J. Abadie *et al.*, *All-sky search for gravitational-wave bursts in the first joint LIGO-GEO-Virgo run*, Phys. Rev. D **81**, 102001 (2010).

80. J. Abadie *et al.*, *First search for gravitational waves from the youngest known neutron star*, ApJ **722**, 1504 (2010).

81. B. P. Abbott *et al.*, *Searches for gravitational waves from known pulsars with science run 5 LIGO data*, ApJ **713**, 671 (2010).

82. J. Abadie *et al.*, *Search for gravitational-wave inspiral signals associated with short gamma-ray bursts during LIGO's fifth and Virgo's first science run*, ApJ **715**, 1453 (2010).

83. E. Thrane, S. Ballmer, J. Romano, S. Mitra, D. Talukder, S. Bose, V. Mandic, *Probing the anisotropies of a stochastic gravitational-wave background using a network of ground-based laser interferometers*, Phys. Rev. D **80**, 122002 (2009).

84. B. P. Abbott *et al.*, *An upper limit on the stochastic gravitational-wave background of cosmological origin*, Nature **460**, 990 (2009).

85. B. P. Abbott *et al.*, *Search for gravitational waves from low mass compact binary coalescence in 186 days of LIGO's fifth science run*, Phys. Rev. D **80**, 047101 (2009).

86. B. P. Abbott *et al.*, *Einstein@Home search for periodic gravitational waves in early S5 LIGO data*, Phys. Rev. D **80**, 042003 (2009).

87. B. P. Abbott *et al., Search for gravitational wave ringdowns from perturbed black holes in LIGO S4 data,* Phys. Rev. D **80**, 062001 (2009).

88. B. P. Abbott *et al., Search for gravitational-wave bursts in the first year of the fifth LIGO science run,* Phys. Rev. D **80**, 102001 (2009).

89. B. P. Abbott *et al., Stacked search for gravitational waves from the 2006 SGR 1900+14 storm,* ApJ **701**, L68 (2009).

90. B. P. Abbott *et al., Search for high frequency gravitational-wave bursts in the first calendar year of LIGO's fifth science run,* Phys. Rev. D **80**, 102002 (2009).

91. B. P. Abbott *et al., First LIGO search for gravitational wave bursts from cosmic (super)strings,* Phys. Rev. D **80**, 062002 (2009).

92. B. P. Abbott *et al., Search for gravitational waves from low mass binary coalescences in the first year of LIGO's S5 data,* Phys. Rev. D **79**, 122001 (2009).

93. B. P. Abbott *et al., LIGO: the Laser Interferometer Gravitational-Wave Observatory,* Rep. Prog. Phys. **72**, 076901 (2009).