

ANDREW W. STEINER

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Department of Physics and Astronomy
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Academic Positions

- Associate Professor (08/20 -)
Assistant Professor (12/14 - 08/20)
Department of Physics and Astronomy, University of Tennessee, Knoxville and
Physics Division, Oak Ridge National Laboratory
- Research Assistant Professor (07/11 - 12/14)
Institute for Nuclear Theory, Univ. of Washington
- Post-Doctoral Research Associate (9/06 - 07/11)
Joint Institute for Nuclear Astrophysics, National Superconducting
Cyclotron Laboratory and Department of Physics and Astronomy,
Michigan State University
- Post-Doctoral Research Associate (9/04 - 9/06)
Theoretical Division, Los Alamos National Laboratory
- Post-Doctoral Research Associate (9/02 - 9/04)
School of Physics and Astronomy, University of Minnesota

Education

- Ph. D. in Physics (2002)
State University of New York at Stony Brook, Stony Brook, NY, USA.
Advisor: Prof. Madappa Prakash; Thesis: Equation of State and Neutrino Interac-
tions in Neutron Star Matter with Quarks
- M. A. in Physics (1999)
State University of New York at Stony Brook, Stony Brook, NY, USA.
- B. S. in Physics, College Honors (1997)
Carnegie Mellon University, Pittsburgh, PA, USA.

Awards

- [2004 Dissertation Award in Nuclear Physics, American Physical Society](#)
- [2019 Senior Research Award, College of Arts and Sciences, University of Tennessee, Knoxville](#)
- [APS DNP Fellow](#)

Refereed Publications ($h_{\text{HEP}} = 42$; $h_{\text{Astro}} = 40$)

1. “Neural Simulation-Based Inference of the Neutron Star Equation of State directly from Telescope Spectra”,
L. Brandes, C. Modi, A. Ghosh, D. Farrell, L. Lindblom, L. Heinrich, A. W. Steiner, F. Weber, and D. Whiteson,
([arXiv:2403.00287](#))
2. “Indication of Sharp and Strong Phase-Transitions from NICER Observations ”,
Z. Lin and A. W. Steiner,
([arXiv:2310.01619](#))
3. “Structure Factors for Hot Neutron Matter from Ab Initio Lattice Simulations with High-Fidelity Chiral Interactions”,
Y.-Z. Ma, Z. Lin, B.-N. Lu, S. Elhatisari, D. Lee, N. Li, U.-G. Meißner, A. W. Steiner, and Q. Wang,
([arXiv:2306.04500](#))
4. “Deducing Neutron Star Equation of State from Telescope Spectra with Machine-learning-derived Likelihoods”,
D. Farrell, P. Baldi, J. Ott, A. Ghosh, A. W. Steiner, A. Kavitar, L. Lindblom, D. Whiteson, and F. Weber,
([arXiv:2305.07442](#))
5. “Theoretical and Experimental Constraints for the Equation of State of Dense and Hot Matter”,
R. Kumar, V. Dexheimer, J. Jahan, J. Noronha, J. Noronha-Hostler, C. Ratti, N. Yunes, A. R. N. Acuna, M. Alford, M. H. Anik, K. Chatziioannou, H.-Y. Chen, A. Clevinger, C. Conde, N. C. Camacho, T. Dore, C. Drischler, H. Elfner, R. Essick, D. Friedenber, S. Ghosh, J. Grefa, R. Haas, J. Hammelmann, S. Harris, C.-J. Haster, T. Hatsuda, M. Hippert, R. Hirayama, J. W. Holt, M. Kahangirwe, J. Kartheim, T. Kojo, P. Landry, Z. Lin, M. Luzum, T. A. Manning, J. S. S. Martin, C. Miller, E. R. Most, D. Mroczek, A. Muronga, N. Patino, J. Peterson, C. Plumberg, D. Price, C. Providencia, R. Rougemont, S. Roy, H. Shah, S. Shapiro, A. W. Steiner, M. Strickland, H. Tan, H. Togashi, I. P. Vazquez, P. Wen, and Z. Zhang,
([arXiv:2303.17021](#))
6. “Deducing Neutron Star Equation of State Parameters Directly From Telescope Spectra with Uncertainty-Aware Machine Learning”,
D. Farrell, P. Baldi, J. Ott, A. Ghosh, A. W. Steiner, A. Kavitar, L. Lindblom, D. Whiteson, and F. Weber,
J. Cosmo. Astropart. Phys. (2023) 016.
([arXiv:2209.02817](#))

7. “Uncertainty Quantification for Neutrino Opacities in Core-Collapse Supernovae and Neutron Star Mergers”,
Z. Lin, A. W. Steiner, and Jérôme Margueron,
Phys. Rev. C **107** (2023) 015804.
([arXiv:2207.05927](#))
8. “Detectability of hadron-quark phase transition in neutrino signals of failing core-collapse supernova”,
Z. Lin, S., Zha, E. P. O’Connor, and A. W. Steiner,
([arXiv:2203.05141](#) - 3 citations¹)
9. “Decision Theory for the Mass Measurements at the Facility for Rare Isotope Beams”,
J. N. Farr, Z. Meisel, and A. W. Steiner,
([arXiv:2111.11536](#) - 1 citation)
10. “Hot and Dense Matter Equation of State Probability Distributions for Astrophysical Simulations”,
X. Du, A. W. Steiner, and J. W. Holt,
Phys. Rev. C **105** (2022) 035803.
([arXiv:2107.06697](#) - 6 citations)
11. “Combining Electromagnetic and Gravitational-Wave Constraints on Neutron-Star Masses and Radii”,
M. Al-Mamun, A. W. Steiner, J., Nättilä, J. Lange, R. O’Shaughnessy, I. Tews, S. Gandolfi, C. Heinke, and S. Han,
Phys. Rev. Lett. **126** (2021) 061101.
([arXiv:2008.12817](#) - 40 citations)
12. “Measuring Nuclear Matter Parameters with NICER and LIGO/Virgo”,
J. Zimmerman, Z. Carson, K. Schumacher, A. W. Steiner, and K. Yagi,
([arXiv:2002.03210](#) - 44 citations)
13. “Future Prospects for Constraining Nuclear Matter Parameters with Gravitational Waves”,
Z. Carson, A. W. Steiner, and K. Yagi,
Phys. Rev. D **100** (2019) 023012.
([arXiv:1906.05978](#) - 21 citations)
14. “From the microscopic to the macroscopic world: from nucleons to neutron stars”,
S. Gandolfi, J. Lippuner, A. W. Steiner, I. Tews, X. Du, and M. Al-Mamun,
J. Phys. G **46** (2019) 103001.
([arXiv:1903.06730](#) - 24 citations)

¹Citation counts from [inspirehep.net](#).

15. “Constraining nuclear matter parameters with GW170817”,
Z. Carson, A. W. Steiner, and K. Yagi,
Phys. Rev. D **99** (2019) 043010.
([arXiv:1812.08910](#) - 60 citations)

16. “Hyperons and quarks in proto-neutron stars”,
J. Roark, X. Du, C. Constantinou, V. Dexheimer, A. W. Steiner, and J. R. Stone,
Mon. Not. Roy. Astron. Soc. **486** (2019) 5441.
([arXiv:1812.08157](#) - 17 citations)

17. “Simultaneous Fitting of Neutron Star Structure and Cooling Data ”,
S. Beloin, S. Han, A. W. Steiner, and K. Odbadrakh,
Phys. Rev. C **100** (2019) 055801.
([arXiv:1812.00494](#) - 10 citations)

18. “Tidal deformability with sharp phase transitions in (binary) neutron stars”,
S. Han and A. W. Steiner,
Phys. Rev. D **99** (2019) 083014.
([arXiv:1810.10967](#) - 104 citations)

19. “Hot and Dense Homogeneous Nucleonic Matter Constrained by Observations, Experiment, and Theory”,
X. Du, A. W. Steiner, and J. W. Holt,
Phys. Rev. C **99** (2019) 025803.
([arXiv:1802.09710](#) - 20 citations)

20. “Nuclear Reactions in the Crusts of Accreting Neutron Stars”,
R. Lau, M. Beard, S. S. Gupta, H. Schatz, A. V. Afanasjev, E. F. Brown, A. Deibel, L. R. Gasques, G. W. Hitt, W. R. Hix, L. Keek, P. Möller, P. S. Shternin, A. W. Steiner, M. Wiescher, and Y. Xu,
Astrophys. J. **859** (2018) 62.
([arXiv:1803.03818](#) - 39 citations)

21. “Two- and multi-dimensional curve fitting using Bayesian inference”,
A. W. Steiner,
([arXiv:1802.05339](#) - 4 citations)

22. “Testing the formation scenarios of binary neutron star systems with measurements of the neutron star moment of inertia”,
W. G. Newton, A. W. Steiner, and K. Yagi,
Astrophys. J. **856** (2018) 19.
([arXiv:1611.09399](#) - 9 citations)

23. “The radius of the quiescent neutron star in the globular cluster M13”,
A. W. Shaw, C. O. Heinke, A. W. Steiner, S. Campana, H. N. Cohn, W. C. G. Ho, P. M. Lugger, and M. Servillat,
Mon. Not. Roy. Astron. Soc. **476** (2018) 4713.
([arXiv:1803.00029](#) - 24 citations)
24. “Constraining the Mass and Radius of Neutron Stars in Globular Clusters”,
A. W. Steiner, C. O. Heinke, S. Bogdanov, C. Li, W. C. G. Ho, A. Bahramian, and S. Han,
Mon. Not. Roy. Astron. Soc. **476** (2018) 421.
([arXiv:1709.05013](#) - 106 citations)
25. “Constraining Superfluidity in Dense Matter from the Cooling of Isolated Neutron Stars”,
S. Beloin, S. Han, A. W. Steiner, and D. Page,
Phys. Rev. C **97** (2018) 015804.
([arXiv:1612.04289](#) - 29 citations)
26. “Neutron star mass and radius measurements from atmospheric model fits to X-ray burst cooling tail spectra”,
J. Nättilä, M. C. Miller, A. W. Steiner, J. J. E. Kajava, V. F. Suleimanov, and J. Poutanen,
Astron. and Astrophys. **608** (2017) A31.
([arXiv:1709.09120](#) - 120 citations)
27. “Cooling of neutron stars in soft X-ray transients”,
S. Han and A. W. Steiner,
Phys. Rev. C **96** (2017) 035802.
([arXiv:1702.08452](#) - 18 citations)
28. “White paper on nuclear astrophysics and low energy nuclear physics Part 1: Nuclear astrophysics”,
A. Arcones, D. W. Bardayan, T. C. Beers, L. A. Bernstein, J. C. Blackmon, B. Messer, B. A. Brown, E. F. Brown, C. R. Brune, A. E. Champagne, A. Chieffi, A. J. Couture, P. Danielewicz, R. Diehl, M. El-Eid, J. E. Escher, B. D. Fields, C. Fröhlich, F. Herwig, W. R. Hix, C. Iliadis, W. G. Lynch, G. C. McLaughlin, B. S. Meyer, A. Mezzacappa, F. Nunes, B. W. O’Shea, M. Prakash, B. Pritychenko, S. Reddy, E. Rehm, G. Rogachev, R. E. Rutledge, H. Schatz, M. S. Smith, I. H. Stairs, A. W. Steiner, T. E. Strohmayer, F.X. Timmes, D. M. Townsley, M. Wiescher, R. G.T. Zegers, and M. Zingale,
Prog. Part. Nucl. Phys. **94** (2017) 1.
([arXiv:1603.02213](#) - 24 citations)

29. “Reverse engineering nuclear properties from rare earth abundances in the r process”,
M. R. Mumpower, G. C. McLaughlin, R. Surman, and A. W. Steiner,
J. Phys. G **44** (2017) 034003.
([arXiv:1609.09858](#) - 29 citations)
30. “The link between rare earth peak formation and the astrophysical site of the r process”,
M. R. Mumpower, G. C. McLaughlin, R. Surman, and A. W. Steiner,
Astrophys. J. **833** (2016) 282.
([arXiv:1603.02600](#) - 16 citations)
31. “Equation of state constraints for the cold dense matter inside neutron stars using the cooling tail method”,
J. Nättilä, A. W. Steiner, J. J. E. Kajava, V. F. Suleimanov, and J. Poutanen,
Astron. Astrophys. **591** (2016) A25.
([arXiv:1509.06561](#) - 94 citations)
32. “Measuring the neutron star equation of state using X-ray timing”,
A. L. Watts, N. Andersson, D. Chakrabarty, M. Feroci, K. Hebeler, G. Israel, F. K. Lamb,
M. C. Miller, S. Morsink, F. Özel, A. Patruno, J. Poutanen, D. Psaltis, A. Schwenk, A.
W. Steiner, L. Stella, L. Tolos, and M. van der Klis,
Rev. Mod. Phys. **88** (2016) 021001.
([arXiv:1602.01081](#) - 233 citations)
33. “Neutron Star Radii, Universal Relations, and the Role of Prior Distributions”,
A. W. Steiner, J. M. Lattimer, and E. F. Brown,
Eur. Phys. J. A **52** (2016) 18.
([arXiv:1510.07515](#) - 96 citations)
34. “The Fate of the Compact Remnant in Neutron Star Mergers”,
C. L. Fryer, K. Belczynski, E. Ramirez-Ruiz, S. Rosswog, G. Shen, and A. W. Steiner,
Astrophys. J. **812** (2015) 1.
([arXiv:1504.07605](#) - 69 citations)
35. “Hypernuclei and the Hyperon Problem in Neutron Stars”,
P. F. Bedaque and A. W. Steiner,
Phys. Rev. C **92** (2015) 025803.
([arXiv:1412.8686](#) - 14 citations)
36. “Moving beyond Chi-squared in nuclei and neutron stars”,
A. W. Steiner,
J. Phys. G **42** (2015) 034004.
([arXiv:1407.0100](#) - 6 citations)

37. “Using neutron star observations to determine crust thicknesses, moments of inertia, and tidal deformabilities”,
A. W. Steiner, S. Gandolfi, F. J. Fattoyev, and W. G. Newton,
Phys. Rev. C **91** (2015) 015804.
([arXiv:1403.7546](#) - 94 citations)
38. “Sound Velocity Bound and Neutron Stars”,
P. Bedaque and A. W. Steiner,
Phys. Rev. Lett. **114** (2015) 031103.
([arXiv:1408.5116](#) - 192 citations)
39. “Magnetar giant flare oscillations and the nuclear symmetry energy”,
A. T. Deibel, A. W. Steiner, and E. F. Brown,
Phys. Rev. C **90** (2014) 025802.
([arXiv:1303.3270](#) - 18 citations)
40. “Neutron Star Masses and Radii from Quiescent Low-Mass X-ray Binaries”,
J. M. Lattimer and A. W. Steiner,
Astrophys. J. **784** (2014) 123.
([arXiv:1305.3242](#) - 249 citations)
41. “Constraints on the symmetry energy using the mass-radius relation of neutron stars”,
J. M. Lattimer and A. W. Steiner,
Eur. Phys. J. A **50** (2014) 40.
([arXiv:1403.1186](#) - 222 citations)
42. “The equation of state of neutron matter, symmetry energy and neutron star structure”,
S. Gandolfi, J. Carlson, S. Reddy, A. W. Steiner, and R. B. Wiringa,
Eur. Phys. J. A **50** (2014) 10.
([arXiv:1307.5815](#) - 102 citations)
43. “Strong neutrino cooling by cycles of electron capture and β^- decay in neutron star crusts”,
H. Schatz, S. Gupta, P. Möller, M. Beard, E. F. Brown, A. T. Deibel, L. R. Gasques, W. R. Hix, L. Keek, R. Lau, A. W. Steiner, and M. Wiescher,
Nature **505** (2014) 62.
([arXiv:1312.2513](#) - 87 citations)
44. “Core-collapse Supernova Equations of State Based on Neutron Star Observations”,
A. W. Steiner, M. Hempel, and T. Fischer,
Astrophys. J. **774** (2013) 17.
([arXiv:1207.2184](#) - 470 citations)

45. “The Neutron Star Mass-Radius Relation and the Equation of State of Dense Matter”,
A. W. Steiner, J. M. Lattimer, and E. F. Brown,
Astrophys. J. Lett. **765** (2013) 5.
([arXiv:1205.6871](#) - 372 citations)
46. “Constraints on the symmetry energy and neutron skins from experiments and theory”,
M. B. Tsang, J. R. Stone, F. Camera, P. Danielewicz, S. Gandolfi, K. Hebeler, C. J. Horowitz, J. Lee, W. G. Lynch, Z. Kohley, R. Lemmon, P. Möller, T. Murakami, S. Riordan, X. Roca-Maza, F. Sammarruca, A. W. Steiner, I. Vidana, and S. J. Yennello,
Phys. Rev. C **86** (2012) 015803.
([arXiv:1204.0466](#) - 579 citations)
47. “Fermi Breakup and the Statistical Multifragmentation Model”,
B. V. Carlson, R. Donangelo, S. R. Souza, W. G. Lynch, A. W. Steiner, and M. B. Tsang,
Nucl. Phys. A **876** (2012) 77.
([arXiv:1001.1306](#) - 6 citations)
48. “Deep crustal heating in a multicomponent accreted neutron star crust”,
A. W. Steiner,
Phys. Rev. C **85** (2012) 055804.
([arXiv:1202.3378](#) - 56 citations)
49. “Connecting Neutron Star Observations to Three-Body Forces in Neutron Matter and to the Nuclear Symmetry Energy”,
A. W. Steiner and S. Gandolfi,
Phys. Rev. Lett. **108** (2012) 081102.
([arXiv:1110.4142](#) - 198 citations)
50. “Rapid Cooling of the Neutron Star in Cassiopeia A Triggered by Neutron Superfluidity in Dense Matter”,
D. Page, M. Prakash, J. M. Lattimer, and A. W. Steiner,
Phys. Rev. Lett. **106** (2011) 081101.
([arXiv:1011.6142](#) - 321 citations)
51. “The Equation of State from Observed Masses and Radii of Neutron Stars”,
A. W. Steiner, J. M. Lattimer, and E. F. Brown,
Astrophys. J. **722** (2010) 33.
([arXiv:1005.0811](#) - 747 citations)

52. “Neutrino Emission from Cooper Pairs and Minimal Cooling of Neutron Stars”,
D. Page, J. M. Lattimer, M. Prakash, and A. W. Steiner,
Astrophys. J. **707** (2009) 1131.
(arXiv:0906.1621 - 182 citations)
53. “Comparison of statistical treatments for the equation of state for core-collapse supernovae”,
S. R. Souza, A. W. Steiner, W. G. Lynch, R. Donangelo, and M. A. Famiano,
Astrophys. J. **707** (2009) 1495.
(arXiv:0806.1005 - 27 citations)
54. “Constraints on Neutron Star Crusts from Oscillations in Giant Flares”,
A. W. Steiner and A. L. Watts,
Phys. Rev. Lett. **103** (2009) 181101.
(arXiv:0902.1683 - 111 citations)
55. “Isospin effects and the density dependence of the nuclear symmetry energy”,
S. R. Souza, M. B. Tsang, B. V. Carlson, R. Donangelo, W. G. Lynch, and A. W. Steiner,
Phys. Rev. C **80** (2009) 041602(R).
(arXiv:0907.1931 - 16 citations)
56. “Temperature effects in nuclear isoscaling”,
S. R. Souza, M. B. Tsang, B. V. Carlson, R. Donangelo, W. G. Lynch, and A. W. Steiner,
Phys. Rev. C **80** (2009) 044606.
(arXiv:0906.4375 - 15 citations)
57. “Possible Resonances in the $^{12}\text{C} + ^{12}\text{C}$ Fusion Rate and Superburst Ignition”,
R. L. Cooper, A. W. Steiner, and E. F. Brown,
Astrophys. J. **702** (2009) 660.
(arXiv:0903.3994 - 71 citations)
58. “Statistical multifragmentation model with Skyrme effective interactions”,
S. R. Souza, B. V. Carlson, R. Donangelo, W. G. Lynch, A. W. Steiner, and M. B. Tsang,
Phys. Rev. C **79** (2009) 054602.
(arXiv:0901.2985 - 18 citations)
59. “Constraints on the Density Dependence of the Symmetry Energy”,
M. B. Tsang, Y. Zhang, P. Danielewicz, M. Famiano, Z. Li, W. G. Lynch, and A. W. Steiner,
Phys. Rev. Lett. **102** (2009) 122701.
(arXiv:0811.3107 - 624 citations)

60. “Superfluid response and the neutrino emissivity of neutron matter”,
A. W. Steiner and S. Reddy,
Phys. Rev. C **79** (2009) 015802.
(arXiv:0804.0593 - 38 citations)
61. “Viscous damping of r -mode oscillations in compact stars with quark matter”,
P. Jaikumar, G. Rupak, and A. W. Steiner,
Phys. Rev. D **78** (2008) 123007.
(arXiv:0806.1005 - 44 citations)
62. “Probing the symmetry energy from the nuclear isoscaling”,
S. R. Souza, M. B. Tsang, R. Donangelo, W. G. Lynch, and A. W. Steiner,
Phys. Rev. C **78** (2008) 014605.
(arXiv:0804.1352 - 37 citations)
63. “Neutron Star Crust: Nuclear Physics Input”,
A. W. Steiner,
Phys. Rev. C **77** (2008) 035805.
(arXiv:0711.1812 - 58 citations)
64. “High-density symmetry energy and direct Urca process”,
A. W. Steiner,
Phys. Rev. C **74** (2006) 045808.
(arXiv:nucl-th/0607040 - 73 citations)
65. “Constraining the radii of neutron stars with terrestrial nuclear laboratory data”,
B.-A. Li and A. W. Steiner,
Phys. Lett. B **642** (2006) 436.
(arXiv:nucl-th/0511064 - 126 citations)
66. “Quark Matter in Neutron Stars: An apercu”,
P. Jaikumar, S. Reddy, and A. W. Steiner,
Mod. Phys. Lett. A **21** (2006) 1965.
(arXiv:astro-ph/0608345 - 7 citations)
67. “Stability of strange star crusts and strangelets”,
M. G. Alford, K. Rajagopal, S. Reddy, and A. W. Steiner,
Phys. Rev. D **73** (2006) 114016.
(arXiv:hep-ph/0601038 - 89 citations)
68. “Strange Star Surface: A Crust with Nuggets”,
P. Jaikumar, S. Reddy, and A. W. Steiner,
Phys. Rev. Lett. **96** (2006) 041101.
(arXiv:nucl-th/0507055 - 111 citations)

69. “Color-superconducting ’t Hooft interaction”,
A. W. Steiner,
Phys. Rev. D **72** (2005) 054024.
(arXiv:hep-ph/0506238 - 21 citations)
70. “Isospin diffusion in heavy-ion collisions and the neutron skin thickness of lead”,
A. W. Steiner and B.-A. Li,
Phys. Rev. C **72** (2005) 041601.
(arXiv:nucl-th/0505051 - 87 citations)
71. “Isospin asymmetry in nuclei and neutron stars”,
A. W. Steiner, M. Prakash, J. M. Lattimer, and P. J. Ellis,
Phys. Rep. **411** (2005) 325.
(arXiv:nucl-th/0410066 - 794 citations)
72. “Minimal Cooling of Neutron Stars: A New Paradigm”,
D. Page, J. M. Lattimer, M. Prakash, and A. W. Steiner,
Astrophys. J. Suppl. Ser. **155** (2004) 623.
(arXiv:astro-ph/0403657 - 423 citations)
73. “Color-neutral superconducting quark matter”,
A. W. Steiner, S. Reddy, and M. Prakash,
Phys. Rev. D **66** (2002) 094007.
(arXiv:hep-ph/0205201 - 233 citations)
74. “Diffusion of neutrinos in proto-neutron star matter with quarks”,
A. W. Steiner, M. Prakash, and J. M. Lattimer,
Phys. Lett. B **509** (2001) 10.
(arXiv:astro-ph/0101566 - 35 citations)
75. “Evolution of Proto-Neutron Stars with Quarks”,
J.é A. Pons, A. W. Steiner, M. Prakash, and J. M. Lattimer,
Phys. Rev. Lett. **86** (2001) 5223.
(arXiv:astro-ph/0102015 - 147 citations)
76. “Prospects of Detecting Baryon and Quark Superfluidity from Cooling Neutron Stars”,
D. Page, M. Prakash, J. M. Lattimer, and A. W. Steiner,
Phys. Rev. Lett. **85** (2000) 2048.
(arXiv:hep-ph/0005094 - 138 citations)

77. “Quark-hadron phase transitions in young and old neutron stars”,
A. W. Steiner, M. Prakash, and J. M. Lattimer,
Phys. Lett. B **486** (2000) 239.
([arXiv:nuc1-th/0003066](https://arxiv.org/abs/nuc1-th/0003066) - 98 citations)

Other Significant Publications

1. “Stellar Superfluids”,
D. Page, J. M. Lattimer, M. Prakash, and **A. W. Steiner**,
Invited review chapter in *Novel Superfluids, Vol. 2*,
Eds. K. H. Bennemann, and J. B. Ketterson,
([arXiv:1302.6626](https://arxiv.org/abs/1302.6626) - 28 citations)

Submitted, Current and Previously Funded Grants

1. “Collaborative Research: WoU-MMA Constraining the nuclear EOS and population of neutron star mergers through observations of transient and persistent phenomena”
[NSF AAG-2206322](https://www.nsf.gov/awardsearch/showAward?AWDNO=2206322), \$237k, 3 yr duration,
PI A. W. Steiner
2. “Frameworks: MUSES, Modular Unified Solver of the Equation of State”
[NSF PHY-2103680](https://www.nsf.gov/awardsearch/showAward?AWDNO=2103680), \$4,421k (UTK subcontract is \$149k), 5 yr duration (2021-2026),
PI N. Yunes
3. “Nuclear Physics from Multi-Messenger Mergers (NP3M)”
[NSF PHY-2116686](https://www.nsf.gov/awardsearch/showAward?AWDNO=2116686), \$3,250k, 5 yr duration (2021-2026),
PI A. W. Steiner
4. “WoU-MMA: Collaborative Research: Constraining the Nuclear Equation of State and Neutron Star Astrophysics Through Multi-messenger and Multi-object Observations of Neutron Stars”
[NSF PHY-1909490](https://www.nsf.gov/awardsearch/showAward?AWDNO=1909490), \$191k, 3 yr duration (2019-2022),
Collaboration PI: R. O’Shaughnessy, UTK PI: A. W. Steiner
5. “Effect of Exotic Matter on Thermal States of Transiently Accreting Neutron Stars”,
[Chandra Theory 19400273](https://www.chandra.harvard.edu/pressroom/19400273), \$70K, 1 yr duration (2017),
PI: S. Han, Co-Is: A. W. Steiner and D. Page
6. “TEAMS: Towards Exascale Astrophysics of Mergers and Supernovae”,
[DOE SciDAC DE-SC0018232](https://www.doe.gov/scidac/awards/DE-SC0018232), \$1,208K, 5 yr duration (2017-2022),
Collaboration PI: W. R. Hix, UTK PI: A. W. Steiner, UTK Co-PI: A. Mezzacappa.
7. “CAREER: The Composition of Dense Matter and Observations of Neutron Stars”
[NSF PHY-1554876](https://www.nsf.gov/awardsearch/showAward?AWDNO=1554876), \$425k, 5 yr duration (2016-2021),
PI: A. W. Steiner
8. “Theoretical Nuclear Physics”, Oak Ridge National Laboratory Joint Faculty Appointment, \$72k/yr (2015-),
PI: A. W. Steiner

11. “Theoretical-Computational Network for Extracting Astrophysics and Fundamental Physics from Multi-Messenger Observations of Compact Objects”, [TCAN program, NSF AST-1333607](#), \$420k, 3 yr duration (2013-2016),
UW PI: S. Reddy, UW Co-PI: A. W. Steiner
(*Steiner converted to unfunded collaborator after move to Knoxville*)

12. “Neutron Star Crusts: Probing the Properties of Dense Matter”, [NSF-AST 1109176](#), \$230K, 3 yr duration (2011-2014),
PI: E. F. Brown, Co-PI: A. W. Steiner
(*Steiner converted to unfunded collaborator after move to Seattle*)

13. “Constraining the Equation of State of Dense Matter from Isolated and Accreting Neutron Stars”,
[Chandra Theory 12400566](#), \$62K, 1 yr duration (2011),
PI: A. W. Steiner, Co-Is: E. F. Brown and J. M. Lattimer

14. “Superbursts and Starquakes in Neutron Star Crusts”,
[NASA-ATFP 07-ATFP07-0109](#), \$230K, 3 yr duration (2008-2011),
PI: E. F. Brown, Co-PI: A. W. Steiner

Recent Invited Seminars and Colloquia

1. “The Nature of Hot and Dense Strongly-Interacting Matter” (invited colloquium), Los Alamos National Laboratory, Los Alamos, NM, Aug. 2023.
2. “Uncertainty Quantification for the Equation of State and Neutrino Opacities” (invited seminar),
[Astrophysical neutrinos and the origin of the elements](#),
Institute for Nuclear Theory, Seattle, WA, Aug. 2023.
3. “The Nature of Hot and Dense Strongly-Interacting Matter” (virtual invited colloquium),
Tsung-Dao Lee Institute, Shanghai, China, Mar. 2023.
4. “The Nature of Hot and Dense Strongly-Interacting Matter” (virtual invited colloquium),
Iowa State University, Ames, IA, Mar. 2023.
5. “The Nature of Hot and Dense Strongly-Interacting Matter” (invited colloquium),
Texas A&M University, College Station, TX, Sep. 2022.
6. “Connecting Neutron Star Observations to the Nature of Hot and Dense Matter” (invited talk),
Michigan State University, East Lansing, MI, Oct. 2022.
7. “Nuclear Equation of State and Neutron Star Merger” (invited talk),
[Advances on Giant Nuclear Monopole Excitations and Applications to Multi-messenger Astrophysics](#),
European Center for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy, Jul. 2022.
8. “Nuclear Physics Input for Neutron Star Mergers and NP3M” (invited talk),
[TCAN on BNS and BH/NS Workshop 2022](#),
Rochester Institute of Technology, Rochester, NY, Jun. 2022.
9. “The Nature of Hot and Dense Strongly-Interacting Matter” (invited seminar),
2022, Los Alamos, NM, Feb. 2022.
10. “Multi-messenger Astronomy and the Physics of Hot and Dense Matter” (virtual seminar),
Washington University St. Louis, St. Louis, MO, Nov. 2021.

11. “Multi-messenger Astronomy and the Physics of Hot and Dense Matter” (virtual colloquium),
Anton Pannekoek Institute for Astronomy, University of Amsterdam, Amsterdam, Netherlands, Oct. 2021.
12. “Multi-messenger astronomy and the physics of hot and dense matter” (virtual colloquium),
Arizona State Univ., Phoenix, AZ, Oct. 2021.
13. “Nuclear Physics for Future GW Observatories” (virtual invited plenary talk),
[Dawn VI Meeting on Next Generation Observatories](#),
Oct. 2021.
14. “Combining Electromagnetic and Gravitational Wave Observations to Determine the Nature of Dense Matter” (virtual invited talk),
[Neutron Stars as Multi-Messenger Laboratories for Dense Matter](#),
Trento, Italy, Jun. 2021.
15. “Determining the Properties of Strongly-Interacting Matter from Neutron Star Observations” (virtual invited talk),
Institut de Physique des 2 Infinis, Lyon, France, Jul. 2021.
16. “Multi-messenger Astronomy and the Physics of Hot and Dense Matter” (virtual colloquium),
Washington State University, Pullman, WA, Sep. 2021.
17. “Bayesian Inference for Nuclear Astrophysics and Differential Geometry” (virtual invited talk),
[ISNET: Information and Statistics in Nuclear Experiment and Theory](#),
Michigan State Univ., E. Lansing, MI, Dec. 2020.
18. “Frontiers in Theoretical Nuclear Physics” (virtual invited panel),
[JINA Horizons](#),
Michigan State Univ., E. Lansing, MI, Dec. 2020.
19. “The EOS over several regimes in density, temperature, isospin asymmetry, lepton number, and strangeness” (virtual invited talk),
[From heavy-ion collisions to neutron stars](#),
University of Illinois, Urbana-Champaign, Urbana, IL, Aug. 2020.
20. “Determining the Properties of Dense Matter from Neutron Star Observations” (virtual invited talk),
Oak Ridge National Laboratory, Oak Ridge, TN, Jun. 2020.

21. “Neutron Star Masses and Radii and the Equation of State of Dense Matter” (virtual invited talk),
[April APS Meeting](#),
American Physical Society, Washington, DC, Apr. 2020.
22. “Determining the Properties of Dense Matter from Neutron Star Observations” (invited colloquium),
Texas A&M University Cyclotron, College Station, TX, Feb. 2020.
23. “Determining the Properties of Dense Matter from Neutron Star Observations” (virtual invited talk),
[JINA-INT Workshop: Dense Matter & Neutron Star Mergers](#),
Institute for Nuclear Theory, Seattle, WA, Dec. 2019.
24. “Determining the Properties of Dense Matter from Neutron Star Observations” (invited talk),
Lawrence Berkeley Natl. Lab., Berkeley, CA, Oct. 2019.
25. “Using Neutron Star Observations to Determine the Composition of Dense Matter” (invited talk),
[Gordon Research Conference: Nuclear Chemistry](#),
New London, NH, Jun. 2019.
26. “From Gravitational Waves and Neutron Stars to Neutrons and Protons” (invited public talk),
Friends of Oak Ridge National Laboratory, Oak Ridge, TN, May. 2019.
27. “From Multimessenger Astronomy to Neutrons and Protons” (departmental colloquium),
University of Virginia, Charlottesville, VA, Apr. 2019.
28. “Multi-messenger Neutron Star Astrophysics and Determining the Composition of the Neutron Star Core” (invited talk),
17th AAS HEAD Meeting,
Monterey, CA, Mar. 2019.
29. “The Nature of Dense Matter from Multi-Messenger Observations of Neutron Stars” (invited talk),
University of Turku, Turku, Finland, Jun. 2018.
30. “The Nature of Dense Matter from Multi-Messenger Observations of Neutron Stars” (invited talk),
Nordic Institute for Theoretical Physics (NORDITA), Stockholm, Sweden, Jun. 2018.

31. “The Nature of Dense Matter from Multi-Messenger Observations of Neutron Stars” (invited talk),
University of Helsinki, Helsinki, Finland, Jun. 2018.
32. “The Nature of Dense Matter from Multi-Messenger Observations of Neutron Stars” (invited talk),
Canadian Institute for Theoretical Astrophysics, Toronto, ON, Canada, Apr. 2018.
33. “Why neutrino emission is critical for astronomical constraints on dense matter” (invited talk),
[Nuclear ab-initio Theories and Neutrino Physics](#),
Institute for Nuclear Theory, Seattle, WA, Mar. 2018.
34. “Constraints on neutron star radii and tidal deformabilities from qLMXBs and LIGO” (invited talk),
[INT-JINA Symposium: First multi-messenger observations of a neutron star merger and its implications for nuclear physics](#),
Institute for Nuclear Theory, Seattle, WA, Mar. 2018.
35. “Humans are Made (Partially) of Old Neutron Stars” (invited public talk),
[UTK Science Forum](#),
University of Tennessee, Knoxville, TN, Feb. 2018.
36. “The EOS and superfluid properties of dense matter from neutron star observations” (invited talk),
[DNP 2017: Fall Meeting of the DNP of the APS](#),
Carnegie Mellon Univ., Pittsburgh, PA, Oct. 2017.
37. “From the Radius of a Neutron Star to the Neutron Radius of Nuclei” (invited talk),
Carnegie Mellon Univ., Pittsburgh, PA, Oct. 2017.
38. “A Short Talk on Dense Stars” (invited talk),
[Extreme Gravity Workshop](#),
Montana State Univ., Bozeman, MT, Aug. 2017.
39. “Equation of State and Uncertainty Quantification in Hot and Dense Matter” (invited talk),
[Electromagnetic Signatures of r-process Nucleosynthesis in Neutron Star Binary Mergers](#),
Institute for Nuclear Theory, Seattle, WA, Mar. 2017.

Professional Membership

The American Physical Society (DNP, DAP, DGRAV)

The American Astronomical Society (HEAD)

Professional Activities

- Referee for Adv. Space Res., Astropart. Phys., Astrophys. J., Astrophys. J. Lett., Class. Quant. Grav., Eur. J. Phys. A, Eur. J. Phys. C, Int. J. Mod. Phys. E, J. Phys. G, Mod. Phys. Lett. A, Mon. Not. Royal Astron. Soc, Nucl. Phys. A, Phys. Rep., Phys. Rev. C, Phys. Rev. D, Phys. Rev. Lett., Phys. Lett. B, Phys. Rep., Rev. Mod. Phys. and Science.
- Served as an external reviewer for the NASA Postdoctoral Program Review and for proposals submitted to the US Department of Energy, the L'Agence Nationale de la Recherche in France, the Netherlands Organisation for Scientific Research, the National Science Centre in Poland, and the Science and Technology Facilities Council in the UK.
- Serve regularly as an external reviewer for the DOE and NSF Nuclear Theory programs.
- Previously served as a panel reviewer for the NSF in both nuclear theory (PHY) and compact objects (AAG).
- Served as Deputy Chair of a Chandra Review Panel.