

Faculty Folder

Scott K. Bogner
National Superconducting Cyclotron Laboratory,
Facility for Rare Isotope Beams
and
Department of Physics & Astronomy
Michigan State University

August 15, 2019

Contents

Scott K. Bogner Curriculum Vitae

Michigan State University
National Superconducting Cyclotron Laboratory
640 S. Shaw Lane
East Lansing, MI 48824

Phone: (517) 908-7433
Email: bogner@nscl.msu.edu

Education and Appointments

<i>Appointments</i>	<i>Institution</i>	<i>Dates</i>
Professor	NSCL/PA, Michigan State University	2018-
Theoretical Nuclear Science Dept. Head	NSCL/FRIB, Michigan State University	2016-
Associate Professor	NSCL/PA, Michigan State University	2012 - 2018
Assistant Professor	NSCL/PA, Michigan State University	2007 - 2012
Postdoctoral researcher	Ohio State University	2004 - 2007
Postdoctoral researcher	Institute for Nuclear Theory	2002 - 2004
Ph.D. degree	SUNY Stony Brook	Aug. 2002
B.S. degree	University of Cincinnati	Aug. 1996

Research Interests

My research focuses on applications of renormalization group (RG) and effective field theory (EFT) techniques to the microscopic description of nuclei and nuclear matter. I am presently applying two methods that I helped introduce to nuclear physics over the past decade, the similarity renormalization group (SRG) and the in-medium similarity renormalization group (IMSRG), to develop microscopic shell model interactions and effective operators for calculations of $0\nu\beta\beta$ matrix elements, shell model studies of charge symmetry breaking in sd - and fp -shell nuclei, and experimental studies of $^{24,25,26}\text{F}$. I am also applying these methods to construct next-generation nuclear energy density functionals and shed light on the scale and scheme dependence of knockout reactions in few-nucleon systems. I am also interested in applying ideas from machine learning and quantum computing to many-body problems.

Summary of Publications and Talks (last 10 years)

Phys. Rev. C: 20 (6 Rapid Communications)

Phys. Rev. Lett.: 3

Nucl. Phys. A: 5

Phys. Lett B: 3

Review articles: 3 (Phys. Rep., Prog. Part. Nucl. Phys., Ann. Rev. Nucl. Part. Sci.)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Refereed Pub.	1	6	4	2	2	4	2	2	8	3	1
Invited Talks	3	1	4	2	3	3	1	1	1	2	3
Seminars & Coll.	3	1	1	2	0	2	0	2	1	2	0

Citation Summary (Since 1998 from Thomson-Reuters Web of Science)

h-index : 28

Total times cited without self-citations: 2790

Awards

2018 APS Fellow (Division of Nuclear Physics)

Funding

- DOE SciDAC-4 NUCLEI Collaboration, DE-SC0018083, \$698,000 in FY18-22 (Co-PI)
- NSF, PHY-1713901 , \$600,000 in FY17–20 (Lead PI w/ Morten Hjorth-Jensen)
- DOE Topical Collaboration on Neutrinoless Double Beta Decay, DE-SC0015376, \$201,000 in FY16–20 (Co-PI)
- NSF, PHY-1404159, \$600,000 in FY14–17 (Lead PI w/ Morten Hjorth-Jensen)
- DOE SciDAC-3 NUCLEI Collaboration, DE-SC0008511, \$820,000¹ in FY12-16 (Co-PI)
- NSF, PHY-1068648, \$270,000 in FY11–14 (PI)
- NSF, PHY-0758125, \$234,000 in FY08–11 (PI)
- DOE SciDAC-2 UNEDF Collaboration, DE-FC02-07ER41457, \$500,000 in FY07–11 (Co-PI)

Teaching Experience

NOTE: Semesters that are not listed correspond to teaching relief.

- PHY 480/905, *Computational Physics*, Spring 2019
- PHY 989, *Nuclear Forces*, Fall 2017
- PHY 852, *Quantum Mechanics II*, Spring 2015, 2016
- PHY 851, *Quantum Mechanics I*, Fall 2014, 2015
- PHY 321, *Classical Mechanics*, Spring 2013, 2014
- PHY 481, *Electricity and Magnetism I*, Fall 2010-2012
- PHY 841, *Classical Electrodynamics I*, Spring 2011
- ISP 209, *Mystery of the Physical World*, Spring 2009, 2010
- ISP 209L, *Mystery of the Physical World (Lab)*, Spring 2008, Fall 2008

¹Original award was \$400,000 before Nazarewicz joined the NSCL.

Students and Postdocs

Graduate Students

- **current:** Yani Udiani
- **current (co-advised with M. Hjorth-Jensen):** Jane Kim, Julie Butler, Ben Hall
- **graduated:** Biruk Gebremariam (Ph.D. 2010, currently employed at SAS software), Titus Morris (Ph.D. 2016, currently postdoc at ORNL), Nathan Parzuchowski (Ph.D. 2017, currently postdoc at OSU), Robert Branson (M.S. 2019, currently employed at Honeywell)
- **graduated (co-advised w/M. Hjorth-Jensen):** Fei Yuan (Ph.D. 2018, currently employed at Google), Sam Novario (Ph.D. 2018, currently postdoc at ORNL), Justin Lietz (Ph.D. 2019, currently postdoc at ORNL)

Undergraduate Students

- **(Non-MSU students):** Zach Eldredge (2013 REU, U. of Oklahoma), Brandon Thornton (2016 REU, U. of Arizona), Gray Perez (2018 externally supported, Reed College)
- **(MSU students):** Anthony Tropiano (2016-2017, currently grad student at OSU), Samuel Phiri (2017 Honors Research Seminar), Nathan Engler (2018 Honors Research Seminar), Aaron Kruskie (2018 Honors Research Seminar), Aven Zitzelberger (2019 Honors Research Seminar), Sara Jovanovski (2019 Honors Research Seminar)

Postdocs

- Heiko Hergert (2009-2011, currently Assistant Professor at NSCL/FRIB)
- Sushant Moré (2016-2018, currently employed by Chase Credit)

Departmental Service

- FRIB/NSCL Faculty Search Committee Chair (2017)
- FRIB/NSCL Faculty Affairs Committee (2017–, Chair 2018)
- FRIB Laboratory Advisory Committee (2016–)
- Theoretical Nuclear Science Department Head (2016–)
- Research supervisor for Honors College research seminar (2015–)
- FRIB/NSCL Emergency Action Team (2015–)
- NSCL Graduate Student Lunch Mentor (2013–2016)
- Graduate Student Recruiting Committee (2008–2015)
- NSCL Seminar Committee (2008–2014)
- Nuclear Theory Seminar Organizer (2007–2011, 2014)
- NSCL Faculty Search Committee Member (2010–2011, 2016)
- Ph.D. guidance committee member for 12 students (excluding own group)
 - Boyao Zhu (2019-)
 - Dayah Chrisman (2017-)
 - Daniel Votaw (2017-)
 - Jasper Hill (2017- 2019)
 - Chris Richard (2017-)
 - Dennis Foren (2016-)
 - Yuchen (Maxwell) Cao (2016-)
 - Dillon Frame (2017-2019)
 - Chunli Zhang (2015-2017)

- Thomas Hettinger (2013-2016)
- John Novak (2010-2013)
- Shea Mosby (2010-2011)

Professional Service

Organization of Schools, Conferences, and Workshops

- Lead convener for the nuclear forces and structure topical group at the 2018 Conference on Intersections of Particle and Nuclear Physics (CIPANP18), May 29-June 3, 2018, Indian Wells, CA.
- Nuclear Computational Low-Energy Initiative (NUCLEI) annual collaboration meeting, June 10-13, 2015, East Lansing, MI.
- ICNT program "Theory for open-shell nuclei near the limits of stability", May 11-29, 2015, East Lansing, MI.
- Nuclear TALENT Density Functional Theory school, July 2014, Trento, Italy.
- INT program "Computational and Theoretical Advances for Exotic Nuclei in the Medium-Mass Region", March 2013, Seattle, WA.
- EMMI program "The Extreme Matter Physics of Nuclei: From Universal Properties to Neutron-Rich Nuclei", April 2012, Darmstadt, Germany.

Peer Review

- referee for journals: Ann. Phys., Eur. Phys. J. A, J. Phys. G, Nucl. Phys. A, Phys. Lett. B, Phys. Rev. C, Phys. Rev. Lett., Rev. Mod. Phys.
- referee for grant proposals: NSF, DOE, STFC (UK), PAZY Foundation (Israel)

Outreach

- NSCL/FRIB recruitment booth at the 2018 National Society of Black Physicists meeting, Columbus, OH.
- Lecturer at the 2013 Physics of Atomic Nuclei (PAN) workshop for high school students and science teachers (NSCL, July 2013).
- Lecturer at the 2008 Physics of Atomic Nuclei (PAN) workshop for high school students and science teachers (NSCL, July 2008).

Selected Highlights

- Elected APS Fellow (2018), "*For the development and application of renormalization group methods to low-energy nuclear physics, including the similarity renormalization group and the in-medium similarity renormalization group as a new ab initio method.*"
- Co-PI of SciDAC-3 and SciDAC-4 NUCLEI Collaborations (FY14-22),
- Co-PI of DOE Topical Collaboration on Neutrinoless Double Beta Decay (FY16-20)
- 100% success rate on 4 NSF applications (2 as sole PI, 2 as lead-PI with M. Hjorth-Jensen)
- Developed a novel manybody method (IMSRG) for nuclear structure theory, building on previous work in which my collaborators and I helped introduce modern renormalization group methods to low energy nuclear physics.

- **4 invited review articles:** 1) Microscopic shell model interactions review article in Annual Reviews of Nuclear and Particle Science (2019), 2) IMSRG review article in Physics Reports (2016), 3) review article on low-momentum interactions in Progress in Particle and Nuclear Physics (2010), 4) review article on the $V_{\text{low}k}$ interactions in Physics Reports (2003)
- **invited talks** 30 invited talks at conferences, workshops, and summer schools including i) Three APS/DNP Meetings (2019, 2012, 2008), ii) The 2009 and 2018 Conference on the Intersection of Particle and Nuclear Physics (CIPANP), iii) The 2011 National Nuclear Physics Summer School, iv) The 2014 TALENT school on Density Functional Theory at the ECT*.
- **Service at NSCL/FRIB:** Theoretical Nuclear Science Department Head (2016–), NSCL/FRIB Theory Faculty Search Committee Chair (2017)
- **Service for the Nuclear Science Community:** co-organizer of 3 conferences, 1 summer school and 2 SciDAC/Topical Collaboration collaboration meetings; referee for PRL, PRC, NPA, EPJA, JPG, Ann. Phys., RMP; grant reviewer for DOE, NSF, STFC, Pazy Foundation

Publications

Peer reviewed journals

1. **“Nonempirical Interactions for the Nuclear Shell Model: An Update”**
S. Ragnar Stroberg, Scott K. Bogner, Heiko Hergert, and Jason D. Holt
DOI:10.1146/annurev-nucl-101917-021120
Ann. Rev. Nucl. Part. Sci. **69**, no. 1, (2019).
2. **“Incorporating Brueckner-Hartree-Fock correlations in energy density functionals”**
Y. N. Zhang, S. K. Bogner and R. J. Furnstahl.
arXiv:1807.02916 [nucl-th]
DOI:10.1103/PhysRevC.98.064306
Phys. Rev. C **98**, no. 6, 064306 (2018)
INSPIRE-HEP entry
3. **“Nuclear Structure from the In-Medium Similarity Renormalization Group”**
H. Hergert, J. Yao, T. D. Morris, N. M. Parzuchowski, S. K. Bogner and J. Engel.
arXiv:1805.09221 [nucl-th]
DOI:10.1088/1742-6596/1041/1/012007
J. Phys. Conf. Ser. **1041**, no. 1, 012007 (2018)
INSPIRE-HEP entry
4. **“Microscopically based energy density functionals for nuclei using the density matrix expansion. II. Full optimization and validation”**
R. Navarro Pérez, N. Schunck, A. Dyhdalo, R. J. Furnstahl and S. K. Bogner.
arXiv:1801.08615 [nucl-th]
DOI:10.1103/PhysRevC.97.054304
Phys. Rev. C **97**, no. 5, 054304 (2018)
INSPIRE-HEP entry
5. **“Scale dependence of deuteron electrodisintegration”**
S. N. More, S. K. Bogner and R. J. Furnstahl.
arXiv:1708.03315 [nucl-th]
DOI:10.1103/PhysRevC.96.054004
Phys. Rev. C **96**, no. 5, 054004 (2017)
INSPIRE-HEP entry

6. **“Estimates and power counting in uniform nuclear matter with softened interactions”**
A. Dyhdalo, S. K. Bogner and R. J. Furnstahl.
arXiv:1707.07199 [nucl-th]
DOI:10.1103/PhysRevC.96.054005
Phys. Rev. C **96**, no. 5, 054005 (2017)
INSPIRE-HEP entry
7. **“Addition and removal energies of circular quantum dots”**
F. Yuan, S. J. Novario, N. M. Parzuchowski, S. Reimann, S. K. Bogner and M. Hjorth-Jensen.
arXiv:1707.00229 [physics.chem-ph]
DOI:10.1063/1.4995615
J. Chem. Phys. **147**, 164109 (2017)
INSPIRE-HEP entry
8. **“Ab initio electromagnetic observables with the in-medium similarity renormalization group”**
N. M. Parzuchowski, S. R. Stroberg, P. Navrátil, H. Hergert and S. K. Bogner.
arXiv:1705.05511 [nucl-th]
DOI:10.1103/PhysRevC.96.034324
Phys. Rev. C **96**, no. 3, 034324 (2017)
INSPIRE-HEP entry
9. **“Applying the Density Matrix Expansion with Coordinate-Space Chiral Interactions”**
A. Dyhdalo, S. K. Bogner and R. J. Furnstahl.
arXiv:1611.03849 [nucl-th]
DOI:10.1103/PhysRevC.95.054314
Phys. Rev. C **95**, no. 5, 054314 (2017)
INSPIRE-HEP entry
10. **“Ab Initio Excited States from the In-Medium Similarity Renormalization Group”**
N. M. Parzuchowski, T. D. Morris and S. K. Bogner.
arXiv:1611.00661 [nucl-th]
DOI:10.1103/PhysRevC.95.044304
Phys. Rev. C **95**, no. 4, 044304 (2017)
INSPIRE-HEP entry
11. **“Effective proton-neutron interaction near the drip line from unbound states in $^{25,26}\text{F}$ ”**
M. Vandebrouck *et al.* [R3B Collaboration].
arXiv:1707.07995 [nucl-ex]
DOI:10.1103/PhysRevC.96.054305
Phys. Rev. C **96**, no. 5, 054305 (2017)
INSPIRE-HEP entry
12. **“A nucleus-dependent valence-space approach to nuclear structure”**
S. R. Stroberg, A. Calci, H. Hergert, J. D. Holt, S. K. Bogner, R. Roth and A. Schwenk.
arXiv:1607.03229 [nucl-th]
DOI:10.1103/PhysRevLett.118.032502
Phys. Rev. Lett. **118**, no. 3, 032502 (2017)
INSPIRE-HEP entry
13. **“The In-Medium Similarity Renormalization Group: A Novel Ab Initio Method for Nuclei”**

- H. Hergert, S. K. Bogner, T. D. Morris, A. Schwenk and K. Tsukiyama.
arXiv:1512.06956 [nucl-th]
DOI:10.1016/j.physrep.2015.12.007
Phys. Rept. **621**, 165 (2016)
INSPIRE-HEP entry
14. **“Ground and excited states of doubly open-shell nuclei from ab initio valence-space Hamiltonians”**
S. R. Stroberg, H. Hergert, J. D. Holt, S. K. Bogner and A. Schwenk.
arXiv:1511.02802 [nucl-th]
DOI:10.1103/PhysRevC.93.051301
Phys. Rev. C **93**, no. 5, 051301 (2016)
INSPIRE-HEP entry
15. **“Magnus expansion and in-medium similarity renormalization group”**
T. D. Morris, N. Parzuchowski and S. K. Bogner.
arXiv:1507.06725 [nucl-th]
DOI:10.1103/PhysRevC.92.034331
Phys. Rev. C **92**, no. 3, 034331 (2015)
INSPIRE-HEP entry
16. **“Nuclear structure studies of ^{24}F ”**
L. Caceres *et al.*.
arXiv:1501.01166 [nucl-ex]
DOI:10.1103/PhysRevC.92.014327
Phys. Rev. C **92**, no. 1, 014327 (2015)
GANIL-P-2015-01
INSPIRE-HEP entry
17. **“Ultraviolet extrapolations in finite oscillator bases”**
S. König, S. K. Bogner, R. J. Furnstahl, S. N. More and T. Papenbrock.
arXiv:1409.5997 [nucl-th]
DOI:10.1103/PhysRevC.90.064007
Phys. Rev. C **90**, no. 6, 064007 (2014)
INSPIRE-HEP entry
18. **“Ab initio multireference in-medium similarity renormalization group calculations of even calcium and nickel isotopes”**
H. Hergert, S. K. Bogner, T. D. Morris, S. Binder, A. Calci, J. Langhammer and R. Roth.
arXiv:1408.6555 [nucl-th]
DOI:10.1103/PhysRevC.90.041302
Phys. Rev. C **90**, no. 4, 041302 (2014)
INSPIRE-HEP entry
19. **“Properties of nuclear matter within the JISP16 NN interaction”**
A. M. Shirokov, A. G. Negoita, J. P. Vary, S. K. Bogner, A. I. Mazur, E. A. Mazur and D. Gogny.
arXiv:1406.0529 [nucl-th]
DOI:10.1103/PhysRevC.90.024324
Phys. Rev. C **90**, no. 2, 024324 (2014)
INSPIRE-HEP entry

20. **“Nonperturbative shell-model interactions from the in-medium similarity renormalization group”**
S. K. Bogner, H. Hergert, J. D. Holt, A. Schwenk, S. Binder, A. Calci, J. Langhammer and R. Roth.
arXiv:1402.1407 [nucl-th]
DOI:10.1103/PhysRevLett.113.142501
Phys. Rev. Lett. **113**, 142501 (2014)
INSPIRE-HEP entry
21. **“In-Medium Similarity Renormalization Group with Chiral Two- Plus Three-Nucleon Interactions”**
H. Hergert, S. K. Bogner, S. Binder, A. Calci, J. Langhammer, R. Roth and A. Schwenk.
arXiv:1212.1190 [nucl-th]
DOI:10.1103/PhysRevC.87.034307
Phys. Rev. C **87**, no. 3, 034307 (2013)
INT-PUB-12-062
INSPIRE-HEP entry
22. **“High-momentum tails from low-momentum effective theories”**
S. K. Bogner and D. Roscher.
arXiv:1208.1734 [nucl-th]
DOI:10.1103/PhysRevC.86.064304
Phys. Rev. C **86**, 064304 (2012)
INSPIRE-HEP entry
23. **“In-Medium Similarity Renormalization Group for Open-Shell Nuclei”**
K. Tsukiyama, S. K. Bogner and A. Schwenk.
arXiv:1203.2515 [nucl-th]
DOI:10.1103/PhysRevC.85.061304
Phys. Rev. C **85**, 061304 (2012)
INSPIRE-HEP entry
24. **“Testing the density matrix expansion against ab initio calculations of trapped neutron drops”**
S. K. Bogner, R. J. Furnstahl, H. Hergert, M. Kortelainen, P. Maris, M. Stoitsov and J. P. Vary.
arXiv:1106.3557 [nucl-th]
DOI:10.1103/PhysRevC.84.044306
Phys. Rev. C **84**, 044306 (2011)
INSPIRE-HEP entry
25. **“Improved nuclear matter calculations from chiral low-momentum interactions”**
K. Hebeler, S. K. Bogner, R. J. Furnstahl, A. Nogga and A. Schwenk.
arXiv:1012.3381 [nucl-th]
DOI:10.1103/PhysRevC.83.031301
Phys. Rev. C **83**, 031301 (2011)
INSPIRE-HEP entry
26. **“Microscopically-based energy density functionals for nuclei using the density matrix expansion: Implementation and pre-optimization”**
M. Stoitsov, M. Kortelainen, S. K. Bogner, T. Duguet, R. J. Furnstahl, B. Gebremariam and N. Schunck.
arXiv:1009.3452 [nucl-th]

- DOI:10.1103/PhysRevC.82.054307
Phys. Rev. C **82**, 054307 (2010)
INSPIRE-HEP entry
27. **“Operator Evolution via the Similarity Renormalization Group I: The Deuteron”**
E. R. Anderson, S. K. Bogner, R. J. Furnstahl and R. J. Perry.
arXiv:1008.1569 [nucl-th]
DOI:10.1103/PhysRevC.82.054001
Phys. Rev. C **82**, 054001 (2010)
INSPIRE-HEP entry
28. **“In-Medium Similarity Renormalization Group for Nuclei”**
K. Tsukiyama, S. K. Bogner and A. Schwenk.
arXiv:1006.3639 [nucl-th]
DOI:10.1103/PhysRevLett.106.222502
Phys. Rev. Lett. **106**, 222502 (2011)
INSPIRE-HEP entry
29. **“Symbolic integration of a product of two spherical Bessel functions with an additional exponential and polynomial factor”**
B. Gebremariam, T. Duguet and S. K. Bogner.
arXiv:0910.4993 [physics.comp-ph]
DOI:10.1016/j.cpc.2010.02.006
Comput. Phys. Commun. **181**, 1136 (2010)
INSPIRE-HEP entry
30. **“Microscopically-constrained Fock energy density functionals from chiral effective field theory. I. Two-nucleon interactions”**
B. Gebremariam, S. K. Bogner and T. Duguet.
arXiv:1003.5210 [nucl-th]
DOI:10.1016/j.nuclphysa.2010.12.009
Nucl. Phys. A **851**, 17 (2011)
INSPIRE-HEP entry
31. **“From low-momentum interactions to nuclear structure”**
S. K. Bogner, R. J. Furnstahl and A. Schwenk.
arXiv:0912.3688 [nucl-th]
DOI:10.1016/j.ppnp.2010.03.001
Prog. Part. Nucl. Phys. **65**, 94 (2010)
INSPIRE-HEP entry
32. **“Symbolic computation of the Hartree-Fock energy from a chiral EFT three-nucleon interaction at N²LO”**
B. Gebremariam, S. K. Bogner and T. Duguet.
arXiv:0912.3086 [physics.comp-ph]
DOI:10.1016/j.cpc.2010.02.020
Comput. Phys. Commun. **181**, 1167 (2010)
INSPIRE-HEP entry
33. **“An Improved density matrix expansion for spin-unsaturated nuclei”**
B. Gebremariam, T. Duguet and S. K. Bogner.
arXiv:0910.4979 [nucl-th]

- DOI:10.1103/PhysRevC.82.014305
Phys. Rev. C **82**, 014305 (2010)
INSPIRE-HEP entry
34. **“Nuclear matter from chiral low-momentum interactions”**
S. K. Bogner, R. J. Furnstahl, A. Nogga and A. Schwenk.
arXiv:0903.3366 [nucl-th]
INSPIRE-HEP entry
35. **“Density Matrix Expansion for Low-Momentum Interactions”**
S. K. Bogner, R. J. Furnstahl and L. Platter.
arXiv:0811.4198 [nucl-th]
DOI:10.1140/epja/i2008-10695-1
Eur. Phys. J. A **39**, 219 (2009)
INSPIRE-HEP entry
36. **“Comment on ‘Problems in the derivations of the renormalization group equation for the low momentum nucleon interactions’”**
S. K. Bogner, R. J. Furnstahl and A. Schwenk.
arXiv:0806.1365 [nucl-th]
INSPIRE-HEP entry
37. **“Low-momentum interactions in three- and four-nucleon scattering”**
A. Deluva, A. C. Fonseca and S. K. Bogner.
arXiv:0802.1472 [nucl-th]
DOI:10.1103/PhysRevC.77.024002
Phys. Rev. C **77**, 024002 (2008)
INSPIRE-HEP entry
38. **“Block Diagonalization using SRG Flow Equations”**
E. Anderson, S. K. Bogner, R. J. Furnstahl, E. D. Jurgenson, R. J. Perry and A. Schwenk.
arXiv:0801.1098 [nucl-th]
DOI:10.1103/PhysRevC.77.037001
Phys. Rev. C **77**, 037001 (2008)
INSPIRE-HEP entry
39. **“Decoupling in the Similarity Renormalization Group for Nucleon-Nucleon Forces”**
E. D. Jurgenson, S. K. Bogner, R. J. Furnstahl and R. J. Perry.
arXiv:0711.4252 [nucl-th]
DOI:10.1103/PhysRevC.78.014003
Phys. Rev. C **78**, 014003 (2008)
INSPIRE-HEP entry
40. **“Weinberg eigenvalues and pairing with low-momentum potentials”**
S. Ramanan, S. K. Bogner and R. J. Furnstahl.
arXiv:0709.0534 [nucl-th]
DOI:10.1016/j.nuclphysa.2007.10.005
Nucl. Phys. A **797**, 81 (2007)
INSPIRE-HEP entry
41. **“Convergence in the no-core shell model with low-momentum two-nucleon interactions”**
S. K. Bogner, R. J. Furnstahl, P. Maris, R. J. Perry, A. Schwenk and J. P. Vary.
arXiv:0708.3754 [nucl-th]

- DOI:10.1016/j.nuclphysa.2007.12.008
Nucl. Phys. A **801**, 21 (2008)
INSPIRE-HEP entry
42. **“Three-Body Forces Produced by a Similarity Renormalization Group Transformation in a Simple Model”**
S. K. Bogner, R. J. Furnstahl and R. J. Perry.
arXiv:0708.1602 [nucl-th]
DOI:10.1016/j.aop.2007.09.001
Annals Phys. **323**, 1478 (2008)
INSPIRE-HEP entry
43. **“Are low-energy nuclear observables sensitive to high-energy phase shifts?”**
S. K. Bogner, R. J. Furnstahl, R. J. Perry and A. Schwenk.
nucl-th/0701013
DOI:10.1016/j.physletb.2007.04.048
Phys. Lett. B **649**, 488 (2007)
INSPIRE-HEP entry
44. **“Similarity Renormalization Group for Nucleon-Nucleon Interactions”**
S. K. Bogner, R. J. Furnstahl and R. J. Perry.
nucl-th/0611045
DOI:10.1103/PhysRevC.75.061001
Phys. Rev. C **75**, 061001 (2007)
INSPIRE-HEP entry
45. **“Low-momentum interactions with smooth cutoffs”**
S. K. Bogner, R. J. Furnstahl, S. Ramanan and A. Schwenk.
nucl-th/0609003
DOI:10.1016/j.nuclphysa.2006.11.123
Nucl. Phys. A **784**, 79 (2007)
INSPIRE-HEP entry
46. **“Convergence of the Born series with low-momentum interactions”**
S. K. Bogner, R. J. Furnstahl, S. Ramanan and A. Schwenk.
nucl-th/0602060
DOI:10.1016/j.nuclphysa.2006.05.004
Nucl. Phys. A **773**, 203 (2006)
INSPIRE-HEP entry
47. **“Variational calculations using low-momentum potentials with smooth cutoffs”**
S. K. Bogner and R. J. Furnstahl.
nucl-th/0602017
DOI:10.1016/j.physletb.2006.06.037
Phys. Lett. B **639**, 237 (2006)
INSPIRE-HEP entry
48. **“Variational calculations of nuclei with low-momentum potentials”**
S. K. Bogner and R. J. Furnstahl.
nucl-th/0508022
DOI:10.1016/j.physletb.2005.10.094
Phys. Lett. B **632**, 501 (2006)
INSPIRE-HEP entry

49. **“Low momentum shell model effective interactions with all-order core polarizations”**
J. D. Holt, J. W. Holt, T. T. S. Kuo, G. E. Brown and S. K. Bogner.
nucl-th/0504058
DOI:10.1103/PhysRevC.72.041304
Phys. Rev. C **72**, 041304 (2005)
INSPIRE-HEP entry
50. **“Is nuclear matter perturbative with low-momentum interactions?”**
S. K. Bogner, A. Schwenk, R. J. Furnstahl and A. Nogga.
nucl-th/0504043
DOI:10.1016/j.nuclphysa.2005.08.024
Nucl. Phys. A **763**, 59 (2005)
INSPIRE-HEP entry
51. **“Low-momentum interaction in few-nucleon systems”**
A. Nogga, S. K. Bogner and A. Schwenk.
nucl-th/0405016
DOI:10.1103/PhysRevC.70.061002
Phys. Rev. C **70**, 061002 (2004)
INSPIRE-HEP entry
52. **“Counter terms for low momentum nucleon nucleon interactions”**
J. D. Holt, T. T. S. Kuo, G. E. Brown and S. K. Bogner.
nucl-th/0308036
DOI:10.1016/j.nuclphysa.2003.12.004
Nucl. Phys. A **733**, 153 (2004)
INSPIRE-HEP entry
53. **“Model independent low momentum nucleon interaction from phase shift equivalence”**
S. K. Bogner, T. T. S. Kuo and A. Schwenk.
nucl-th/0305035
DOI:10.1016/j.physrep.2003.07.001
Phys. Rept. **386**, 1 (2003)
INSPIRE-HEP entry
54. **“Nuclear interaction in a renormalization group approach”**
T. T. S. Kuo, S. K. Bogner, L. Coraggio, A. Covello, A. Gargano and N. Itaco.
INSPIRE-HEP entry
55. **“The Nucleon interaction and neutron matter from the renormalization group”**
A. Schwenk, B. Friman, S. K. Bogner, G. E. Brown and T. T. S. Kuo.
nucl-th/0207005
Acta Phys. Slov. **52**, 207 (2002)
INSPIRE-HEP entry
56. **“Renormalization group equation for low momentum effective nuclear interactions”**
S. K. Bogner, A. Schwenk, T. T. S. Kuo and G. E. Brown.
nucl-th/0111042
INSPIRE-HEP entry
57. **“Towards a model independent low momentum nucleon nucleon interaction”**
S. K. Bogner, T. T. S. Kuo, A. Schwenk, D. R. Entem and R. Machleidt.
nucl-th/0108041

DOI:10.1016/j.physletb.2003.10.012
 Phys. Lett. B **576**, 265 (2003)
 INSPIRE-HEP entry

58. **“Equivalence of model space techniques and the renormalization group for a toy two-body problem”**
 S. K. Bogner and T. T. S. Kuo.
 nucl-th/0009077
 DOI:10.1016/S0370-2693(01)00074-0
 Phys. Lett. B **500**, 279 (2001)
 INSPIRE-HEP entry

Books and Book Chapters

1. **“In-Medium Similarity Renormalization Group Approach to the Nuclear Many-Body Problem”**
 H. Hergert, S. K. Bogner, J. G. Lietz, T. D. Morris, S. Novario, N. M. Parzuchowski and F. Yuan.
 arXiv:1612.08315 [nucl-th]
 DOI:10.1007/978-3-319-53336-0_10
 Lect. Notes Phys. **936**, 477 (2017)
 INSPIRE-HEP entry

Conference Proceedings

1. **“The Magnus expansion and the in-medium similarity renormalization group”**
 T. D. Morris and S. K. Bogner.
 DOI:10.1063/1.4899225
 AIP Conf. Proc. **1619**, 117 (2014).
 INSPIRE-HEP entry
2. **“Kirson-Babu-Brown core polarization diagrams and low-momentum shell model effective interactions”**
 T. T. S. Kuo, J. D. Holt, J. W. Holt, G. E. Brown and S. K. Bogner.
 DOI:10.1088/1742-6596/20/1/001
 J. Phys. Conf. Ser. **20**, 1 (2005).
 INSPIRE-HEP entry
3. **“Realistic Low-momentum Nucleon-nucleon Potential”**
 T. T. S. Kuo, S. K. Bogner, L. Coraggio, A. Covello and N. Itaco.
 DOI:10.1142/9789812778383_0012
 INSPIRE-HEP entry

Talks

Conferences and Workshops

NOTE: Invited talks are highlighted in boldface text.

1. **“High-momentum nucleons in low-momentum theories,”**
 Fall Meeting of the Division of Nuclear Physics of the American Physical Society, invited

overview talk for the mini-symposium *Short Range Correlations and Bound Nucleon Structure Across Scales*, Arlington, VA, October 14-17, 2019.

2. **"Microscopically-based energy density functionals from chiral interactions,"**
INT program: *Nuclear Structure at the Crossroads*, Seattle, WA, July 22-27, 2019.
3. **"High-momentum tails in low-momentum theories,"**
2nd MIT Workshop on Quantitative Challenges in EMC and SRC Research, Cambridge, MA, March 20-23, 2019.
4. **" Nuclear Theory in the FRIB Era,"**
2018 Conference of the National Society of Black Physicists, Columbus, OH, November 4-7, 2018.
5. "Short Range Correlations,"
INT program: *Fundamental Physics with Electroweak Probes of Light Nuclei*, Seattle, WA, July 9-13, 2018.
6. **"Microscopic shell model interactions and effective operators,"**
2018 Conference on the Intersections of Particle and Nuclear Physics (CIPANP18), Indian Wells, CA, May 29 - June 3, 2018.
7. "Scale dependence of short-range correlations with the In-medium Similarity Renormalization Group,"
American Physical Society April Meeting, Columbus, OH, April 14-17, 2018.
8. "Effective operators from wave function factorization,"
INT program: *Neutrinoless Double Beta Decay*, Seattle, WA, June 19-23, 2017.
9. **"Scale dependence of high-momentum operators,"**
Low-Energy Nuclear Theory Get-Together workshop, Oak Ridge National Lab, December 5-8, 2016.
10. **"Ab-initio nuclear structure theory,"**
FRIB-China Workshop, East Lansing, MI, May 29, 2015.
11. **"Introduction to the in-medium similarity renormalization group,"**
ESNT workshop *Near-degenerate systems in quantum chemistry and nuclear structure*, Saclay, France, March 30, 2015.
12. **"Recent Developments in the In-medium Similarity Renormalization Group,"**
TRIUMF workshop: *Nuclear Structure and Reactions: Experimental and Theoretical Perspectives*, Vancouver, Canada, February 18-21, 2014.
13. **"In-medium SRG for Nuclei,"**
International Conference of Nuclear Theory in the Supercomputing Era - 2013, Ames, IA, May 17, 2013.
14. **"High-momentum tails from low-momentum theories,"**
Institute for Nuclear Theory workshop: *Structure of light nuclei*, Seattle, WA, Oct. 8, 2012.
15. **"In-medium SRG for Nuclei and High-momentum tails from low-momentum theories,"**
Argonne Theory Institute workshop: *Facing up to contemporary challenges in light nuclei*, Argonne, IL, August 2, 2012.

16. **"Microscopically-based energy density functionals for nuclei,"**
American Physical Society April Meeting: *Bonner Prize Session*, Atlanta, GA, April 1, 2012.
17. **"In-medium Similarity Renormalization Group for Nuclei,"**
Facets of Strong-Interaction Physics: International Workshop on Gross Properties of Nuclei and Nuclear Excitations, Hirschegg, Austria, January 15-21, 2012.
18. **"In-medium SRG for nuclei and nuclear matter,"**
ECT* workshop: *The limits of existence of light nuclei*, Trento, Italy, October 26, 2010.
19. **"Non-empirical energy density functionals,"**
6th ANL/MSU/JINA/INT FRIB Theory Workshop: *Computational Forefront in Nuclear Theory: Preparing for FRIB*, Argonne, IL, March 24, 2010.
20. **"Similarity RG methods for the nuclear many-body problem,"**
ECT* workshop: *Confrontation and Convergence in Nuclear Theory*, Trento, Italy, July 2009.
21. **"Similarity RG and low-momentum nuclear interactions,"**
2009 *Conference on the intersection of Particle and Nuclear Physics*, San Diego, CA, May 2009.
22. **"Energy density functionals from chiral NN and NNN interactions,"**
INT program: *Effective Field Theories and the Many-Body Problem*, University of Washington, Seattle, May 2009.
23. **"Microscopically Based Nuclear Energy Density Functionals,"**
NSCL workshop: *Bulk Nuclear Properties*, Michigan State University, East Lansing, MI, November 2008.
24. **"The Similarity Renormalization Group in Nuclear Physics,"**
Heraeus Foundation Workshop: *Ab-Initio Nuclear Structure - Where Do We Stand?*, Bad Honnef, Germany, July 28 - 30, 2008.
25. **"The Similarity Renormalization Group in Nuclear Physics,"**
University of Oslo Conference: *From Quarks to the Nuclear Many-Body Problem, on the occasion of Eivind Osnes' 70th birthday*, Oslo, Norway, May 23 - 25, 2008.
26. **"Towards a Microscopic Density Functional Theory for Nuclei,"**
American Physical Society Spring Meeting: *Nuclear Few Body Physics, Session II*, St. Louis, MO, April 12, 2008.
27. Contributed talk, *20th European Conference on Few-Body Problems in Physics*, Pisa, Italy, September 2007.
28. **"DFT from low-momentum interactions,"** European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*) workshop: *Experiment-Theory Intersections in Modern Nuclear Structure*, Trento, Italy, April 2007.
29. **"Low-momentum 3N interactions in light nuclei and nuclear matter,"** TRIUMF workshop: *Three-Nucleon Interactions from Few- to Many-Body Systems*, Vancouver, British Columbia, March 2007.
30. **Invited talk**, *2007 Nuclear Dynamics Winter Workshop*, Big Sky, MT, February 2007.
31. **"Low Momentum Effective NN Potentials,"**
2006 *Gordon Research Conference on Photonicuclear Reactions*, Tilton, NH, August 2006.

32. **"Simplifying the Nuclear Many-Body Problem with Low Momentum NN and NNN Interactions,"**
Institute for Nuclear Theory Workshop: *Towards a Universal Density Functional for the Nucleus*, University of Washington, Seattle, WA, September 2005.
33. **"Low-momentum interactions and nuclei,"** ECT* workshop: *Novel approaches to the nuclear many-body problem: From nuclei to stellar matter*, Trento, Italy, September 2004.
34. **"Implications of the low-momentum effective interactions,"** NSCL workshop: *New perspectives on p-shell nuclei - the nuclear shell model and beyond*, Michigan State University, East Lansing, MI, July 2004.
35. **"Renormalization Group Methods and Effective Interactions in Nuclei,"**
Asian Pacific Center for Theoretical Physics Lecture Program: *Effective Field Theoretical Approaches to Nuclear Physics*, Seoul, Korea, February 2002.

Collaboration Meetings

1. "Recent progress with the in-medium similarity renormalization group,"
annual NUCLEI collaboration meeting, Argonne National Lab, IL, June 6-9, 2016.
2. "IM-SRG and microscopic EDF progress report,"
annual NUCLEI collaboration meeting, Indiana University, Bloomington, In, June 24-27, 2013.

Seminars and Colloquia

1. "Ab-initio calculations of medium-mass nuclei from the in-medium similarity renormalization group,"
Nuclear theory seminar speaker, Ohio University, Athens, OH, Sept. 2, 2014.
2. "Putting on Blurry Glasses: Nuclei and Nuclear Matter at Low Resolution,"
Department of Physics and Astronomy Colloquium, Texas AM University-Commerce, Commerce, TX, April 12, 2012.
3. "Putting on Blurry Glasses: Nuclei and Nuclear Matter at Low Resolution,"
Department of Physics and Astronomy Colloquium, Michigan State University, East Lansing, MI, February 16, 2012.
4. "From low momentum interactions to nuclear structure,"
NSCL seminar, East Lansing, MI, January 13, 2010.
5. "In-medium Similarity Renormalization Group for nuclei,"
Theory group seminar, Argonne National Laboratory, Argonne, IL, November 19, 2009.
6. "Towards Non-Empirical Energy Functionals for Nuclei,"
Institute of Nuclear and Particle Physics Seminar, Ohio University, Athens, OH, January 6, 2009.
7. "The In-Medium Similarity Renormalization Group,"
Theory Group seminar, TRIUMF Laboratory, Vancouver, British Columbia, August 19, 2008.
8. "Towards a Microscopic Density Functional Theory for Nuclei,"
Nuclear Theory Group seminar, George Washington University, Washington DC, April 29, 2008.

9. "Towards a Microscopic Density Functional Theory for Nuclei,"
Nuclear Theory Group seminar, University of Maryland, College Park, MD, April 30, 2008.
10. "Building a Microscopic Nuclear Energy Density Functional,"
Research Triangle Nuclear Theory colloquium, Duke University, Durham, North Carolina, November 2007.
11. Nuclear Theory Group seminar, NSCL, Michigan State University, East Lansing, MI, December 2006.
12. "Simplifying Quantum Many-Body Problems with the Renormalization Group,"
Department of Physics Colloquium, University of Notre Dame, South Bend, IN, November 2006.
13. "Simplifying the Nuclear Many-Body Problem with Low Momentum Interactions,"
Nuclear Theory Group seminar, University of Notre Dame, South Bend, IN, October 2006.
14. Nuclear Theory Group seminar, Indiana University, Bloomington, IN, June 2005.
15. "Towards Model Independent and Perturbative Shell Model Effective Interactions,"
Nuclear Theory Group seminar, Argonne National Laboratory, Argonne, IL, March 2004.
16. "Towards Model Independent and Perturbative Shell Model Effective Interactions,"
Nuclear Theory Group (T16) seminar, Los Alamos National Laboratory, Los Alamos, NM, February 2004.
17. Theory Group seminar, TRIUMF Laboratory, Vancouver, British Columbia, January 2004.
18. "Perturbative and Model-Independent Effective Interactions in Nuclei,"
Nuclear Theory Group seminar, SUNY Stony Brook, Stony Brook, NY, July 2003.

Summer School Lectures

1. "Density Functional Theory and Self-Consistent Methods,"
Nuclear TALENT Course on Density Functional Theory, ECT*, Trento, Italy, July 2014.
2. "Similarity Renormalization Group and All That,"
Third UiO-MSU-ORNL-UT School on Topics in Nuclear Physics: The computational quantum many-body problem, Oak Ridge, TN, January 23-27, 2012.
3. "Nuclear Structure Theory,"
National Nuclear Physics Summer School 2011, Chapel Hill, NC, June 27-29, 2011.

Outreach Lectures

1. "Nuclear Theory in the FRIB Era,"
Invited talk at the National Society of Black Physicists annual conference, Columbus, OH, November 5, 2018.
2. "Nuclei from the ground-up,"
Seminar for the Michigan State Society of Physics Students, Michigan State University, East Lansing, MI, April 7, 2014.
3. "Introduction to Nuclear Theory,"
2013 Physics of Atomic Nuclei (PAN) summer camp for high school science teachers, Michigan State University, East Lansing, MI, August 1, 2013.

Last updated: August 15, 2019