

Dean Junyuel Lee

Facility for Rare Isotope Beams
Michigan State University
640 S. Shaw Lane
East Lansing MI 48824-1321

Phone: (517) 908-7282
Fax: (517) 353-5967
Email: leed@frib.msu.edu

Degrees Earned

Harvard University, Ph.D., Theoretical particle physics, 1998

Harvard University, A.B., Summa cum laude in physics, 1992

Professional Experience

Theoretical Nuclear Science Head, Facility for Rare Isotope Beams,
Michigan State University, 2020-present

Professor, Facility for Rare Isotope Beams, Michigan State University, 2017-present

Professor, North Carolina State University, 2012-2017

Associate Professor, North Carolina State University, 2007-2012

Assistant Professor, North Carolina State University, 2001-2007

Postdoctoral Researcher, University of Massachusetts, 1998-2001

Awards, Honors, and Offices Held

Chair Line (Vice Chair, Chair Elect, Chair, Past Chair)

Division of Nuclear Physics

American Physical Society, 2022-present

Network for Neutrinos, Nuclear Astrophysics, and Symmetries (N₃AS)

Advisory Committee, 2021-present

Institute for Nuclear Theory (INT) National Advisory Committee, 2019-2023

Facility for Rare Isotope Beams (FRIB) Theory Alliance Executive Board, 2018-2021

Chair Line (Vice Chair, Chair Elect, Chair, Past Chair)

Topical Group on Few-Body Systems and Multiparticle Dynamics

American Physical Society, 2016-2020

American Physical Society Fellow, 2014

Alumni Distinguished Undergraduate Professor Award, 2012-2013

Outstanding Teaching Award, NC State University, 2006-2007

Fannie and John Hertz Foundation Graduate Fellowship, 1992-1997

Robbins Prize, Harvard University, 1996

Deturs Prize, Gross Scholar, Hoopes Prize, John Harvard Scholarship, Phi Beta Kappa
Harvard University, 1988-1992

Apker Award, National Co-Winner, American Physical Society, 1991

Selected Recent Publications

1. S. Elhatisari, L. Bovermann, E. Epelbaum, D. Frame, F. Hildenbrand, M. Kim, Y. Kim, H. Krebs, T. A. Lähde and D. Lee, *et al.* "Wave function matching for the quantum many-body problem," [arXiv:2210.17488 [nucl-th]].
2. C. Hicks and D. Lee, "Trimmed sampling algorithm for the noisy generalized eigenvalue problem," *Phys. Rev. Res.* **5**, no.2, L022001 (2023) doi:10.1103/PhysRevResearch.5.L022001 [arXiv:2209.02083 [nucl-th]].
3. E. Bonilla, P. Giuliani, K. Godbey and D. Lee, "Training and projecting: A reduced basis method emulator for many-body physics," *Phys. Rev. C* **106**, no.5, 054322 (2022) doi:10.1103/PhysRevC.106.054322 [arXiv:2203.05284 [nucl-th]].
4. S. Shen, S. Elhatisari, T. A. Lähde, D. Lee, B. N. Lu and U. G. Meißner, "Emergent geometry and duality in the carbon nucleus," *Nature Commun.* **14**, no.1, 2777 (2023) doi:10.1038/s41467-023-38391-y [arXiv:2202.13596 [nucl-th]].
5. A. Boehnlein, M. Diefenthaler, N. Sato, M. Schram, V. Ziegler, C. Fanelli, M. Hjorth-Jensen, T. Horn, M. P. Kuchera and D. Lee, *et al.* "Colloquium: Machine learning in nuclear physics," *Rev. Mod. Phys.* **94**, no.3, 031003 (2022) doi:10.1103/RevModPhys.94.031003 [arXiv:2112.02309 [nucl-th]].
6. B. N. Lu, N. Li, S. Elhatisari, Y. Z. Ma, D. Lee and U. G. Meißner, "Perturbative Quantum Monte Carlo Method for Nuclear Physics," *Phys. Rev. Lett.* **128**, no.24, 242501 (2022) doi:10.1103/PhysRevLett.128.242501 [arXiv:2111.14191 [nucl-th]].
7. S. Elhatisari, T. A. Lähde, D. Lee, U. G. Meißner and T. Vonk, "Alpha-alpha scattering in the Multiverse," *JHEP* **02**, 001 (2022) [arXiv:2112.09409 [hep-th]].
8. B. N. Lu, N. Li, S. Elhatisari, Y. Z. Ma, D. Lee and U. G. Meißner, "Perturbative Quantum Monte Carlo Method for Nuclear Physics," *Phys. Rev. Lett.* **128**, no.24, 242501 (2022) [arXiv:2111.14191 [nucl-th]].
9. D. Lee, "Chiral Effective Field Theory after Thirty Years: Nuclear Lattice Simulations," *Few Body Syst.* **62**, no.4, 115 (2021) [arXiv:2109.09582 [nucl-th]].
10. E. A. Coello Pérez, J. Bonitati, D. Lee, S. Quaglioni and K. A. Wendt, "Quantum state preparation by adiabatic evolution with custom gates," *Phys. Rev. A* **105**, no.3, 032403 (2022) [arXiv:2111.12207 [quant-ph]].
11. A. Sarkar and D. Lee, "Self-learning Emulators and Eigenvector Continuation," *Phys. Rev. Research* **4**, 023214 (2022) [arXiv:2107.13449 [nucl-th]].
12. Y. H. Song, Y. Kim, N. Li, B. N. Lu, R. He and D. Lee, "Quantum many-body calculations using body-centered cubic lattices," *Phys. Rev. C* **104**, no.4, 044304 (2021) [arXiv:2107.03626 [cond-mat.quant-gas]].
13. S. Shen, T. A. Lähde, D. Lee and U. G. Meißner, "Wigner SU(4) symmetry, clustering, and the spectrum of ^{12}C ," *Eur. Phys. J. A* **57**, no.9, 276 (2021) [arXiv:2106.04834 [nucl-th]].

14. N. Summerfield, B. N. Lu, C. Plumberg, D. Lee, J. Noronha-Hostler and A. Timmins, “ ^{16}O ^{16}O collisions at energies available at the BNL Relativistic Heavy Ion Collider and at the CERN Large Hadron Collider comparing α clustering versus substructure,” *Phys. Rev. C* **104**, no.4, L041901 (2021) [arXiv:2103.03345 [nucl-th]].
15. D. Lee, S. Bogner, B. A. Brown, S. Elhatisari, E. Epelbaum, H. Hergert, M. Hjorth-Jensen, H. Krebs, N. Li and B. N. Lu, *et al.* “Hidden Spin-Isospin Exchange Symmetry,” *Phys. Rev. Lett.* **127**, no.6, 062501 (2021) [arXiv:2010.09420 [nucl-th]].
16. K. Choi, D. Lee, J. Bonitati, Z. Qian and J. Watkins, “Rodeo Algorithm for Quantum Computing,” *Phys. Rev. Lett.* **127**, no.4, 040505 (2021) [arXiv:2009.04092 [quant-ph]].
17. Y. Kanada-En’yo and D. Lee, “Effective interactions between nuclear clusters,” *Phys. Rev. C* **103**, no.2, 024318 (2021) [arXiv:2008.01867 [nucl-th]].
18. D. Frame, T. A. Lähde, D. Lee and U. G. Meißner, “Impurity Lattice Monte Carlo for Hypernuclei,” *Eur. Phys. J. A* **56**, no.10, 248 (2020), [arXiv:2007.06335 [nucl-th]].
19. D. Lee, U. G. Meißner, K. A. Olive, M. Shifman and T. Vonk, “ θ -dependence of light nuclei and nucleosynthesis,” *Phys. Rev. Res.* **2**, no.3, 033392 (2020) [arXiv:2006.12321 [hep-ph]].
20. P. Bedaque, A. Boehnlein, M. Cromaz, M. Diefenthaler, L. Elouadrhiri, T. Horn, M. Kuchera, D. Lawrence, D. Lee and S. Lidia, *et al.* *Eur. Phys. J. A* **57**, no.3, 100 (2021)
21. D. Lee, “Recent Progress in Nuclear Lattice Simulations,” *Front. in Phys.* **8**, 174 (2020)
22. A. Sarkar and D. Lee, “Convergence of Eigenvector Continuation,” *Phys. Rev. Lett.* **126**, no.3, 032501 (2021) [arXiv:2004.07651 [nucl-th]].
23. B. N. Lu, N. Li, S. Elhatisari, D. Lee, J. E. Drut, T. A. Lähde, E. Epelbaum and U. G. Meißner, “*Ab Initio* Nuclear Thermodynamics,” *Phys. Rev. Lett.* **125**, no.19, 192502 (2020) [arXiv:1912.05105 [nucl-th]].
24. S. König, A. Ekström, K. Hebeler, D. Lee and A. Schwenk, “Eigenvector Continuation as an Efficient and Accurate Emulator for Uncertainty Quantification,” *Phys. Lett. B* **810**, 135814 (2020) [arXiv:1909.08446 [nucl-th]].
25. C. W. Johnson, K. D. Launey, N. Auerbach, S. Bacca, B. R. Barrett, C. R. Brune, M. A. Caprio, P. Descouvemont, W. H. Dickhoff and C. Elster, *et al.* “White paper: from bound states to the continuum,” *J. Phys. G* **47**, no.12, 123001 (2020) [arXiv:1912.00451 [nucl-th]].
26. D. Lee, J. Bonitati, G. Given, C. Hicks, N. Li, B. N. Lu, A. Rai, A. Sarkar and J. Watkins, “Projected Cooling Algorithm for Quantum Computation,” *Phys. Lett. B* **807**, 135536 (2020) [arXiv:1910.07708 [quant-ph]].
27. R. He, N. Li, B. N. Lu and D. Lee, “Superfluid Condensate Fraction and Pairing Wave Function of the Unitary Fermi Gas,” *Phys. Rev. A* **101**, 063615 (2020) [arXiv:1910.01257 [cond-mat.quant-gas]].
28. D. Lee, “Recent Progress in Nuclear Lattice Simulations,” *Front. Phys.* **8**, 174 (2020).
29. P. Demol, T. Duguet, A. Ekström, M. Frosini, K. Hebeler, S. König, D. Lee, A. Schwenk, V. Somá, A. Tichai, “Improved many-body expansions from eigenvector continuation,” *Phys. Rev. C* **101**, 041302(R) (2020) [arXiv:1911.12578 [nucl-th]].
30. L. Bovermann, E. Epelbaum, H. Krebs and D. Lee, “Scattering phase shifts and mixing angles for an arbitrary number of coupled channels on the lattice,” *Phys. Rev. C* **100**, no. 6, 064001 (2019) [arXiv:1905.02492 [nucl-th]].

31. B.-N. Lu, N. Li, S. Elhatisari, D. Lee, E. Epelbaum and U.-G. Meißner, Phys. Lett. B **797**, 134863 (2019) [arXiv:1812.10928 [nucl-th]].
32. N. Li, S. Elhatisari, E. Epelbaum, D. Lee, B. Lu and U.-G. Meißner, “Galilean invariance restoration on the lattice,” Phys. Rev. C **99**, no. 6, 064001 (2019) [arXiv:1902.01295 [nucl-th]].
33. D. Lee, J. Watkins, D. Frame, G. Given, R. He, N. Li, B. N. Lu and A. Sarkar, “Time fractals and discrete scale invariance with trapped ions,” Phys. Rev. A **100**, no. 1, 011403(R) (2019) [arXiv:1901.01661 [cond-mat.quant-gas]].
34. N. Klein, D. Lee and U.-G. Meißner, “Lattice Improvement in Lattice Effective Field Theory,” Eur. Phys. J. A **54**, no. 12, 233 (2018) [arXiv:1807.04234 [hep-lat]].
35. N. Li, S. Elhatisari, E. Epelbaum, D. Lee, B. N. Lu and U.-G. Meißner, “Neutron-proton scattering with lattice chiral effective field theory at next-to-next-to-next-to-leading order,” Phys. Rev. C **98**, no. 4, 044002 (2018) [arXiv:1806.07994 [nucl-th]].
36. M. Freer, H. Horiuchi, Y. Kanada-En’yo, D. Lee and U.-G. Meißner, “Microscopic Clustering in Light Nuclei,” Rev. Mod. Phys. **90**, no. 3, 035004 (2018) [arXiv:1705.06192 [nucl-th]].
37. N. Klein, S. Elhatisari, T. A. Lähde, D. Lee and U. G. Meißner, “The Tjon Band in Nuclear Lattice Effective Field Theory,” Eur. Phys. J. A **54**, no. 7, 121 (2018) [arXiv:1803.04231 [nucl-th]].
38. D. Frame, R. He, I. Ipsen, D. Lee, D. Lee and E. Rrapaj, “Eigenvector continuation with subspace learning,” Phys. Rev. Lett. **121**, 032501 (2018) [arXiv:1711.07090 [nucl-th]].
39. S. Elhatisari *et al.*, “Ab initio Calculations of the Isotopic Dependence of Nuclear Clustering,” Phys. Rev. Lett. **119**, no. 22, 222505 (2017) [arXiv:1702.05177 [nucl-th]].
40. J. M. Alarcón *et al.*, “Neutron-proton scattering at next-to-next-to-leading order in Nuclear Lattice Effective Field Theory,” Eur. Phys. J. A **53**, no. 5, 83 (2017) [arXiv:1702.05319 [nucl-th]].
41. S. König and D. Lee, “Volume Dependence of N-Body Bound States,” Phys. Lett. B **779**, 9 (2018) [arXiv:1701.00279 [hep-lat]].
42. A. Rokash, E. Epelbaum, H. Krebs and D. Lee, “Effective forces between quantum bound states,” Phys. Rev. Lett. **118** 232502 (2017) [arXiv:1612.08004 [nucl-th]].
43. S. Elhatisari, K. Katterjohn, D. Lee, U.-G. Meißner and G. Rupak, Phys. Lett. B **768**, 337 (2017) [arXiv:1610.09095 [nucl-th]].
44. D. Lee, “Lattice methods and the nuclear few- and many-body problem,” Lect. Notes Phys. **936**, 237 (2017) [arXiv:1609.00421 [nucl-th]].
45. S. Elhatisari, D. Lee, U.-G. Meißner and G. Rupak, “Nucleon-deuteron scattering using the adiabatic projection method,” Eur. Phys. J. A **52**, no. 6, 174 (2016) [arXiv:1603.02333 [nucl-th]].
46. S. Elhatisari *et al.*, “Nuclear binding near a quantum phase transition,” Phys. Rev. Lett. **117**, no. 13, 132501 (2016) [arXiv:1602.04539 [nucl-th]].