Kenneth M. Nollett
Curriculum Vitae

Contact

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Education

THE UNIVERSITY OF CHICAGO
Ph.D., Department of Physics, 2000

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
S.B. in Physics, Concentration in German Language, 1995

Research Interests

Theoretical nuclear astrophysics, nucleosynthesis, presolar grains and extinct radioactivities in meteorites, nuclear reactions, few-body nuclear physics, cosmic rays, cosmology

Positions

2015–2025 Associate Professor, Department of Physics, San Diego State University

2015–2022 Assistant Professor, Department of Physics, San Diego State University

2014–2015 Adjunct Professor, Department of Physics, San Diego State University

2014–2015 Research Assistant Professor, Department of Physics and Astronomy, University of South Carolina

2012–2014 Visiting Assistant Professor, Department of Physics and Astronomy, Ohio University

2008–2012 Physicist, Physics Division, Argonne National Laboratory

2003–2008 Assistant Physicist, Physics Division, Argonne National Laboratory

2002–2003 Postdoctoral Research Associate, Institute for Nuclear Theory, University of Washington. Supervised by Wick Haxton.

2000–2002 Postdoctoral Scholar in Physics, California Institute of Technology. Supervised by G. J. Wasserburg, Marc Kamionkowski.

1996–2000 Research Assistant, The University of Chicago.
Supervised by David Schramm, Michael Turner.

1997–2000 Guest/Lab Graduate Student, Argonne National Laboratory, Physics Division. Supervised by R. B. Wiringa.

Significant Publications

(comprehensive list starts on next page)

Top 6 Career Publications

(Total citation counts from the ADS Database, as of July 30, 2025.)

E. G. Adelberger *et al.* (38 authors), "Solar fusion cross sections II: The pp chain and CNO cycles," *Rev. Mod. Phys.* **83**, 195 (2011). 683 citations.

Scott Burles, Kenneth M. Nollett, and Michael S. Turner, "Big-bang nucleosynthesis predictions for precision cosmology," *Astrophys. J. Lett.* **552**, L1 (2001). 482 citations.

Kenneth M. Nollett, M. Busso, and G. J. Wasserburg, "Cool bottom Processes on the Thermally-pulsing AGB and the Isotopic Composition of Circumstellar Dust Grains," *Astrophys. J.* **582**, 1036 (2003). 250 citations.

Scott Burles, Kenneth M. Nollett, James W. Truran, and Michael S. Turner, "Sharpening the predictions of big-bang nucleosynthesis," *Phys. Rev. Lett.*, **82**, 4176 (1999). 248 citations.

G. J. Wasserburg, M. Busso, R. Gallino, and K. M. Nollett, "Short-lived radioactivities in the early solar system: possible AGB sources," *Nucl. Phys. A* **777**, 5 (2006). 221 citations.

Kenneth M. Nollett, Steven C. Pieper, R. B. Wiringa, J. Carlson, and G. M. Hale, "Quantum Monte Carlo calculations of neutron-alpha scattering," *Phys. Rev. Lett.* **99**, 022502 (2007). 202 citations.

Selected Publications by Category

Cosmology

Scott Burles, Kenneth M. Nollett, and Michael S. Turner, "Big-bang nucleosynthesis predictions for precision cosmology," *Astrophys. J. Lett.* **552**, L1 (2001).

Presents analytic fits to the predictions of big-bang nucleosynthesis (BBN) theory, with error bars, as functions of the universal mean baryon density and examines consequences of observational constraints on BBN.

Stellar Nucleosynthesis & Presolar Grains

Kenneth M. Nollett, M. Busso, and G. J. Wasserburg, "Cool bottom Processes on the Thermally-pulsing AGB and the Isotopic Composition of Circumstellar Dust Grains," *Astrophys. J.* **582**, 1036 (2003).

Presents a full exploration of the consequences of "extra" mixing inside asymptotic giant branch stars across a wide range of the available parameter space and examines consequences of the model for the compositions of presolar grains recovered from meteorites; this work showed that "Group 2" oxide grains are products of extra mixing.

Scattering & Reactions of Light Nuclei

Kenneth M. Nollett, Steven C. Pieper, R. B. Wiringa, J. Carlson, and G. M. Hale, "Quantum Monte Carlo calculations of neutron-alpha scattering," *Phys. Rev. Lett.* **99**, 022502 (2007).

Reports the first-ever exact, *ab initio*, calculation of scattering in a system of more than four nucleons; this is a crucial step toward calculations of astrophysical reaction cross sections from first principles using quantum Monte Carlo methods.

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "Halo effective field theory constrains the solar $^7\mathrm{Be} + p \to {}^8\mathrm{B} + \gamma$ rate," *Phys. Lett. B* **751**, 535 (2015).

Presents a halo effective field theory at next-to-leading order of a crucial nuclear reaction in solar neutrino production, and applies it to obtain a precise extrapolation of laboratory data to conditions in the Sun.

Rapid-Review Publications

Scott Burles, Kenneth M. Nollett, James W. Truran, and Michael S. Turner, "Sharpening the predictions of big-bang nucleosynthesis," *Phys. Rev. Lett.*, **82**, 4176 (1999).

Scott Burles, Kenneth M. Nollett, and Michael S. Turner, "Big-bang nucleosynthesis predictions for precision cosmology," *Astrophys. J. Lett.* **552**, L1 (2001).

S. Peng Oh, Kenneth M. Nollett, Piero Madau, and G. J. Wasserburg, "Did massive stars pre-enrich and reionize the universe?" *Astrophys. J. Lett.* **562**, L1 (2001).

Kenneth M. Nollett, Steven C. Pieper, R. B. Wiringa, J. Carlson, and G. M. Hale, "Quantum Monte Carlo calculations of neutron-alpha scattering," *Phys. Rev. Lett.* **99**, 022502 (2007).

Kenneth M. Nollett and R. B. Wiringa, "Asymptotic normalization coefficients from *ab initio* calculations," *Phys. Rev. C* **83**, 041001(R) (2011).

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "Combining *ab initio* calculations and low-energy effective field theory for halo nuclear systems: The case of $^7\mathrm{Be} + p \to {}^8\mathrm{B} + \gamma$," *Phys. Rev. C* **89**, 051602(R) (2014).

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "Halo effective field theory constrains the solar $^7\mathrm{Be} + p \to {}^8\mathrm{B} + \gamma$ rate," *Phys. Lett. B* **751**, 535 (2015).

Invited Refereed Publications

G. J. Wasserburg, M. Busso, R. Gallino, and K. M. Nollett, "Short-lived radioactivities in the early solar system: possible AGB sources," *Nucl. Phys. A* **777**, 5 (2006).

L. E. Marcucci, Kenneth M. Nollett, R. B. Wiringa, and R. Schiavilla, "Modern theories of low-energy nuclear reactions," *Nucl. Phys. A* **777**, 111 (2006).

Other Refereed Publications

Kenneth M. Nollett, Martin Lemoine, and David N. Schramm, "Nuclear Reaction Rates and Primordial ^{6}Li," *Phys. Rev. C* **56**, 1144 (1997).

Kenneth M. Nollett and Scott Burles, "Estimating reaction rates and uncertainties for primordial nucleosynthesis," *PhysRev. D* **61**, 123505 (2000).

Kenneth M. Nollett, R. B. Wiringa, and R. Schiavilla, "Six-body calculation of the alpha-deuteron radiative capture cross section," *Phys. Rev. C* **63**, 024003 (2001).

Scott Burles, Kenneth M. Nollett, and Michael S. Turner, "What is the BBN prediction for the baryon density and how reliable is it?" *Phys. Rev. D* **63**, 063512 (2001).

Kenneth M. Nollett, "Radiative alpha-capture cross sections from realistic nucleon-nucleon interactions and variational Monte Carlo wave functions," *Phys. Rev. C* **63**, 054002 (2001). Based on thesis work.

Kenneth M. Nollett and Robert E. Lopez, "Primordial nucleosynthesis with a varying fine structure constant: An improved estimate," *Phys. Rev. D* **66**, 063507 (2002).

Kenneth M. Nollett, M. Busso, and G. J. Wasserburg, "Cool Bottom Processes on the Thermally-pulsing AGB and the Isotopic Composition of Circumstellar Dust Grains," *Astrophys. J.* **582**, 1036 (2003).

Wick C. Haxton, Kenneth M. Nollett, and Kathryn M. Zurek, "The Piecewise Moments Method: A Generalized Lanczos Technique for Nuclear Response Surfaces," *Phys. Rev. C* **72**, 065501 (2005).

M. Busso, G. J. Wasserburg, Kenneth M. Nollett, and A. Calandra, "Can extra mixing in RGB and AGB stars be attributed to magnetic mechanisms?" *Astrophys. J.* **671**, 802 (2007).

Gilbert P. Holder, Kenneth M. Nollett, and Alexander van Engelen "On Possible Variation in the Cosmological Baryon Fraction," *Astrophys. J.* **716**, 907 (2010).

E. G. Adelberger *et al.* (38 authors), "Solar fusion cross sections II: The pp chain and CNO cycles," *Rev. Mod. Phys.* **83**, 195 (2011).
In this comprehensive re-analysis of nuclear properties for solar-neutrino studies, I made major contributions to the sections on the reactions $^3\mathrm{He}(\alpha,\gamma)^7\mathrm{Be}$ and $^7\mathrm{Be}(p,\gamma)^8\mathrm{B}$.

Kenneth M. Nollett, "*Ab initio* calculations of nuclear widths via an integral relation," *Phys. Rev. C* **86**, 044330 (2012).

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "Combining *ab initio* calculations and low-energy effective field theory for halo nuclear systems: The case of $^7\mathrm{Li} + n \rightarrow {}^8\mathrm{Li} + \gamma$," *Phys. Rev. C* **89**, 024613 (2014).

Kenneth M. Nollett and Gary Steigman, "BBN and the CMB constrain light, electromagnetically coupled WIMPs," *Phys. Rev. D* **89**, 083508 (2014).

Kenneth M. Nollett and Gary Steigman, "BBN and the CMB constrain neutrino coupled light WIMPs," *Phys. Rev. D* **91**, 083505 (2015).

Ryan J. Cooke, Max Pettini, Kenneth M. Nollett, and Regina Jorgenson, "The primordial deuterium abundance of the most metal-poor damped Lyman-α system," *Astrophys. J.* **830**, 148 (2016).

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "Models, measurements, and effective field theory: Proton capture on ^{7}Be at next-to-leading order," *Phys. Rev. C* **98**, 034616 (2018).

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips, "S-factor and scattering-parameter extractions from $^3\mathrm{He} + {}^4\mathrm{He} \rightarrow {}^7\mathrm{Be} + \gamma$," *J. Phys. G*, **47**, 054002 (2020).

Abraham R. Flores and Kenneth M. Nollett, "Variational Monte Carlo Calculations of $n+{}^3$H Scattering," *Phys. Rev. C* **108**, 034001 (2023).

Abraham R. Flores, Kenneth M. Nollett and Maria Piarulli, "Variational Monte Carlo Calculations of neutron-alpha scattering via an integral relation," *Phys. Rev. C* **112**, 014008 (2025).

arXiv

Kenneth M. Nollett and Gilbert P. Holder, "An analysis of constraints on relativistic species from primordial nucleosynthesis and the cosmic microwave background," arXiv:1112.2683 [astro-ph.CO] (2011).

J. D. Bowman *et al.* (27 authors), "Determination of the free neutron lifetime," arXiv:1410.5311 (White paper submitted to the 2014 NSAC Long Range Plan town meeting on fundamental symmetries).

B. Acharya *et al.* (50 authors), "Solar fusion III: New data and theory for hydrogen-burning stars," accepted at Reviews of Modern Physics, arXiv:2405.06470 [astro-ph.SR] (2024) (Co-convener of the working group on the $^3\mathrm{He}(^3\mathrm{He}, 2p)^4\mathrm{He}$ and $^3\mathrm{He}(\alpha,\gamma)^7\mathrm{Be}$ reactions for this comprehensive review of nuclear-physics inputs to solar models).

Calvin W. Johnson, Bui Minh Loc, Austin Keller, and Kenneth M. Nollett, "Scattering phase shifts from overlap relations in the J-matrix method ," arXiv:2412.08825 [nucl-th] (2025).

Popular-Level Article

Kenneth Nollett, "Testing the elements of the Big Bang," *Physics World* Vol. 20, No. 8, p. 20 (August 2007).

Book Edited

Opportunities with Exotic Beams: Proceedings of the Third ANL/MSU/JINA/INT RIA Workshop, eds. T. Duguet, H. Esbensen, K. M. Nollett, and C. D. Roberts. (World Scientific: Singapore 2007) ISBN 978-9812705679 (Primary responsibility for collecting latex contributions and assembling them for handoff to the publisher.)

Summer-School Lectures

14th Euro Summer School on Exotic Beams, Lecturer on topic "*Ab initio* calculations of light nuclei." Four lectures of three hours total, Houlgate, France, August 26–31, 2007

Invited Conference Talks

Radiative captures in astrophysics and nucleosynthesis, LOWq Workshop on Electromagnetic Nuclear Reactions at Low Momentum Transfer, Halifax, NS, Canada, August 2001

Time-varying constants, the nucleon mass difference, and big-bang nucleosynthesis, Invited session on charge symmetry breaking, American Physical Society April Meeting, Philadelphia, PA, April 2003

How fast, realistically: ab initio calculations of low-energy astrophysical reaction rates, Invited session on recent developments in computational nuclear physics, American Physical Society April Meeting, Denver, CO, May 2004

Venturing into the continuum with quantum Monte Carlo, 2005 Gordon Research Conference on Nuclear Chemistry, New London, NH, July 2005

Quantum Monte Carlo: Not Just for Energy Levels Anymore, Third Argonne/MSU/INT/JINA RIA Theory Workshop, Argonne National Laboratory, April 2006

Quantum Monte Carlo studies of bound and unbound states, 7th International Conference on Radioactive Nuclear Beams, Cortina d'Ampezzo, Italy, July 2006

Quantum Monte Carlo studies of bound and unbound nuclear states, Nuclear Structure '06: Conference on Nuclei at the Limits, Oak Ridge, TN, July 2006

Reactions, scattering, ab initio nuclear theory, and astrophysics, Workshop on Nucleons and Nuclei, Washington, DC, October 2006

Scattering and reactions in ab initio nuclear theory, Pre-meeting workshop: "Exotic Nuclei: From the Laboratory to the Cosmos," American Physical Society Division of Nuclear Physics Fall Meeting, Nashville, TN, October 2006

Combining structure, reactions, NN potentials, and astrophysics through ab initio nuclear theory, Town meeting for the NSAC (Nuclear Science Advisory Committee) long-range plan, Chicago, IL, January 2007

Quantum Monte Carlo, continuum states, and the three-nucleon interaction, Workshop on Three-Nucleon Interactions from Few- to Many-Body Systems, TRIUMF, Vancouver, BC, Canada, March 2007

What's the matter with lithium? Invited session on nucleosynthesis of the lightest nuclei, American Physical Society April Meeting, Jacksonville, FL, April 2007

Recent insights into light nuclei from quantum Monte Carlo, 2007 Gordon Research Conference on Nuclear Chemistry, New London, NH, June 2007

Nuclear quantum Monte Carlo: Expanding into the continuum, 20th European Conference on Few-Body Problems in Physics, Pisa, Italy, September 2007

Soft photons and light nuclei: astrophysical implications, Workshop on Soft Photons and Light Nuclei, Institute for Nuclear Theory, Seattle, WA, June 2008

Quantum Monte Carlo methods, Workshop on Continuum Coupling Close to the Drip Lines, CEA Saclay, Gif-sur-Yvette, France, May 2009

The outer limits of quantum Monte Carlo calculations, Sixth Argonne/MSU/INT/JINA FRIB Theory Workshop: Computational Forefront in Nuclear Theory, Argonne National Laboratory, March 2010

Scattering, reactions, and related quantities in nuclear quantum Monte Carlo, Workshop on Finite-Volume Effects in Few-Body Systems, Institute for Nuclear Theory, Seattle, WA, April 2010

Quantum Monte Carlo description of atomic nuclei, Nuclear Structure Seen Through Ground-State Properties of Exotic Nuclei, European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT*), Trento, Italy, October 2011

Asymptotic normalization constants, widths, and overlaps from integral relations, "key talk" at The Extreme Matter Physics of Nuclei: From Universal Properties to Neutron-Rich Extremes, ExtreMe Matter Institute, GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany, April 2012

What did the light nuclides know and when did they know it? overview talk at
The 4$^{\text{th}}$ Neutrino Workshop, Kavli Institute for Cosmological Physics, University of Chicago, May 2012

Ab initio nuclear widths, virtual and real, workshop on Facing up to contemporary challenges in light nuclei, Argonne National Laboratory, August 2012

Astrophysics and reactions of light nuclei, and some quantum Monte Carlo, workshop on Electroweak Properties of Light Nuclei, Institute for Nuclear Theory, Seattle, November 2012

Astrophysics/cosmology and the neutron lifetime, Measuring the Neutron Lifetime workshop, Amherst Center for Fundamental Interactions, Amherst, Massachusetts, September 2014

An overview of ab initio scattering, reactions, and operators circa 2014, Time-reversal Tests in Nuclear and Hadronic Processes workshop, Amherst Center for Fundamental Interactions, Amherst, Massachusetts, November 2014

Quantum Monte Carlo calculations of reaction and scattering processes, Reactions and Structure of Exotic Nuclei, Institute for Nuclear Theory, Seattle, March 2015

Linking ab initio models, phenomenology, and data, 2016 R-Matrix Workshop on Methods and Applications, Santa Fe, NM, June 2016

Quantum Monte Carlo calculations of continuum properties, Ab Initio Nuclear Structure and Electroweak Response: Current Status and Future Prospects, Thomas Jefferson National Accelerator Facility, Newport News, VA, August 2017

Prospects for Quantum Monte Carlo calculations of hadronic parity nonconservation in light-nucleus reactions, N3AS Workshop on Hadronic Parity Nonconservation, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, March 2018

Improving Astrophysical Nuclear Rates with New Many-Body and Fewer-Body Reaction Models, 13$^{\text{th}}$ Conference on the Intersections of Particle and Nuclear Physics (CIPANP), Indian Wells, CA, May 2018

Understanding astrophysical direct capture reactions through halo EFT and vice versa, Program on Fundamental Physics with Electroweak Probes of Light Nuclei, Institute for Nuclear Theory, Seattle, June 2018

Some Quantum Monte Carlo calculations of continuum properties in light nuclei, Program on Advances in Monte Carlo Techniques for Many-Body Quantum Systems, Institute for Nuclear Theory, Seattle, August 2018

Some quantum Monte Carlo approaches to scattering and reactions, First Nuclear and Particle Theory Meeting at Washington University, Saint Louis, March 2019

Seminars & Colloquia

Few-body nuclear physics in the big bang, T-5 (Medium-Energy Theory) Group Seminar, Los Alamos National Laboratory, December 1999

Few-body nuclear physics in the big bang, TRIUMF Seminar, Vancouver, BC, Canada, January 2000

Nuclear structure and alpha captures on light nuclei, Kellogg Radiation Laboratory Seminar, California Institute of Technology, April 2001

Mixing in giant stars and its signatures in stellar spectra and presolar grains, Nuclear Theory Seminar, Argonne National Laboratory, September 2001

Mixing in giant stars and its signatures in stellar spectra and presolar grains, T-16 (Nuclear Theory) Group Seminar, Los Alamos National Laboratory, January 2002

Mixing in giant stars and its signatures in stellar spectra and presolar grains, Physics Division Seminar, Argonne National Laboratory, February 2002

Mixing in giant stars and its signatures in stellar spectra and presolar grains, Nuclear Physics Seminar, Ohio University, Athens, OH, March 2002

Nuclear structure and alpha captures on light nuclei, Nuclear Science Seminar, Michigan State University, September 2002

Primordial nucleosynthesis with a time-varying fine-structure constant, TRIUMF Theory Seminar, Vancouver, BC, Canada, May 2003

Variational Monte Carlo calculations of $A = 6$ and 7 radiative capture cross sections, Institute for Nuclear Theory Seminar, University of Washington, October 2003

Astrophysical Reaction Rates from Realistic Nuclear Forces and Currents, Physics Division Seminar, Argonne National Laboratory, May 2004

Big bang nucleosynthesis, with and (mostly) without weird stuff, Astrophysics at Argonne Lunch Seminar, June 2004

Harnessing recent advances in nuclear physics for astrophysics, JINA Seminar, The University of Chicago, November 2004

Scattering, reactions and astrophysics with modern nuclear interactions, Astrophysics Seminar, University of Notre Dame, February 2005, *and* Nuclear Science Seminar, Michigan State University, February 2005

Nuclear Physics in the pp Chain, r-Process, and x-Process, Physics Division Colloquium, Argonne National Laboratory, May 2006

The cosmological context of nuclear astrophysics, Astrophysics at Argonne Lunch Seminar, February 2007

Scattering, reactions, and astrophysics with modern nuclear interactions, Astrophysical Institute and Institute for Nuclear and Particle Physics Seminar, Ohio University, Athens, OH, May 2007

The puzzle of the nitrogen isotopic composition of presolar grains (delivered half-and-half with A. Karakas of Mt. Stromlo Observatory), JINA Seminar, The University of Chicago, September 2007

What are carbon, nitrogen, and oxygen isotopes in stardust trying to tell us? Space Sciences Seminar, Washington University, St. Louis, MO, December 2007

What do presolar grains tell us about what's happening inside low-mass stars? Astrophysics Seminar, McGill University, Montreal, Canada, February 2008

Some puzzles in the origins of carbon, nitrogen, and oxygen, Physics Division Colloquium, Argonne National Laboratory, March 2008

Pin the Tail on the Wave Function, Heavy-Ion Discussion Group, Argonne National Laboratory, May 2008

A potpourri of lithium problems, Kavli Institute for Cosmological Physics Lunch Seminar, University of Chicago, January 2009

Fusion cross sections in the Sun, Astrophysics at Argonne Lunch Seminar, Argonne National Laboratory, May 2009

The puzzling behavior of lithium in stellar surface layers, High Energy Physics Division Lunch Seminar, Argonne National Laboratory, January 2010

Nucleosynthesis, galaxy clusters, the microwave background, and the initial baryon distribution, Astrophysics at Argonne Lunch Seminar, Argonne National Laboratory, July 2010

Nuclear widths, virtual and real?, Physics Division Seminar, Argonne National Laboratory, May 2011

Ab initio nuclear widths, virtual and real, Institute for Nuclear Theory Seminar, University of Washington, August 2011

Ab initio nuclear widths, virtual and real, Cyclotron Colloquium, Texas A&M University Cyclotron Institute, College Station, TX, September 2011

Predicting real and virtual nuclear widths, Nuclear Science Seminar, Michigan State University, East Lansing, MI, October 2011

Light nuclei, the universe, and everything, Physics Colloquium, Racah Institute, Hebrew University, Jerusalem, Israel, November 2011

Big bang nucleosynthesis: Its role in cosmology and its problem with lithium, Micro-Workshop on Astrophysics at Phase I of SARAF, Soreq Nuclear Research Center, Yavne, Israel, November 2011

Light nuclei, the universe, and everything: New insights from big-bang nucleosynthesis, Physics Division Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, February 2012

Ab initio nuclear widths, virtual and real, Physics Division Seminar, Oak Ridge National Laboratory, Oak Ridge, TN, February 2012

Computing nuclei and reaction rates from scratch, Physics and Astronomy Colloquium, University of Alabama, Tuscaloosa, AL, March 2012

Light nuclei, the universe, and everything: New insights from big-bang nucleosynthesis, Physics and Astronomy Seminar, Ohio University, Athens, OH, April 2012

Light Nuclei, the Universe, and Everything: New insights from big-bang nucleosynthesis, TRIUMF Theory Seminar, Vancouver, BC, Canada, May 2012

Predicting real and virtual nuclear widths, Institute for Nuclear and Particle Physics Seminar, Ohio University Athens, OH, September 2012

Predicting real and virtual nuclear widths, T-2 (Nuclear and Particle Physics, Astrophysics and Cosmology) Group Seminar, Los Alamos National Laboratory, October 2012

Few-body physics in the first few minutes: Physics of light nuclei in the big bang, Cosmology Lunchtime Seminar, University of Minnesota, January 2013

Few-body physics in the first few minutes: Physics of light nuclei in the big bang, Nuclear Physics Seminar, Indiana University, March 2013

Looking out for the little guy: Light nuclei in the computer and the cosmos, Physics Department Colloquium, Western Michigan University, March 2013

Few-body physics in the first few minutes: Physics of light nuclei in the big bang, Astroparticle Lunch, The Ohio State University, March 2013

The Needs of the Few: Astrophysical challenges in the physics of light nuclei, Triangle Nuclear Theory Colloquium, North Carolina State University, May 2013

Looking out for the little guy: Light nuclei in the computer and the cosmos, Physics Department and Astronomy Department Colloquium, San Diego State University, January 2014

The first few minutes of few-body physics, Physics and Astronomy Department Colloquium, University of South Carolina, September 2014

Speeding things up and slowing them down in the big bang, Physics Colloquium, University of Tennessee, January 2015

Light nuclei, the Universe, and everything, Physics and Astronomy Colloquium, California State University, Long Beach, September 2015

The new era of percent-level nuclear rates for astrophysics, Center for Astrophysics and Space Sciences Astrophysics Seminar, University of California, San Diego, November 2015

Speeding things up and slowing them down in the big bang, Physics and Astronomy Colloquium, California State University, Los Angeles, February 2016

Probing fundamental particles, the big bang, and the Sun with the physics of light nuclei, Physics Department and Astronomy Department Colloquium, San Diego State University, September 2016

Nuclear collisions from the ground up, Physics Department and Astronomy Department Colloquium, San Diego State University, September 2017

Probing the universe and its laws with collisions of light nuclei, Physics Seminar, Point Loma Nazarene University, March 2019

Contributed Conference Talks

Where are the major uncertainties in big bang nucleosynthesis? Second Workshop on Frontiers of Nuclear Astrophysics, East Lansing, MI, July 1999

Cool Bottom Processes in Low Mass Stars and ^{26}*Al Production,* Eleventh Annual V. M. Goldschmidt Conference (Geochemistry), Hot Springs, VA, May 2001 (with M. Busso and G. J. Wasserburg)

Cool Bottom Processing on the AGB and Presolar Grain Compositions, 33rd Lunar and Planetary Science Conference, Houston, TX, March 2002 (with M. Busso and G. J. Wasserburg)

Spectroscopic Factors and Particle Widths in Light Nuclei, APS Division of Nuclear Physics Fall Meeting, Chicago, IL, October 2004 (with J. P. Schiffer, K. E. Rehm, and A. H. Wuosmaa)

Quantum Monte Carlo as a tool for astrophysics, Frontiers 2005 Workshop (Nuclear Astrophysics), East Lansing, MI, August 2005

Toward ab initio calculations of astrophysical reaction rates, Tenth International Symposium on Nuclei in the Cosmos, Mackinac Island, MI, July 2008

Asymptotic normalizations and related quantities from quantum Monte Carlo wave functions, APS Division of Nuclear Physics Fall Meeting, Santa Fe, NM, November 2010

Widths of nuclear states from ab initio calculations, APS Division of Nuclear Physics Fall Meeting, East Lansing, MI, October 2011

Ab initio widths and asymptotic normalizations, Nuclear Structure 2012, Argonne National Laboratory, August 2012

Constraining light WIMPs and neutrinos with BBN and the CMB, APS April Meeting, Savannah, GA, April 2014 (with Gary Steigman)

Cosmological neutrino counting, light WIMPs, and nuclear physics, 4th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, Waikoloa, HI, October 2014 (with Gary Steigman)

Amplitudes and overlaps in ab initio calculations of light nuclei, APS Division of Nuclear Physics Fall Meeting, Vancouver, BC, October 2016

Direct capture potential models in light of halo EFT, and vice versa, APS April Meeting, Columbus, OH, April 2018

Nuclear data as laboratory astrophysics, Low-Energy Nuclear Physics Community Meeting, Durham, NC, August 2019

Quantum Monte Carlo calculation of scattering in $A = 4$ and $A = 5$ systems, APS Division of Nuclear Physics Fall Meeting, Arlington, VA, October 2019

Evaluating astrophysical nuclear rates and their errors with halo effective field theory, 236$^{\text{th}}$ Meeting of the American Astronomical Society, Held online, June 2020

First-principles asymptotic normalizations of nuclear wave functions and their application to reaction rates, 238$^{\text{th}}$ Meeting of the American Astronomical Society, Held online, June 2021 https://aas238-aas.ipostersessions.com/Default.aspx?s=aas_238_gallery

Ab initio asymptotic normalizations of ^{7}Be and ^{7}Li states, (Satish Chandran co-author) APS Division of Nuclear Physics Fall Meeting, New Orleans, LA, October 2022

Scattering and direct reactions in a shell model framework, 2023 Stewardship Science Academic Programs Symposium, Santa Fe, NM, February 2023

Using integral relations to improve ab initio structure and reaction calculations for light nuclei, 6th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan, Waikoloa, HI, November 2023 (with Abraham R. Flores, Satish Chandran, and Arik Mahbub)

Applying integral relations to improve ab initio structure and reaction calculations for light nuclei, APS April Meeting, Sacramento, CA, April 2024 (with Abraham R. Flores, Satish Chandran, and Arik Mahbub)

Light nuclei from the inside out, APS Division of Nuclear Physics Fall Meeting, Boston, MA, October 2024 (with Abraham R. Flores, Satish Chandran, and Arik Mahbub)

Other Abstracts & Proceedings

(Posters, or presented by one of the other authors)

K. M. Nollett and S. Burles, "Improved use of Inputs to Primordial Nucleosynthesis," *The Light Elements and their Evolution,* Proceedings of the IAU Symposium 198 (2000), p. 120

M Busso, K. M. Nollett, and G. J. Wasserburg, "Implications of cool bottom processes in thermally pulsing phases of AGB stars," *Proceedings of the 11th Workshop on Nuclear Astrophysics* (Ringberg Castle, 2002), p. 18

L. R. Nittler, P. Hoppe, C. M. O'D. Alexander, M. Busso, R. Gallino, K. K. Marhas and K. Nollett, "Magnesium Isotopes in Presolar Spinel," *Lunar Planet. Sci. Conf.* **34**, 1703 (2003)

J. Carlson and Kenneth M. Nollett, "Microscopic Approaches to Light-Nucleus Reactions," *International Conference on Nuclear Data for Science and Technology,* AIP Conference Proceedings **769**, 1289 (2005)

Muslema Pervin, R. B. Wiringa, Steven C. Pieper, and Kenneth M. Nollett, "Ab Initio calculations of Electroweak Matrix Elements," *Bull. Am. Phys. Soc.* **51**, 20 (2006)

S. Palmerini, K. Nollett, and M. Busso, "Magnetically-driven Cool Bottom Processing," PoS (NIC X) 074 (2008)

R. B. Wiringa, Kenneth M. Nollett, Steven C. Pieper, and I. Brida, "Quantum Monte Carlo Calculations of Nucleon-Nucleus Scattering," *Bull. Am. Phys. Soc.* **54**, 85 (2009)

Xilin Zhang, Kenneth M. Nollett, and Daniel R. Phillips "Marrying ab initio calculations and Halo-EFT: the case of $^7\mathrm{Li} + n \rightarrow {}^8\mathrm{Li} + \gamma$," *Bull. Am. Phys. Soc.* **58**, Abstract BAPS.2013.OSS.E1.8 (2013)

Xilin Zhang, Kenneth Nollett, and Daniel Phillips "Marrying *ab initio* calculations and Halo-EFT: ^{7}Li and ^{7}Be radiative nucleon captures," *Bull. Am. Phys. Soc.* **58**, Abstract BAPS.2013.DNP.HF.00008 (2013)

Gary Steigman and Kenneth M. Nollett, "Light WIMPs, Equivalent Neutrinos, BBN, and the CMB," Les Rencontres de l'Observatoire 2013 ESO Workshop "Metal Production and Distribution in a Hierarchical Universe," *Mem. S. A. It.* **85**, 175 (2014) [arXiv:1401.5488].

Gary Steigman and Kenneth M. Nollett, "Light WIMPs And Equivalent Neutrinos," 13th International Conference on Topics in Astroparticle and Underground Physics (TAUP), Wick C. Haxton and Frank Avignone, Eds., *Physics Procedia* **61**, 179 (2015) [arXiv:1402.5399].

Xilin Zhang, Kenneth M. Nollett, and D. R. Phillips "How well do we understand $^7\mathrm{Be} + p \rightarrow {}^8\mathrm{B} + \gamma$? An Effective Field Theory perspective," 21st International Conference on Few-Body Problems in Physics, *Eur. Phys. J. Web of Conferences*, **113**, 06001 (2016) [arXiv:1508.06935].

Xilin Zhang, Kenneth M. Nollett, and Daniel R. Phillips "S-factor and scattering parameters from $^3\mathrm{He} + {}^4\mathrm{He} \rightarrow {}^7\mathrm{Be} + \gamma$ data," In: N. Orr, M. F. Ploszajczak, J. Carbonell J. (eds), Recent Progress in Few-Body Physics. FB22 2018. Springer Proceedings in Physics, vol. 238 [arXiv:1811.07611].

Abraham R. Flores and Kenneth M. Nollett "Variational Monte Carlo calculation of $n + {}^3\mathrm{H}$ scattering," APS Division of Nuclear Physics Fall Meeting, New Orleans, LA, October 2022 [abstract PH.00001].

Professional Activities

Referee for:
Astroparticle Physics, Astrophysical Journal, Astrophysics and Space Science, Atomic Data and Nuclear Data Tables, European Physical Journal A & C, Europhysics Letters, International Journal of Modern Physics E, Journal of Cosmology and Astroparticle Physics, Journal of High Energy Physics, Journal of Physics G, Nuclear Physics A, Physical Review A, C & D, Physical Review Letters, Physics Letters B

Co-organizer, Second Argonne/MSU/JINA/INT RIA Workshop: "Reaction Mechanisms for Rare Isotope Beams," East Lansing, Michigan, March 9–12, 2005

Co-organizer, Third Argonne/MSU/JINA/INT RIA Workshop, Argonne National Laboratory, April 4–7, 2006

Co-organizer, "Astrophysics at Argonne" lunch seminar series
Primary responsibility for organizing monthly seminars with a strong pedagogical aspect in an area in which Argonne was expanding, April 2004 to May 2012

Co-organizer, Mainz Institute of Theoritical Physics workshop on "Uncertainties in calculations of nuclear reactions of astrophysical interest," planned as an in-person meeting but held online due to Covid-19, December 7–11, 2020.

Executive Committee Member, American Physical Society Topical Group on Few-Body Physics, three-year term, 2016–2019

Governing Committee Member-at-Large, American Astronomical Society Laboratory Astrophysics Division, three-year term, 2018–2021

Nominating Committee, American Astronomical Society Laboratory Astrophysics Division, 2021

Classroom Teaching

San Diego State University, Department of Physics, Principal instructor
PHYS 604, Electromagnetic Theory (graduate electromagnetism), Fall 2015–2024
PHYS 410, Quantum Mechanics (upper division undergraduate), Fall 2017–2022, 2024
PHYS 360, Thermal Physics (upper division undergraduate), Spring 2016–2025
PHYS 197, Principles of Physics (3rd semester calculus-based physics), Spring 2017–2024
PHYS 195, Principles of Physics (1st semester calculus-based physics), Spring 2025

Ohio University, Department of Physics and Astronomy, Lecturer & Lab Instructor
Physics 2001, Introduction to Physics (Physics with algebra), Fall 2012 & 2013
Physics 2052, General Physics (calculus-based), Spring 2013
Astronomy 1000, Survey of Astronomy, Spring 2013 & 2014

Student Supervision

California Institute of Technology
Summer Undergraduate Research Fellowship Program
Mentor, Summer 2002

Argonne National Laboratory
Undergraduate summer programs
Summer Research Aide supervisor, Summer 2006
Student Research Participation Program supervisor, Summer 2007
(The difference in these two titles reflects only the citizenship of the students.)
DOE Summer Undergraduate Laboratory Internships Program mentor, Summer 2008

University of Chicago undergraduate thesis mentor, 2007-2008 Academic Year
Supervised undergraduate honors thesis of Brent Graner (2007 summer student at Argonne. Official advisor at the University was Prof. Zheng-Tian Lu, who held a joint appointment.)

SDSU undergraduate thesis supervisor
2016-2017 Academic Year, Garrett Gallear
Spring-Fall 2018, Carlos Marquez
2019-2020 Academic Year, Kiley Mayford
2021-2022 Academic Year, Nicholas Kinzel
2022-2023 Academic Year, Esteban Canizales

SDSU M.S. thesis supervisor
2022 Satish Chandran
2023 Arik Mahbub

SDSU Ph.D. supervisor
2023 Abraham Flores, SDSU/UC Irvine Joint Doctoral Program in Computational Science

Cal-Bridge Program
CSU Mentor
Intensive mentoring for SDSU undergraduate students participating in an NSF-funded program to increase the number of students from underrepresented groups who complete bachelor's degrees and enter Ph.D. programs. Students so far have entered graduate studies at UC Santa Cruz (2020), the University of Nevada Las Vegas (2022), and the University of Colorado Boulder (2023). Currently mentoring a fourth student starting from Fall 2023.

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"Quantum Monte Carlo and Fewer-Body Approaches to Scattering, Reactions, and Related Properties of Nuclei"
Principle Investigator
$153,000 from September 1, 2018 to November 30, 2021
$150,000 from December 1, 2021 to August 31, 2024

U.S. Department of Energy, National Nuclear Security Agency, Stewardship Science Academic Alliances, Contract No. DE-NA0004075
"Scattering and direct reactions in a shell model framework
Principle Investigator
$450,000 from September 1, 2022 to August 31, 2025