Mark Wayne Paris

Theoretical Division
Los Alamos National Laboratory
MS B283
Los Alamos, New Mexico 87545

T (505) 665-0455
F (505) 667-1931
mparis@lanl.gov
http://public.lanl.gov/mparis

Education

Ph.D. Physics, University of Illinois at Urbana-Champaign (UIUC), September 2000
Dissertation: *Quantum Monte Carlo Calculations of Three- and Six-Quark States*
Adviser: Vijay R. Pandharipande
M.S. Physics, UIUC, 1994
B.A. Physics with High Honors, Rutgers, The State University of New Jersey, 1992

Honors

Most Valued Reviewer 2011, *Physics Letters B* (J.-P. Blaizot, Ed.)
Visiting Scholar, Institute for Nuclear Theory, University of Washington, 11/2009
GAANN Fellowship, Department of Physics, UIUC, 1996
Sigma Pi Sigma, since 1991

Funding

PI, *Modern Structure-based Nuclear Data Evaluations for Basic Science, Nuclear Safety & Security*
US Department of Energy Office of Science; FY2023–FY2025
PI, *Quantum Effects on Cosmological Observables: Probing Physics Beyond the Standard Model*
Laboratory Directed Research & Development – Exploratory Research #20170430ER; FY2017–FY2019
PI, *Quantum Effects on cosmological Observables as a Probe of BSM & Nuclear Physics*
LANL Center for Space and Earth Sciences Student & PostDoc Fellowship program; FY2017–FY2019
PI, *Quantum Effects on Cosmology: Probing Physics Beyond the Standard Model with Big Bang Nucleosynthesis*
LANL HPC Institutional Computing allocation; *Ongoing since 2017*

Experience

01/2012 – Present:	Staff Member Theoretical Division, Los Alamos National Laboratory
06/2010 – 12/2011:	Assistant Research Professor, Center for Nuclear Studies, Department of Physics, George Washington University
08/2008 – 05/2010:	Research Scientist, Center for Nuclear Studies, Department of Physics, George Washington University
11/2006 – 08/2008:	Research Scientist, Excited Baryon Analysis Center, Theory Group, Jefferson Laboratory
11/2003 – 11/2006:	Postdoctoral Fellow, Theory Group, Jefferson Laboratory
10/2001 – 10/2003:	Postdoctoral Research Assistant, Theoretical Division, Los Alamos National Laboratory
07/2001 – 10/2001:	Postdoctoral Research Assistant, University of Basel
01/2001 – 07/2001:	Postdoctoral Research Assistant, UIUC

Research Interests

Computational physics; Numerical methods; Nuclear data; Transport theory; Equation of state; Nuclear reactions; R-matrix theory; Fission dynamics; Quantum Monte Carlo methods; Quantum field theory; Plasma effects on nuclear reactions; Nuclear astrophysics; Cosmology; Big Bang nucleosynthesis

Professional Activities

Guest Associate Editor, *Frontiers in Physics*; Derivative classifier; Chair *LDRD-ER Nuclear & Particle, Astrophysics & Cosmology Review Panel, 2018-19*; Consultant *IAEA-International Nuclear Data Evaluation Network* Member *Cross Section Evaluation Working Group, National Nuclear Data Center*; Member *Nuclear Energy Agency, WPEC Subgroups 38, 48, 50*

Selected Publications

[1] H.Y. Lee, S. Kuvin, B. DiGiovine, G. Hale, S. Mosby, M. Paris, D. Votaw, M. White, and L. Zavorka. "New measurements of double differential cross sections on the $^{16}O(n,\alpha)$ reaction at LANSCE". In: (2022). Submitted to Phys. Rev. C.

[2] Pablo Ducru et al. "Scattering matrix pole expansions for complex wave numbers in *R*-matrix theory". In: *Phys. Rev. C* 103 (6 June 2021), p. 064609. DOI: 10.1103/PhysRevC.103.064609.

[3] Pablo Ducru et al. "Shadow poles in the alternative parametrization of *R*-matrix theory". In: *Phys. Rev. C* 103 (6 June 2021), p. 064608. DOI: 10.1103/PhysRevC.103.064608.

[4] Evan B. Grohs et al. "Big Bang Nucleosynthesis and Neutrino Cosmology". In: *National Academy of Science: Astro2020 Decadal Survey* (Apr. 2019). arXiv: 1903.09187.

[5] Carl R. Brune, Gerald M. Hale, and Mark W. Paris. "Monotonic properties of the shift and penetration factors". In: *Phys. Rev. C* 97.2 (2018), p. 024603. DOI: 10.1103/PhysRevC.97.024603.

[6] A. D. Carlson et al. "Evaluation of the Neutron Data Standards". In: *Nucl. Data Sheets* 148 (2018). [Erratum: Nucl.Data Sheets 163, 280–281 (2020)], pp. 143–188. DOI: 10.1016/j.nds.2018.02.002.

[7] M. B. Chadwick et al. "CIELO Collaboration Summary Results: International Evaluations of Neutron Reactions on Uranium, Plutonium, Iron, Oxygen and Hydrogen". In: *Nucl. Data Sheets* 148 (2018), pp. 189–213. DOI: 10.1016/j.nds.2018.02.003.

[8] V. Cirigliano, Mark Paris, and S. Shalgar. "Collective neutrino oscillations with the halo effect in single-angle approximation". In: *JCAP* 11 (2018), p. 019. DOI: 10.1088/1475-7516/2018/11/019.

[9] V. Cirigliano, Mark W. Paris, and S. Shalgar. "Effect of collisions on neutrino flavor inhomogeneity in a dense neutrino gas". In: *Phys. Lett. B* 774 (2017), pp. 258–267. DOI: 10.1016/j.physletb.2017.09.039.

[10] E. Grohs et al. "Lepton asymmetry, neutrino spectral distortions, and big bang nucleosynthesis". In: *Phys. Rev. D* 95.6 (2017), p. 063503. DOI: 10.1103/PhysRevD.95.063503. arXiv: 1612.01986 [astro-ph.CO].

[11] Mark Paris et al. "Constraining nuclear data via cosmological observations: Neutrino energy transport and big bang nucleosynthesis". In: *EPJ Web Conf.* 146 (2017), p. 01008. DOI: 10.1051/epjconf/201714601008.

[12] A. B. Zylstra et al. "Proton Spectra from ^{3}He+T and ^{3}He+^{3}He Fusion at Low Center-of-Mass Energy, with Potential Implications for Solar Fusion Cross Sections". In: *Phys. Rev. Lett.* 119.22 (2017), p. 222701. DOI: 10.1103/PhysRevLett.119.222701.

[13] E. Grohs et al. "Neutrino energy transport in weak decoupling and big bang nucleosynthesis". In: *Phys. Rev. D* 93.8 (2016), p. 083522. DOI: 10.1103/PhysRevD.93.083522. arXiv: 1512.02205 [astro-ph.CO].

[14] Lucas Johns et al. "Neutrino flavor transformation in the lepton-asymmetric universe". In: *Phys. Rev. D* 94.8 (2016), p. 083505. DOI: 10.1103/PhysRevD.94.083505. arXiv: 1608.01336 [hep-ph].

[15] M. Paris et al. "R-matrix analysis of reactions in the ^{9}B compound system applied to the ^{7}Li problem in BBN". In: *J. Phys. Conf. Ser.* 665.1 (2016), p. 012006. DOI: 10.1088/1742-6596/665/1/012006.

[16] Mark W. Paris and Gerald M. Hale. "Spectra for the A = 6 reactions calculated from a three-body resonance model". In: *EPJ Web Conf.* 122 (2016). Ed. by M. W. Paris et al., p. 08002. DOI: 10.1051/epjconf/201612208002.

[17] A. B. Zylstra et al. "Using Inertial Fusion Implosions to Measure the T+^{3}He Fusion Cross Section at Nucleosynthesis-Relevant Energies". In: *Phys. Rev. Lett.* 117.3 (2016), p. 035002. DOI: 10.1103/PhysRevLett.117.035002.

[18] C. R. Brune et al. "R-matrix description of particle energy spectra produced by low-energy ^{3}H+^{3}H reactions". In: *Phys. Rev. C* 92.1 (2015), p. 014003. DOI: 10.1103/PhysRevC.92.014003.

[19] E. Grohs et al. "Probing neutrino physics with a self-consistent treatment of the weak decoupling, nucleosynthesis, and photon decoupling epochs". In: *JCAP* 05 (2015), p. 017. DOI: 10.1088/1475-7516/2015/05/017.

[20] G. M. Hale and M. W. Paris. "Data Covariances from R-Matrix Analyses of Light Nuclei". In: *Nucl. Data Sheets* 123 (2015), pp. 165–170. DOI: 10.1016/j.nds.2014.12.029.

[21] Gerald M. Hale, Lowell S. Brown, and Mark W. Paris. "Effective field theory as a limit of R-matrix theory for light nuclear reactions". In: *Phys. Rev. C* 89.1 (2014), p. 014623. DOI: 10.1103/PhysRevC.89.014623. eprint: 1308.0348.

[22] Mark Alford et al. "Hybrid stars that masquerade as neutron stars". In: *Astrophys. J.* 629 (2005), pp. 969–978. DOI: 10.1086/430902.

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