

Kristina D. Launey

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aka: Kristina D. Sviratcheva; **STATUS:** US Citizen

SUMMARY OF QUALIFICATIONS:

PhD in Physics, with 18-year research level experience and concurrent 12-year teaching experience; MS in Computer Science and in Nuclear Physics.

PROFESSIONAL EXPERIENCE:

Research

08/2016-Present: Assistant Professor, Louisiana State University.

06/2014-08/2016: Research Assistant Professor, LSU.

01/2012-06/2014: Research Associate, LSU.

01/2007-12/2011: Senior Postdoctoral Researcher, LSU.

01/2004-01/2007: Postdoctoral researcher, LSU.

01/1999-12/2003: Research Assistant, LSU.

Teaching

Fall 2016: Physics 2113 (General Physics for Technical Students), LSU.

Fall 2009-2015: Physics 2411 (Computational Science I for Physics Majors), LSU.

Fall 2010, 2012, 2014: Physics 7373 (Nuclear Physics for Graduate Students, “Microscopic Nuclear Models”), Guest Lecturer, LSU.

Spring 2008: Physics 1209 (General Physics Laboratory for Physics Majors), LSU

2005-2007: Recitations, Physics 2002, LSU.

Spring 2004: Physics 2102 (General Physics for Technical Students), LSU.

01/1999-12/2003: Teaching Assistant at LSU.

EDUCATION:

Louisiana State University	Physics	PhD 2003
Louisiana State University	Systems/Computer Science	MS 2003
Sofia University	Nuclear Physics	MS 1998
National High School of Mathematics and Nature Science	School of Physics	1993

- *PhD in Physics* at **Louisiana State University** (11/2003), Baton Rouge, LA; dissertation title: “*Group Theoretical Approach to Pairing and Non-Linear Phenomena in Atomic Nuclei*”; supervisor: Professor Jerry P. Draayer;
- *MS in Systems Science* at **Louisiana State University** (05/2003), Baton Rouge, LA; project title “*Algebraic and Numerical Computations for Fermion Realization of $sp(4)$* ”; supervisor: Professor Jerry P. Draayer;
 - GPA 4.0/4.0.
- *MS in Nuclear Physics* at **Sofia University**, Sofia, Bulgaria (06/1998); M.S. thesis title “*Two-dimensional model of the nuclear collective motion of a q -deformed $SU(3)$ dynamical symmetry*”; supervisor: Dr. Ana I. Georgieva;
 - Graduated in top first with a GPA of 3.9/4.0.
- *School of Physics* at **National High School of Mathematics and Nature Science** (5/93), Sofia, Bulgaria;

- Graduated in top first with a GPA of 4.0/4.0.

RESEARCH ACTIVITIES:

STUDENTS MENTORED:

(total: 1 high-school student, 16 undergraduates, 4 PhD students)

Alison Dreyfuss (PhD student, 08/2012-Present; LSU REU Program/Keene State College, 2011)

Grigor Sargsyan (PhD student, 08/2015-Present; B.S. Thesis, Yerevan State U., Spring 2014)

Harvey Shows (undergraduate, LSU, 08/2015-present)

Logan Woolsey (undergraduate, LSU, Phys 4398, Spring 2015-present)

Sean Laughlin (undergraduate, LSU, Computational project, 01/2016-present)

Kadi Runnels (Baton Rouge Magnet High School, 08/2015-3/2016)

Madeleine Miora (LSU REU Program/ Rollins College, Summer 2015)

Jonathan Curole (undergraduate, LSU, Phys 4399, Spring 2015)

Brian Harvie (LSU REU Program/University of Massachusetts, Summer 2014)

David Kekejian (undergraduate, Yerevan State U., Nuclear theory project, 2014)

Anthony Risolio (LSU REU Program/St. John's College, Summer 2013)

Austin Jenkins (undergraduate, LSU, Computational project, 01/2013-12/2014)

Mia Ferris (undergraduate, LSU, Phys 4399 & Honors Thesis, 08/2012-05/2013)

Gegory Tobin (undergraduate, LSU, Nuclear theory project, 06/2012-06/2013)

Xin Guan (PhD student, exchange program with Liaoning Normal U., 01-06/2012)

Sumit Sarbadhicary (undergraduate, LSU, Computational project, Fall 2011)

Eric O'Quinn (undergraduate, LSU, Phys 4399, Spring 2011)

Duoshikun Li (undergraduate, LSU, STEM, 2011)

Victor Popa (PhD student, LSU, Nuclear theory project, 2009/2010)

POSTDOCS MENTORED:

Neelam Upadhyay (2013-2014)

Nikola Nikolov (2012-2013)

THESIS ADVISEE:

- Mia Ferris, Undergraduate Honors Thesis – “Application of the No-Core Symplectic Shell Model to Beryllium and Carbon Isotopes”, April 2013
- Grigor Sargsyan, B.S. Thesis, Yerevan State University – “Description of light and intermediate-mass nuclei from first principles”, May 2014

GRANTS, CONTRACTS, AND AWARDS:

- 2015 - 2017 NSF – ACI-1516338: \$89,976 (Total Award: \$129,912); “Collaborative Research: Innovative *ab initio* symmetry-adapted no-core shell model for advancing fundamental physics and astrophysics”; PI: Draayer (PD), Launey, Dytrych (LSU)/Vary (ISU)/Catalyurek (OSU)/Sosonkina (ODU)
- 08/2015 INT program proposal (accepted), “*Towards predictive theories of nuclear reactions across the isotopic chart*”, Spring 2017, organizers: J.E. Escher, Ch. Elster, K.D. Launey, and D. Lee
- 01/2015 Travel award (CUSTIPEN China-U.S. Theory Institute for Physics with Exotic Nuclei & Liaoning Normal University) – visit to Liaoning Normal University and Nankai University, China

- 01/2015 Contract with World Scientific Publishing Co., review book, “*Emergent phenomena in Atomic Nuclei from Large-scale Modeling: a Symmetry-guided Perspective*”, editor (to appear 2016)
- 2009 - 2014 NSF – OCI-0904874: \$481,292 (Total Award: \$1,398,413); PetaApps Collaboration; “Collaborative Research: Taming the scale explosion in ab initio nuclear structure calculations”; PI: Draayer (PD), Launey, Dytrych (LSU)/Vary, Sosonkina (ISU)/Catalyurek (OSU)

OTHER PROPOSALS:

- 2010 - 2013 DOE/DOE-EPSCoR – DE-SC0005248: \$450,000; “*Ab Initio Nuclear Structure and Reaction Calculations for Rare Isotopes*”; PI: Draayer (LSU)/Hayes (LANL);

COMPUTATIONAL SUPPORT: 6M+ node-hr – Blue Waters, ACI-1516338 (NSF & U. of Illinois); HPC & LONI, LSU; contribution to an INCITE award (PI Vary) with access to National Energy Research Supercomputer Center, NERSC (DOE).

REFEREE:

J. of Physics A: Math. Gen., J. of Physics G: Nucl. Part. Phys., Reports on Progress in Physics, Eur. Phys. J. A, Phys. Rev. C, Physica Scripta, Wiley book proposal

SYNERGISTIC ACTIVITIES:**COMMITTEE SERVICE:**

- Member of Organizing Committee, International Conference on Nuclear Theory in the Supercomputing Era - 2013, May 13-17, 2013, Ames, Iowa (www.cpm.iastate.edu/ntse2013).
- Co-chair of HITES 2012, "Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics", International conference in honor of Prof. J. P. Draayer, New Orleans, June 4-7, 2012 (www.phys.lsu.edu/hites2012).
- International Particle Accelerator Conference IPAC'12 (May 20-25, 2012), young member of Scientific Advisory Board (www.ipac12.org).
- Corresponding Organizer of the 2009 Mardi Gras “Special Symmetries and Ab Initio Methods for Light Nuclei” Workshop, 22 February 2009 (www.phys.lsu.edu/lsunpw).
- PHYS 2411 Assessment reports (Fall 2011-14), included in “Departmental Assessment of the B.S. Program in Physics”.
- Blue Waters Fellowship, reviewer (2015, 2016)

OUTREACH:

- Summer Lecture Series (Nuclear Theory), Research Experiences for Undergraduates program (REU), LSU, 2013.
- Organized Public Lecture attended by undergraduate and graduate students from universities in Baton Rouge and New Orleans, HITES 2012, New Orleans, June 4, 2012.
- Summer Lecture Series (Nuclear Theory), Research Experiences for Undergraduates program (REU), LSU, 2010.
- Presented a lecture to graduate students at the 6th Balkan School on Nuclear Physics, September 17-24, 2008, Troyan, Bulgaria, “*Next-generation ab initio models for nuclear structure*”.
- Nuclear Theory lecture to graduate students in nuclear physics, weekly, 2013-Present, LSU
- Developed web sites for education and scientific events.
- Organized a tour of LSU’s particle accelerator CAMD for interested students in Phys 2113 (Gravity, Electricity, & Magnetism), Oct. 2016.

RESEARCH INTEREST:

-*Ab initio* nuclear structure and reactions with a focus on symmetries that dominate the many body nuclear dynamics, inter-nucleon interaction & its effective counterparts in nuclear medium-

Overarching research programs:

- Fundamentals of nuclear physics (further advancing our knowledge of the complex nuclear structure and probing fundamental properties of the nucleon-nucleon interaction);
- Applications to nuclei-driven processes in nature, including reactions of importance to astrophysics, neutrino physics and applied research for energy and national security.

Research experience: no-core symplectic shell model (NCSpM) for large deformation and alpha clustering; symmetry-adapted no-core shell model (SA-NCSM) for *ab initio* nuclear structure; spectral distribution theory (SDT) for nuclear structure and reactions; similarity renormalization group (SRG) for effective interactions; coupled-channel method (CCM) for nuclear reactions and reaction rates of interest to astrophysics; electron and neutrino scattering; exact pairing & Heine-Stieltjes correspondence/polynomial approach; group-theoretical approaches based on symplectic Sp(3,R) and Sp(2) groups, and SU(3) group.

Computational experience: Monte Carlo techniques, molecular dynamics simulations, partial differential equations, multi-dimensional Newton-Raphson method, and large matrices manipulations; work with supercomputers and parallel programming environment.

Programming languages: C/C++, Fortran, Pascal, Assembly, & Basic; MATHEMATICA & Matlab; SQL for data management; PHP and JavaScript for web development.

REFEREED PUBLICATIONS:

1. J. P. Draayer, K. D. Launey, and T. Dytrych, "Symmetry-guided large-scale shell-model theory", invited review, *Prog. Part. Nucl. Phys.* 89, 101 (2016); doi:10.1016/j.pnpnp.2016.02.001
2. K. D. Launey, J. P. Draayer, T. Dytrych, G.-H. Sun, and S.-H. Dong, "Approximate symmetries in atomic nuclei from a large-scale shell-model perspective", *Int. J. Mod. Phys. E* 24, 1530005 (2015), review article, featured article; doi: 10.1142/S0218301315300052.
3. Feng Pan, Xiaoxue Ding, Kristina D. Launey, Hui Li, Xinxin Xu, and Jerry P. Draayer, "An exactly solvable spherical mean-field plus extended monopole pairing model", *Nucl. Phys. A* 947, 234–247 (2016).
4. X.Guan, K.D.Launey, Y.Wang, F.Pan, J.P.Draayer, "Ground-state properties of rare-earth nuclei in the Nilsson mean-field plus extended-pairing model", *Phys. Rev. C* 92, 044303 (2015); doi: 10.1103/PhysRevC.92.044303.
5. T. Dytrych, A. C. Hayes, K. D. Launey, J. P. Draayer, P. Maris, J. P. Vary, D. Langr, and T. Oberhuber, "Electron-scattering form factors for Li-6 in the *ab initio* symmetry-guided framework", *Phys. Rev. C* 91 (2015) 024326.
6. T. Dytrych, P. Maris, K. D. Launey, J. P. Draayer, J. P. Vary, et al., "Efficacy of the SU(3) scheme for *ab initio* large-scale calculations beyond the lightest nuclei", *Comput. Phys. Commun.* 207, 202 (2016).
7. F. Pan, Yu Zhang, K.D. Launey, L. Dai, X. Guan, and J.P. Draayer, "Exact Solutions of the Extended Pairing Interactions in Bose and Fermi Many-Body Systems", *Bulg. J. Phys.* 42 (2015) 429.
8. Feng Pan, Shuli Yuan, Kristina D. Launey, and Jerry P. Draayer, "A new procedure for constructing basis vectors of SU(3)↓SO(3)", submitted to *Ann. Phys.* (2015).
9. Yin Wang, Feng Pan, Kristina D. Launey, Yan-An Luo, and J. P. Draayer, "Angular momentum projection for a Nilsson mean-field plus pairing model", *Nucl. Phys. A* 950 (2016) 1.

10. N. Upadhyay, A. Risolio, K.D. Launey, T. Dytrych, and J.P. Draayer, “Role of nuclear deformation for (p, γ) reactions in the framework of the no-core symplectic shell model”, in preparation (2016).
11. B. Harvie, K. D. Launey, Z. Kohley, et al., “*Ab initio* symmetry-adapted no-core shell-model calculations and the unresolved question of the He-10 ground-state resonance”, to be submitted to *Phys. Rev. C* (2016).
12. Guo-Hua Sun, Shi-Hai Dong, K. D. Launey, T. Dytrych, and J. P. Draayer, “Shannon information entropy for a hyperbolic double-well potential”, *Intl. J. of Quantum Chemistry* 115 (2015) 891; doi: 10.1002/qua.24928.
13. G. K. Tobin, M. C. Ferriss, K. D. Launey, T. Dytrych, J. P. Draayer, A. C. Dreyfuss, and C. Bahri, "Symplectic No-core Shell-model Approach to Intermediate-mass Nuclei", *Phys. Rev. C* 89 (2014) 034312.
14. K. D. Launey, S. Sarbadhicary, T. Dytrych, and J. P. Draayer, “Program in C for studying characteristic properties of two-body interactions in the framework of spectral distribution theory”, *Comput. Phys. Commun.* 185 (2014) 254.
Program: Catalogue ID AEQG_v1_0 (cpc.cs.qub.ac.uk/summaries/AEQG_v1_0.html).
15. Guo-Hua Sun, K. D. Launey, T. Dytrych, Shi-Hai Dong, and J. P. Draayer, “A new kind of shift operators for infinite circular and spherical wells”, *Advances in Mathematical Physics*, 2014 (2014) 987376.
16. G. Yanez-Navarro, Guo-Hua Sun, T. Dytrych, K. D. Launey, Shi-Hai Dong, and J. P. Draayer, “Quantum information entropies for position-dependent mass Schrodinger problem”, *Ann. Phys.* 348 (2014) 153.
17. A. C. Dreyfuss, K. D. Launey, T. Dytrych, J. P. Draayer, and C. Bahri, “Hoyle state and rotational features in Carbon-12 within a no-core shell-model framework”, *Phys. Lett. B* 727 (2013) 511 (10.1016/j.physletb.2013.10.048).
18. T. Dytrych, K. D. Launey, J. P. Draayer, P. Maris, J. P. Vary, E. Saule, U. Catalyurek, M. Sosonkina, D. Langr, and M. A. Caprio, “Collective Modes in Light Nuclei from First Principles”, *Phys. Rev. Lett.* 111 (2013) 252501 (10.1103/PhysRevLett.111.252501).
19. Xin Guan, Kristina D. Launey, Jianzhong Gu, Feng Pan, and J. P. Draayer, “Level statistical properties of the spherical mean-field plus standard pairing model”, *Phys. Rev. C* 88 (2013) 044325.
20. Xin Guan, Kristina D. Launey, Mingxia Xie, Lina Bao, Feng Pan, and J. P. Draayer, “Numerical algorithm for the standard pairing problem based on the Heine-Stieltjes correspondence and the polynomial approach”, *Comput. Phys. Commun.* 185 (2014) 2714.
21. K.D. Launey, T. Dytrych, J.P. Draayer, “Importance of Symmetries in the Similarity Renormalization Group Approach”, *Bulg. J. Phys.* 39 (2012) 271.
22. K.D. Launey, T. Dytrych, and J.P. Draayer, “Similarity renormalization group and many-body effects in multiparticle systems”, *Phys. Rev. C* 85 (2012) 044003.
23. K.D. Launey, T. Dytrych, J.P. Draayer, and G. Popa, "Dynamics and Applicability of the Similarity Renormalization Group", *J. Phys. A: Math. Theor.* 45 (2012) 015208.
24. Xin Guan, Kristina D. Launey, Mingxia Xie, Lina Bao, Feng Pan, and J. P. Draayer, “The Heine-Stieltjes correspondence and the polynomial approach to the standard pairing problem”, *Phys. Rev. C* 86 (2012) 024313.

25. S. G. de Clark, M. K. G. Kruse, K. D. Launey, B. R. Barrett, and A. F. Lisetskiy, “Effective three-body monopole interaction in the valence cluster”, submitted to *Phys. Rev. C* (2011).
26. M. A. Caprio, K. D. Sviratcheva, and A. E. McCoy, “Racah’s method for general subalgebra chains: Coupling coefficients of $SO(5)$ in canonical and physical bases”, *J. Math. Phys.* 51 (2010) 093518.
27. T. Dytrych, K. D. Sviratcheva, J. P. Draayer, C. Bahri, and J. P. Vary, “*Ab initio* symplectic no-core shell model,” *J. Phys. G: Nucl. Part. Phys.* 35 (2008) 123101 (47pp).
28. T Dytrych, K D Sviratcheva, C Bahri, J P Draayer and J P Vary, “Highly deformed modes in the *ab initio* symplectic no-core shell model”, *J. Phys. G: Nucl. Part. Phys.* 35 (2008) 095101.
29. T. Dytrych, K. D. Sviratcheva, C. Bahri, J. P. Draayer, and J. P. Vary, “Evidence for symplectic symmetry in *ab initio* no-core-shell-model results for light nuclei,” *Phys. Rev. Lett.* 98 (2007) 162503.
30. T. Dytrych, K. D. Sviratcheva, C. Bahri, J. P. Draayer, and J. P. Vary, “Dominant role of symplectic symmetry in *ab initio* no-core shell model results for light nuclei,” *Phys. Rev. C* 76 (2007) 014315.
31. K. D. Sviratcheva, J. P. Draayer, and J. P. Vary, “Global properties of *fp*-shell interactions in many-nucleon systems,” *Nucl. Phys. A* 786 (2007) 31.
32. K. D. Sviratcheva, J. P. Draayer, and J. P. Vary, “*Underlying symmetries of realistic interactions and the nuclear many-body problem*,” *Phys. Rev. C* 73 (2006) 034324.
33. K. D. Sviratcheva, A. I. Georgieva, and J. P. Draayer, “*Microscopic description of isospin mixing pairing correlations in the framework of an algebraic $Sp(4)$ Model*,” *Bulg. J. Phys.* 32 (2005) 159.
34. K. D. Sviratcheva, A. I. Georgieva, and J. P. Draayer, “*Isospin Symmetry Breaking in an Algebraic Pairing $Sp(4)$ Model*,” *Phys. Rev. C* 72 (2005) 054302.
35. K.D. Sviratcheva, A.I. Georgieva, and J.P. Draayer, “*Dynamical symmetry of isobaric analog 0^+ states in medium mass nuclei*,” *Phys. Rev. C* 70 (2004) 064302.
36. K.D. Sviratcheva, C. Bahri, A.I. Georgieva, and J.P. Draayer, “*Physical Significance of q Deformation and Many-Body Interactions in Nuclei*,” *Phys. Rev. Lett.* 93 (2004) 152501.
37. K.D. Sviratcheva, A.I. Georgieva, and J.P. Draayer, “*Staggering behavior of 0^+ state energies in the $Sp(4)$ pairing model*,” *Phys. Rev. C* 69 (2004) 024313.
38. K.D. Sviratcheva, A.I. Georgieva, and J.P. Draayer, “*Generalized q -deformed symplectic $sp(4)$ algebra for multi-shell applications*,” *J. Phys. A: Math. Gen.* 36 (2003) 7579-7587.
39. K.D. Sviratcheva, A.I. Georgieva, and J.P. Draayer, “*An Algebraic Pairing Model with $Sp(4)$ Symmetry and its Deformation*,” *J. Phys. G: Nucl. Part. Phys.* 29 (2003) 1281-1297.
40. K.D. Sviratcheva, A.I. Georgieva, V.G. Gueorguiev, J.P. Draayer, and M.I. Ivanov, “*Deformations of the fermion realization of the $sp(4)$ algebra and its subalgebras*”, *J. Phys. A: Math. Gen.* 34 (2001) 8365-8382.

CONFERENCE PROCEEDINGS:

1. M. E. Miora, K. D. Launey, D. Kekejian, J. P. Draayer, and F. Pan, “Exact Solutions for Pairing Correlations among Protons and Neutrons”, (APS Conference, DNP, Santa Fe, NM, 28-31 October 2015), abstract.
2. Kristina D. Launey, Alison C. Dreyfuss, Robert Baker, Jerry P. Draayer, and Tomas Dytrych, “Emergent Symmetries in Atomic Nuclei from First Principles,” (Proceedings

- of the 30th International Colloquium on Group Theoretical Methods in Physics, 14-18 July, 2014, Ghent, Belgium), *Journal of Physics: Conference Series* 597 (2015) 012054.
3. Kristina D. Launey, Alison C. Dreyfuss, Jerry P. Draayer, Tomas Dytrych, and Robert Baker, “Emergence of cluster structures and collectivity within a no-core shell-model framework,” (Proceedings of the 3rd International Workshop on "State of the Art in Nuclear Cluster Physics" (SOTANCP3), May 26-30, 2014, Yokohama, Japan), *Journal of Physics: Conference Series* 569 (2014) 012061.
 4. X. Guan, H. Xu, K. D. Launey, F. Pan, and J.P. Draayer, “A new polynomial approach with Heine-stieltjes correspondence to the Standard pairing problem”, (Proceedings of the 15th National Conference on Nuclear Structure in China, China, 2014), *Nuclear Structure in China 2014* (2016) 31, World Scientific Publishing Co., doi: 10.1142/9789813109636_0006.
 5. T. Dytrych, J. P. Draayer, K. D. Launey, P. Maris, J. P. Vary, D. Langr, and T. Oberhuber, “Emergence of Simple Patterns in Complex Atomic Nuclei from First Principles,” (Proceedings of International Conference ‘Nuclear Theory in the Supercomputing Era — 2014’ (NTSE-2014), Khabarovsk, Russia, June 23–28, 2014), Eds. A. M. Shirokov and A. I. Mazur. Pacific National University, Khabarovsk, Russia (2014), to be published.
 6. Jerry P. Draayer, Tomas Dytrych, Kristina D. Launey, Alison C. Dreyfuss, and Daniel Langr, “HPC-enabled Nuclear Structure Studies – Description and Applications of the Symmetry-adapted No-Core Shell Model,” (Proceedings of the 11th International Spring Seminar On Nuclear Physics, May 12-16, 2014, Ischia), *Journal of Physics: Conference Series* 580 (2015) 012044.
 7. Jerry P. Draayer, Tomas Dytrych, Kristina D. Launey, Alison C. Dreyfuss, and Daniel Langr, “Dominant Modes in Light Nuclei – *Ab Initio* View of Emergent Symmetries,” (Proceedings of the XXXVII Symposium on Nuclear Physics, January 6-9, 2014, Cocoyoc, Mexico), *Journal of Physics: Conference Series* 578 (2015) 012010; doi:10.1088/1742-6596/578/1/012010.
 8. Jerry P. Draayer, Tomas Dytrych, Kristina D. Launey, Alison C. Dreyfuss, Mia C. Ferriss, Gregory K. Tobin, Xin Guan, and Feng Pan, “Keynote talk: Unraveling Mysteries of the Strong Interaction - 'Top Down' versus 'Bottom Up' Considerations,” (Proceedings of International Conference ‘Nuclear Theory in the Supercomputing Era — 2013’ (NTSE-2013), Ames, IA, USA, May 13–17, 2013), Eds. A. M. Shirokov and A. I. Mazur. Pacific National University, Khabarovsk, Russia (2014), p. 47.
 9. T. Dytrych, J. P. Draayer, K. D. Launey, P. Maris, J. P. Vary, and D. Langr, “Utilizing Symmetry Coupling Schemes in *Ab Initio* Nuclear Structure Calculations,” (Proceedings of International Conference ‘Nuclear Theory in the Supercomputing Era — 2013’ (NTSE-2013), Ames, IA, USA, May 13–17, 2013), Eds. A. M. Shirokov and A. I. Mazur. Pacific National University, Khabarovsk, Russia (2014), p. 62.
 10. Feng Pan, Xin Guan, Kristina D. Launey, Jianzhong Gu, and Jerry P. Draayer “Level statistics of the spherical mean-field plus pairing model,” (Proceedings of the Heavy Ion Accelerator Symposium on Fundamental and Applied Research, 8 - 12 April, 2013, Canberra, Australia), *EPJ Web of Conferences* 63 (2013) 01011. (10.1051/epjconf/20136301011)
 11. K. D. Launey, T. Dytrych, J. P. Draayer, G. K. Tobin, M. C. Ferriss, D. Langr, A. C. Dreyfuss, P. Maris, J. P. Vary, and C. Bahri, “Symmetry-adapted No-core Shell Model for Light Nuclei,” (Proceedings of the 5th International Conference on “Fission and properties of neutron-rich nuclei”, ICFN5, November 4 - 10, 2012, Sanibel Island,

- Florida), eds: J. H. Hamilton and A. V. Ramayya, World Scientific Publishing Co. (2014), p. 29; doi: 10.1142/9789814525435_0003.
12. K. D. Launey, A. C. Dreyfuss, T. Dytrych, J. P. Draayer, D. Langr, P. Maris, J. P. Vary, and C. Bahri, "Symmetry-adapted *ab initio* no-core shell model calculations for ^{12}C ," (Proceedings of the 10th International Conference on Clustering Aspects of Nuclear Structure and Dynamics, 24-28 September, 2012, Debrecen, Hungary), Journal of Physics: Conference Series 436 (2013) 012023.
 13. Alison C. Dreyfuss, Kristina D. Launey, Tomas Dytrych, Jerry P. Draayer, and Chairul Bahri, "Microscopic Description of the Elusive Hoyle State," ("Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics", New Orleans, June 4-7, 2012), Journal of Physics: Conference Series 403 (2012) 012024.
 14. T. Dytrych, J. P. Draayer, K. D. Launey, M. A. Caprio, and D. Langr, "Symmetry-Guided Ab Initio Approach to Light and Medium-Mass Nuclei," ("Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics", New Orleans, June 4-7, 2012), Journal of Physics: Conference Series 403 (2012) 012015.
 15. Feng Pan, Kristina D Launey and Xin Guan, "The Heine–Stieltjes correspondence and the polynomial approach to the Gaudin–Richardson models," ("Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics", New Orleans, June 4-7, 2012), Journal of Physics: Conference Series 403 (2012) 012007.
 16. Alison C. Dreyfuss, Jerry P. Draayer, Tomas Dytrych, Kristina D. Launey, and Chairul Bahri, "Symmetry-adapted no-core shell model for light nuclei -- C-12 and O-16," (Beauty in Physics: Theory and Experiment: in honor of Francesco Iachello on the occasion of his 70th birthday, May 14-18, 2012, Cocoyoc, Mexico), AIP Conference Proceedings 1488 (2012) 204-210.
 17. Jerry P. Draayer, Tomas Dytrych, Kristina D. Launey, Daniel Langr, Alison C. Dreyfuss, and Chairul Bahri, "Symmetry-Adapted Ab Initio Open Core Shell Model Theory," (Proceedings of the XXXV Symposium on \square Nuclear Physics, January 3-6, 2012, Cocoyoc, Mexico), Journal of Physics: Conference Series 387 (2012) 012017.
 18. T. Dytrych, K. D. Launey, J. P. Draayer, D. Langr, "Ab initio No-core Shell Model Calculations in a SU(3)-based Coupling Scheme," (Proceedings of the XXXV Symposium on \square Nuclear Physics, January 3-6, 2012, Cocoyoc, Mexico), Journal of Physics: Conference Series 387 (2012) 012016.
 19. A.C. Dreyfuss, K. D. Launey, C. Bahri, T. Dytrych. And J. P. Draayer, "Microscopic Description of the Elusive Hoyle State", (APS Conference, DNP, Michigan State University, October 2011), abstract.
 20. J. P. Draayer, T. Dytrych, K. D. Launey, and D. Langr, "Symmetry-Adapted Ab Initio Shell Model for Nuclear Structure Calculations" (Proceedings of the XIX International School on Nuclear Physics, Neutron Physics and Application, September 19 - 25, 2011, Varna, Bulgaria), Journal of Physics: Conference Series 366 (2012) 012014.
 21. J. P. Draayer, T. Dytrych, K. D. Launey, and D. Langr, "Symmetry-Adapted No-Core Shell Model Applications for Light Nuclei with QCD-Inspired Interactions" (Proceedings of the International School Of Nuclear Physics, September 2011, Erice, Sicily, Italy), "Progress in Particle and Nuclear Physics" 67 (2012) 516.
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BOOKS and CHAPTERS:

1. “*Emergent phenomena in Atomic Nuclei from Large-scale Modeling: a Symmetry-guided Perspective*”, editor (World Scientific Publishing Co., 2016), in press (topics include experimental signatures of symmetries; emergent phenomena within an intricate many-body framework: symplectic model, *ab initio* SA-NCSM, *ab initio* lattice EFT, cluster models, exactly solvable pairing models and density functional theory (DFT), lattice QCD, & Monte Carlo shell model; and symmetry-guided examples in condensed-matter and quantum information), authors: D. Rowe, J. Wood, C. Johnson, J. Escher, D. Lee, T.

- Luu, A. Shindler, J. Draayer, T. Dytrych, F. Pan, G. Rosensteel, Y. Suzuki, W. Horiuchi, and Y. Alhassid.
- International Innovation 160, 20 (2015), J. P. Draayer, K. D. Launey, and T. Dytrych, featured article.
 - McGraw-Hill Yearbook of Science & Technology 2014, “Symmetry-adapted no-core shell model”, Tomas Dytrych, Kristina D. Launey, Jerry P. Draayer, contribution.
 - “Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics”, chief editor, Proceedings of the HITES international conference, June 4-7, 2012, New Orleans (IOP Publishing, 2012).
 - "Spectral Distributions in Nuclei and Statistical Spectroscopy", V. K. B. Kota and R.U. Haq, contribution, p. 654 (World Scientific Publishing Co., 2010).

INVITED TALKS

“First-principle symmetry-guided modeling of atomic nuclei on the nucleosynthesis paths”, University of Louisiana at Lafayette, March 2016

“*First Ab Initio Nuclear Modeling across the Intermediate-mass Region*”, Public lecture, Liaoning Normal University, Dalian, China, April 2015

“*First Ab Initio Nuclear Modeling across the Intermediate-mass Region*”, Nankai University, Tianjin, China, March 2015

“*Formation of Simple Patterns in Complex Atomic Nuclei from First Principles*”, Tulane University, New Orleans, November 2014

“*Emergence of cluster structures and collectivity within a no-core shell-model framework*” SOTANCP3, Yokohama, Japan, May 2014.

“*Formation of Simple Patterns in Complex Atomic Nuclei from First Principles*” Michigan State University, Michigan, March 2014.

“*First Ab Initio Nuclear Modeling Across the Intermediate-Mass Region*” Michigan State University, Michigan, March 2014.

“*Similarity Renormalization Group: algebraic approach to nucleon-nucleon interaction renormalization*”

Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria, May 2011.

“*Next-generation Ab Initio Models for Nuclear Structure*”

Institute of Nuclear and Particle Physics at Ohio University, Ohio, March 2010.

“*Significance of Symplectic Symmetry in Ab Initio Many-nucleon Dynamics*”,

National Superconducting Cyclotron Laboratory at Michigan State University, Michigan, June 2008.

“*Symplectic Ab Initio No-Core Shell Model - Taming the Model Space Dilemma*”,

Argonne National Laboratory, Illinois, June 2008.

“*Significance of Symplectic Symmetry in Many-nucleon Dynamics*”,

Los Alamos National Laboratory, January 2008.

WORKSHOPS

“*Ab Initio SA-NCSM Modeling across the Intermediate-mass Region*”,

Workshop on Reactions and Structure of Exotic Nuclei, Institute for Nuclear Theory in Seattle, Washington, March 2015.

“*Shell-model description of the Hoyle state in Carbon-12*”,

“Perspectives of the Ab Initio No-Core Shell Model” workshop, TRIUMF, Vancouver, Canada, February 23-25, 2012.

“*Significance of SRG-generated Many-body Interactions*”,
“Perspectives of the Ab Initio No-Core Shell Model” workshop, TRIUMF, Vancouver, Canada, February 10-12, 2011.

“*Role of Symmetries in Similarity Renormalization Group Transformations of Two-nucleon Interactions*”,

Workshop on Effective Field Theories and the Many-Body Problem, Institute for Nuclear Theory in Seattle, Washington, March 2009.

“*Underlying symmetries of inter-nucleon interactions*”,

Mardi Gras “Special Symmetries and Ab Initio Methods for Light Nuclei” Workshop, Louisiana State University, Baton Rouge, February 2009.

“*Symplectic NCSM—Taming the Model Space Dilemma*”,

Workshop on Nuclear Many-body Approaches for the 21st Century, Institute for Nuclear Theory in Seattle, Washington, November 2007.

“*Symplectic Ab Initio No-Core Shell Model*”,

International workshop on Nuclear Structure, Kyoto, Japan, June 2007.

“*Symplectic Dynamical Symmetry of Isobaric Analog 0^+ States in Medium Mass Nuclei*”

Workshop on Microscopic Nuclear Structure, Institute for Nuclear Theory in Seattle, Washington, November 2004.

Participant in (1) “Material Design: Experimental and Computational Challenges” in Baton Rouge, LA, March 2-4, 2000; (2) “Bologna 2000 - Structure of the Nucleus at the Dawn of the Century” in Bologna, Italy, May 29 - June 3, 2000; (3) Workshop on Nuclear Structure for the 21st Century”, Institute for Nuclear Theory in Seattle, Washington, December 2000; (4) International Nuclear Physics Conference INPC 2007, Tokyo, Japan, June 3 - June 8, 2007.

PROJECTS AND PRESENTATIONS at LSU:

▪ **Physics:** Computational projects on *Fluid simulations, Monte Carlo simulations, Simulated Annealing method, and Finite Element method*; computational projects on *Hartree-Fock* and *Lipkin* nuclear models; high energy physics presentation “ τ - θ puzzle”; project “*The mass of the photon*”;

▪ **Computer Science:** presentation “*Advanced Algorithms for Solving Linear Systems*” (Algorithm Design); presentation “*File and Device Management of MS-DOS*”.

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