

CURRICULUM VITAE

Michael John Cavagnero

(July 2013)

BIRTH: June 15, 1959. Torrington, CT U.S.A.

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MARITAL STATUS: Married, two children

CITIZENSHIP: U.S.A.

EDUCATION:

9/81-8/87 The University of Chicago, Chicago, IL.
M.S. in Physics, 5/83.
Ph.D. in Physics, 8/87.

*Research in theoretical atomic physics under Prof. U. Fano.
Dissertation: "Electron correlations in atomic shells."*

9/77-5/81 The University of Connecticut, Storrs, CT.
B.S. *Summa cum Laude* in Physics, 5/81.

EXPERIENCE:

7/13-Present Professor of Physics, University of Kentucky, Lexington, KY.

1/10-6/13 Chair, Department of Physics and Astronomy,
University of Kentucky, Lexington, KY.

7/09-12/09 Administrative Leave of Absence for Research

7/05-6/09 Chair, Department of Physics and Astronomy,
University of Kentucky, Lexington, KY.

5/02- Professor of Physics, University of Kentucky, Lexington, KY.

Theoretical Research in the study of ultra-cold atomic and molecular dilute gases

7/96-4/02 Associate Professor of Physics, University of Kentucky,
Lexington, KY. Member of the Graduate Faculty.

*Theoretical Research in the theory of long-range interactions with
applications to both Rydberg atomic states and ultra-cold atomic collisions.*

7/97-7/98 Visiting Scientist, Harvard-Smithsonian Center for
Astrophysics, Cambridge, MA, supported by a grant
from the Institute for Theoretical Atomic, Molecular
and Optical Physics.

8/90-6/96 Assistant Professor of Physics, University of Kentucky,
Lexington, KY.

*Theoretical Research in the dynamics of Rydberg states. Supervision
of research work by post-doctoral, graduate and undergraduate
assistants. Teaching duties. Departmental committee assignments.
Elected to Faculty Senate, 2003-2005.*

8/89-7/90 Research Associate, Joint Institute for Laboratory
Astrophysics, University of Colorado, Boulder, CO.

*Theoretical research on the resonant structure of the hydrogen
negative-ion with Prof. Chris Greene.*

6/86-8/89 Research Associate, Department of Physics and Astronomy,
University of Nebraska, Lincoln, NE.

*Theoretical research on non-relativistic few-body dynamics with
Profs. Anthony Starace and Joseph Macek.*

PUBLICATIONS:

1. A. Russek, D. Kimball, and M. Cavagnero, "Angular-momentum effects in atom-atom scattering", Phys. Rev. A 23, 139 (1981).
2. M. Cavagnero, "Electron correlations in atomic shells: Systematics of high-angular-momentum admixtures", Phys. Rev. A 30, 1169 (1984).
3. M. Cavagnero, "Electron correlations in atomic shells: II. Antisymmetric basis functions", Phys. Rev. A 33, 2877 (1986).
4. F. Robicheaux, U. Fano, M. Cavagnero and D. A. Harmin, "Generalized WKB and Milne solutions to one-dimensional wave equations", Phys. Rev. A 35, 3619 (1987).
5. M. Cavagnero, "Electron correlations in atomic shells: III. Algebraic form of the Hamiltonian matrix", Phys. Rev. A 36, 523 (1987).

6. M. Cavagnero, "A hyperspherical description of N-electron atoms", in Fundamental Processes in Atomic Dynamics, edited by J. S. Briggs, H. Kleinpoppen, and H. Lutz (Plenum Press, New York, 1988), pp. 301-310.
7. J. Macek, M. Cavagnero, K. Jerjian, and U. Fano, "Bypassing translation factors in molecular dissociation and reactions", *Phys. Rev. A* 35, 3940 (1987).
8. M. Cavagnero, "Quasi-atomic contributions to molecular scattering form factors", *Phys. Rev. A* 40, 6199 (1989).
9. M. Cavagnero, Z. Zhen, and J. Macek, "Two-body fragmentation channels of three-body systems", *Phys. Rev. A* 41, 1225 (1990).
10. H. R. Sadeghpour, C. H. Greene, and M. Cavagnero, "Extensive eigenchannel R-matrix study of the H photodetachment spectrum", *Phys. Rev. A* 45, 1587 (1992).
11. C. H. Greene, M. J. Cavagnero and H. R. Sadeghpour, "Theoretical description of high-lying two-electron states", in Atomic Physics 13, Proceedings of the Thirteenth International Conference on Atomic Physics, (1992).
12. H. R. Sadeghpour and M. J. Cavagnero, "Formation and decay of the $3\{1\}_4^+ 1P^0$ autoionizing resonance of helium", *J. Phys. B* 26, L271 (1993).
13. M. Cavagnero and Yu Zheng, "Fast electron scattering from Rydberg states of Na", *J. Phys. B* 27, 565 (1994). (Undergraduate research publication.)
14. D. M. Homan, M. J. Cavagnero and D. A. Harmin, "Charge transfer in ion collisions with circular Rydberg atoms", *Phys. Rev. A* 50, R1965 (1994).
15. M. Cavagnero, "Secular perturbation theory of long-range interactions", *Phys. Rev. A* 50, 2841 (1994).
16. D. M. Homan, M. J. Cavagnero, and D. A. Harmin, "Classical charge transfer and ionization channels for ion collisions with circular Rydberg atoms", *Phys. Rev. A* 51, 2075 (1995).
17. M. J. Cavagnero, "Floquet analysis of inelastic collisions of ions with Rydberg atoms", *Phys. Rev. A* 52, 2865 (1995).
18. K. B. MacAdam, J. C. Day, J. C. Aguilar, D. M. Homan, A. D. MacKellar, and M. J. Cavagnero, "Transient molecular-ion formation in Rydberg-electron capture", *Phys. Rev. Lett.* 75, 1723 (1995).
19. D. M. Homan, M. J. Cavagnero, and D. A. Harmin, "Charge transfer and ionization in ion collisions with circular Rydberg atoms", *AIP Conference Proceedings Series Number 362*, 281 (AIP, New York, 1996).
20. M. Cavagnero and S. Cornett, "Discrete-time picture for multi-photon microwave spectroscopy", *Phys. Rev. A* 55, 3746 (1997).
21. E. Hessels, D. Homan, and M. Cavagnero, "Two-stage Rydberg charge exchange: An efficient method for production of anti-hydrogen", *Phys. Rev. A* 57, 1668 (1998).
22. D. Homan, K. MacAdam and M. Cavagnero, "Anomalous final-state distributions of electrons captured from directed Rydberg states", *Phys. Rev. A* 57, R13 (1998).

23. J. Macek and M. Cavagnero, “Demkov-Osherov model reformulated in terms of conventional scattering theory”, *Phys. Rev. A* **58**, 348 (1998).
24. S. Cornett, H. Sadeghpour and M. Cavagnero, “Interferometric lineshape modulation in alkali-halide photoabsorption”, *Phys. Rev. Lett.* **82**, 2488 (1999).
25. N. Balakrishnan, B. Esry, H. Sadeghpour, S. Cornett and M. Cavagnero, “Quantum wavepacket dynamics of the photodissociation of LiF”, *Phys. Rev. A* **60**, 1407 (1999).
26. A. B. Alekseyev, R. J. Buenker, N. Balakrishnan, H. R. Sadeghpour, S. T. Cornett and M. J. Cavagnero, “Spin-orbit effects in photodissociation of sodium iodide”, *J. Chem. Phys.* **113**, 1514 (2000).
27. H. R. Sadeghpour, J. L. Bohn, M. J. Cavagnero, B. D. Esry, I. I. Fabrikant, J. H. Macek, and A. R. P. Rau, “Collisions near threshold in atomic and molecular physics”, *J. Phys. B: At. Mol. Opt. Phys.* **33**, R93-R140 (2000).
28. H. Ouerdane, M. J. Jamieson, D. Vrinceanu and M. J. Cavagnero, “The variable phase method used to calculate and correct scattering lengths”, *J. Phys. B: At. Mol. Opt. Phys.* **36**, 4055 (2003).
29. Seth T. Rittenhouse, M. J. Cavagnero, Javier von Stecher, and Chris H. Greene, “Collective behavior of the closed-shell Fermi gas”, e-print cond_mat/0510454.
30. Seth T. Rittenhouse, M. J. Cavagnero, Javier von Stecher, and Chris H. Greene, “A hyperspherical variational approach to the N fermion problem”, *Few-Body Systems* p. 23-28 (Springer-Verlag, 2005).
31. Seth T. Rittenhouse, M. J. Cavagnero, Javier von Stecher, and Chris H. Greene, “Hyperspherical description of the degenerate Fermi gas: s-wave interactions”, *Phys. Rev. A* **74**, 053624 (2006).
32. V. Roudnev and M. J. Cavagnero, “Universal resonant ultracold molecular scattering”, *Phys. Rev. A* **79**, 014701 (2009).
33. V. Roudnev and M. J. Cavagnero, “Resonance phenomena in ultracold dipole-dipole scattering”, *J. Phys. B: At. Mol. Opt. Phys.* **42**, 044017 (2009), special issue on resonance phenomena.
34. Catherine Newell and M. J. Cavagnero, “Inelastic semi-classical collisions in cold dipolar gases”, *New J. Phys.* **11** 055040 (2009); special issue on ultracold gases.
35. J. Bohn, C. Ticknor and M. Cavagnero, “Quasi-universal dipolar scattering in cold and ultracold gases”, *New J. Phys.* **11** 055039 (2009); special issue on ultracold gases.
36. S. Rittenhouse, M. J. Cavagnero, and C. H. Greene, “Collective coordinate description of Anisotropically Trapped degenerate Fermi gases”, *J. Phys. Chem. A*, 2009, 113 (52).
37. V. Roudnev, Michael Cavagnero, “Automatic grid construction for few-body quantum-mechanical calculations. *Computer Physics Communications* 182(10): 2099-2106 (2011).
38. E. A. Kolganova, V. Roudnev and M. J. Cavagnero, “Solution of three-dimensional Faddeev equations: ultracold Helium trimer calculations with a public quantum three-body code”, arXiv:1010.1404v1 [physics.atm-clus].

39. M. Cavagnero, "Glauber's eikonal approximation to elastic dipole-dipole scattering", to be submitted to Physical Review A.

40. Vladimir Roudnev and Michael Cavagnero, "Benchmark helium dimer and trimer calculations with a public few-body code," *J. Phys. B: At. Mol. Opt. Phys.* **45** 025101 (2012).

41. V. Roudnev and M. Cavagnero, "Approaching universality in weakly-bound three-body systems", *Phys. Rev. Lett.* **108**, 110402 (2012).

CONFERENCE PAPERS:

1. M.J. Cavagnero and J.H. Macek, "A quasi-atomic model of the electron-impact dissociation of H_2^+ in Born Approximation", (APS Spring Meeting, Baltimore, Maryland, April 18-21, 1988). Abstract: *Bull. Am. Phys. Soc.* **33**, 996 (1988).

2. Z. Zhen, J. Macek and M. Cavagnero, "Asymptotic wavefunctions for the dissociation or ionization of three-body systems", (APS Spring Meeting, Baltimore, Maryland, April 18-21, 1988). Abstract: *Bull. Am. Phys. Soc.* **33**, 996 (1988).

3. M.J. Cavagnero, "Multipole Contributions to Molecular Scattering Form Factors", (DAMOP-APS, Windsor, Ontario, May 17-19, 1989). Abstract: *Bull. Am. Phys. Soc.* **34**, 1407 (1989).

4. M. Cavagnero, "Spectrum and Spherical Wave Parameters of the Finite-Dipole Potential", (International Symposium, IAC, Gold Coast, Australia, July 1991).

5. M. Cavagnero, "Low Energy s-wave Muon Capture in Atomic Hydrogen", (APS Spring Meeting, Washington, D.C., April 22-25, 1991). Abstract: *Bull. Am. Phys. Soc.* **36**, 1254 (1991).

6. M. Cavagnero, "Frame-transformation Theory of Electron Scattering from a Rotating Dipole", (DAMOP-APS, Chicago, Illinois, May 20-22, 1992). Abstract: *Bull. Am. Phys. Soc.* **37**, 1095 (1992).

7. A. D. MacKellar, M. Cavagnero and R. L. Becker, "Classical $v/2$ Electron Capture Resonance in Ion Collisions with Oriented Rydberg Atoms", (DAMOP-APS, Chicago, Illinois, May 20-22, 1992). Abstract: *Bull. Am. Phys. Soc.* **37**, 1097 (1992).

8. H. R. Sadeghpour and M. J. Cavagnero, "Eigenchannel R-matrix Calculations of the Helium Photoionization Spectrum", XVIII International Conference on the Physics of Electronic and Atomic Collisions (Aarhus, Denmark, July 21-27 1993). Abstracts of Contributed Papers, XVIII ICPEAC, edited by T. Andersen, B. Fastrup, F. Folkmann, and H. Knudsen, p. 5.

9. M. Cavagnero, "A Tunneling-shell Hypothesis for Charge-Transfer from Rydberg Atom Targets", (DAMOP-APS, Reno, Nevada, May 1993). (Post-deadline paper. No abstract.)

10. D. M. Homan, M. J. Cavagnero, and D. A. Harmin, "Charge Transfer and Ionization Channels in Ion Collisions with Circular Rydberg Atoms", (ICAP, Boulder, CO, August 1994).

11. D. M. Homan, M. J. Cavagnero, and D. A. Harmin, "Classical Study of Coplanar Collisions of $H^+ + H$ ", (APS Spring Meeting, Crystal City, VA, April 18-22, 1994). Abstract: *Bull. Am. Phys. Soc.* **39**, 1216 (1994).

12. M.J. Cavagnero, "A secular perturbation theory of long-range interactions", (APS Spring Meeting, Crystal City, VA, April 18-22, 1994). Abstract: Bull. Am. Phys. Soc. 39, 1204 (1994).
13. M.J. Cavagnero and Y. Zheng, "Fast electron scattering from Rydberg States of Na", (APS Spring Meeting, Crystal City, VA, April 18-22, 1994). Abstract: Bull. Am. Phys. Soc. 39, 1074 (1994).
14. M. Cavagnero, "Floquet Analysis of Rydberg State Evolution in Distant Ion-Atom Collisions", (XIX-ICPEAC, Whistler, BC, July 1995).
15. D. M. Homan, J. C. Day, M. J. Cavagnero, K. B. MacAdam, and D. A. Harmin, "Three-swap Electron Capture for Ion Collisions with Oriented Circular-State Rydberg Atoms", (XIX-ICPEAC, Whistler, BC, July 1995).
16. M. Cavagnero, "Floquet Analysis of Inelastic Ion-Atom Collisions", (DAMOP-APS, Toronto, Ontario, May 1995). Abstract: Bull. Am. Phys. Soc. 40, 1310 (1995).
17. D. M. Homan, J. C. Day, M. J. Cavagnero, D. A. Harmin, K. B. MacAdam, "Three-swap Electron Capture for Ion Collisions with Circular Rydberg Atoms", (DAMOP-APS, Toronto, Ontario, May 1995). Abstract: Bull. Am. Phys. Soc. 40, 1311 (1995).
18. M. Cavagnero, "Discrete-Time Representation of Multi-Photon Microwave Spectroscopy", (DAMOP-APS, Ann Arbor, Michigan, May 1996). (Post-deadline paper. No abstract).
19. T.R. Symons, S.T. Cornett, M.J. Cavagnero and D.A. Harmin, "Rydberg Atom State Mixing in a Time-Dependent Electric Field and Implications for Selective-Field Ionization", (DAMOP-APS, Ann Arbor, Michigan, May 15-18, 1996). Abstract: Bull. Am. Phys. Soc. 41, 1072 (1996).
20. S.T. Cornett, T.R. Symons and M.J. Cavagnero, "Floquet Analysis of Rydberg State Evolution in Half-Cycle Pulses", (DAMOP-APS, Ann Arbor, Michigan, May 15-18, 1996). Abstract: Bull. Am. Phys. Soc. 41, 1145 (1996).
21. M.J. Cavagnero and S.T. Cornett, "Multiphoton Microwave Processes in Rydberg Atoms", (APS Spring Meeting, Washington D.C., April 18-21, 1997). Abstract: Bull. Am. Phys. Soc. 42, 957 (1997).
22. J.H. Macek and M.J. Cavagnero, "The Demkov-Osherov Model Revisited", (APS Spring Meeting, Washington D.C., April 18-21, 1997). Abstract: Bull. Am. Phys. Soc. 42, 1028 (1997).
23. D.M. Homan, M.J. Cavagnero and K.B. MacAdam, "Predicted Structure in Velocity, Impact-parameter and Final-n dependences of Ion-Rydberg Capture", (APS Spring Meeting, Washington D.C., April 18-21, 1997). Abstract: Bull. Am. Phys. Soc. 42, 1033 (1997).
24. S.T. Cornett, H.R. Sadeghpour, and M.J. Cavagnero, "Quantum defect theory of photodissociation: Predissociation of LiF", XX International Conference on Photonic, Electronic and Atomic Collisions (Vienna, Austria, July 23-29, 1997). Abstracts of Contributed Papers, XX ICPEAC, Volume 1, edited by F. Aumayr, G. Betz and H.P. Winter, p. WE-043.
25. M.J. Cavagnero, "Analytical Wave Functions for Ultracold Collisions", (DAMOP-APS, Santa Fe, New Mexico, May 27-30, 1998). Abstract: Bull. Am. Phys. Soc. 43, 1280 (1998).

26. S.T. Cornett, H.R. Sadeghpour and M.J. Cavagnero, "Photopredissociation of LiF", (DAMOP-APS, Santa Fe, New Mexico, May 27-30, 1998). Abstract: Bull. Am. Phys. Soc. 43, 1302 (1998).
27. Balakrishnan, B. Esry, H.R. Sadeghpour, S.T. Cornett, M.J. Cavagnero, "Quantum wave packet dynamics of the photodissociation of LiF". (Centennial Meeting of the APS, Atlanta, GA, 1999). Abstract: Bull. Am. Phys. Soc. 44, 1104 (1999).
28. M. Cavagnero, S. Cornett, H. Karacali and H. Sadeghpour, "Analytical wavefunctions for ultracold H + H collisions", (Centennial Meeting of the APS, Atlanta, GA, 1999). Abstract: Bull. Am. Phys. Soc. 44, 345 (1999).
29. S.T. Cornett, M.J. Cavagnero, N. Balakrishnan, and H.R. Sadeghpour, "Ab Initio Calculations of the Photopredissociation of NaI", (DAMOP-APS, Storrs, CT, June 14-17, 2000). Abstract: Bull. Am. Phys. Soc. 45, 47 (2000).
30. A.B. Alekseyev, N. Balakrishnan, H.R. Sadeghpour, S.T. Cornett and M.J. Cavagnero, "Time and frequency dynamics in photodissociation of NaI", (DAMOP-APS, Storrs, CT, June 14-17, 2000). Abstract: Bull. Am. Phys. Soc. 45, 94 (2000).
31. M. Cavagnero, "The Scale Renormalization of Few-Body Systems", (DAMOP-APS, London, Ontario, May 16-19, 2001). Abstract: Bull. Am. Phys. Soc. 46, 67 (2001).
32. M. Cavagnero, "The Scale Renormalization of Few-body Dynamics", XXII International Conference on Photonic, Electronic and Atomic Collisions (Santa Fe, New Mexico, USA, July 18-24, 2001). Abstracts of Contributed Papers, XXII ICPEAC, edited by S. Datz, M.E. Bannister, H.F. Krause, L.H. Saddiqu, D.R. Schultz and C.R. Vane (Rinton Press, Princeton NJ, 2001), p. 196.
33. H. Ouerdane, M. J. Jamieson, D. Vrinceanu and M. J. Cavagnero, "The variable phase method used to calculate and correct scattering lengths", XXIII International Conference on Photonic, Electronic and Atomic Collisions (Stockholm, Sweden, July 2003).
34. M. Cavagnero and D. Vrinceanu, "The Influence of Strong Coupling on Threshold Phenomena", (DAMOP-APS, Tucson, Arizona, May 25-29, 2004).
35. M. Cavagnero, "Convergent Atomic and Molecular Asymptotics, (DAMOP-APS, Lincoln, Nebraska, May 17-21, 2005).
36. J. von Stecher, S. Rittenhouse, M. Cavagnero and C. Greene, "Exploring the Possibility of Collapse in a Degenerate Fermi Gas", (APS March Meeting, Baltimore, Maryland, March 13-17, 2006).
37. Catherine Newell, Vladimir Roudnev, M. J. Cavagnero and John Bohn, "Cold and ultracold dipole-dipole collisions", (DAMOP-APS, Calgary, Ontario, June 5-9, 2007). Abstract: 2007APS..DMP.D1023N.
38. C. Newell, M. Cavagnero, and V. Roudnev, "Semi-classical study of cold inelastic dipole-dipole collisions", (DAMOP-APS, State College, PA, May 27-31, 2008). Abstract: 2008APS..DMP.R1.00108.
39. V. Roudnev, and M. Cavagnero, "Anisotropic threshold scattering in ultracold dipolar gases", (DAMOP-APS, State College, PA, May 27-31, 2008). Abstract: 2008APS..DMP.R1.00109.
40. C. Newell and M. Cavagnero, "Inelastic collisions in cold dipolar gases", (DAMOP-APS, Charlottesville, VA, May 19-23, 2009). Abstract: BAPS.2009.DAMOP.M1.93.

41. V. Roudnev and M. Cavagnero, "Resonance phenomena in ultracold dipole-dipole scattering of bosons and fermions," (DAMOP-APS, Charlottesville, VA, May 19-23, 2009). Abstract: BAPS.2009.DAMOP.T1.121.
42. V. Roudnev and M. Cavagnero, "Dipole-dipole scattering in momentum space," (DAMOP-APS, Charlottesville, VA, May 19-23, 2009). Abstract: BAPS.2009.DAMOP.T1.122.
43. V. Roudnev and M. Cavagnero, "Benchmark calculations for small rare gas clusters", (DAMOP-APS, Houston, Texas, May 25-29, 2010) Abstract: BAPS.2010.DAMOP.M1.57.
44. V. Roudnev and M. Cavagnero, "Phillips line and the universality in elastic three-body collisions", (DAMOP-APS, Atlanta, Georgi, June 13-17, 2011) Abstract: BAPS.2011.DAMOP.Q1.170.
45. V. Roudnev and M. Cavagnero, "Progress in development of public three-body code", (DAMOP-APS, Orange County, CA, June 4-8, 2012) Abstract: BAPS.2012.DAMOP.D1.43.
46. Sergey Yakovlev, Vladimir Roudnev, Vitaly Gradusov, and Michael Cavagnero, "Direct and indirect annihilation channels in positron-atom scattering", (DAMOP-APS, Orange County, CA, June 4-8, 2012) Abstract: BAPS.2012.DAMOP.K1.58.

INVITED TALKS AT CONFERENCES AND WORKSHOPS:

A hyperspherical description of N-electron atoms. NATO Advanced Study Institute, "Fundamental Processes of Atomic Dynamics," Maratea, Italy, September 29, 1987.

A comparison of quasi-atomic and LCAO models of the electron impact dissociation of H_2^+ in Born approximation. Tenth Conference on the Application of Accelerators in Research and Industry, Denton, Texas, November 9, 1988.

Mechanisms of slow muon capture. ITAMP Workshop on Hidden Crossings in Ion-Atom Collisions, Harvard-Smithsonian Center for Astrophysics, May 17, 1991.

Understanding the super-promotion mechanism in ion-atom collisions. Department of Energy Contractors Workshop, University of Virginia, October 13, 1993.

Modelling charged-particle collisions with Rydberg atoms. APS Spring Meeting, Crystal City, Virginia, April 20, 1994.

The dynamics of weakly bound states in collisions and fields. Department of Energy Contractors Workshop, University of Kentucky, October 15, 1994.

Core-mediated dynamical processes in Rydberg atoms. ITAMP Workshop on Electron Correlations, Harvard-Smithsonian Center for Astrophysics, November 1, 1997.

Modified effective-range theory revisited. ITAMP Workshop on Threshold Phenomena, Harvard-Smithsonian Center for Astrophysics, June 9, 1998.

Ultracold collisions and the motions of the moon. ITAMP Workshop on Threshold Phenomena, Harvard-Smithsonian Center for Astrophysics, June 12, 1998.

The Few-body Physics of Antihydrogen Formation. ITAMP Workshop on Cold Antimatter, Harvard-Smithsonian Center for Astrophysics, April 18, 2002. Online talk:

<http://itamp.harvard.edu/antimatter/cavagnero.ram>

Photoabsorption in Alkali-Halide Molecules. Fano Memorial Symposium, Harvard-Smithsonian Center for Astrophysics, July 24, 2002. Online talk: <http://itamp.harvard.edu/fano/cavagnero.ram>

Solution of three-dimensional Faddeev equations on example of ultracold Helium trimer. Elena Kolganova, V. Roudnev and M. Cavagnero, 2nd South Africa –JINR Symposium, September 8–11, 2010, Dubna, Russia.

INVITED COLLOQUIA AND SEMINARS:

Multipole expansions for the interpretation of collisions and spectra. Atomic Physics Seminar, Kansas State University, April 11, 1988.

The sizes, shapes, and modes of small atoms and molecules. Physics and Astronomy Colloquium, University of Nebraska-Lincoln, February 20, 1989.

Beyond Condon and Shortley: New trends in atomic spectroscopy. Physics and Astronomy Colloquium, University of Kentucky, April 21, 1989.

The dynamics of slow muon capture. Physics Department Colloquium, Louisiana State University, February 6, 1990.

Electron-dipole interactions. ITAMP Seminar, Harvard-Smithsonian Center for Astrophysics, February 2, 1993.

The physics of symmetry. Geological Sciences Colloquium, University of Kentucky, February 15, 1994.

Resonant Interactions in Ion Collisions with Rydberg Atoms. ITAMP Seminar, Harvard-Smithsonian Center for Astrophysics, November 17, 1995.

Cooking Atoms in the Microwave. Physics Department Colloquium, Auburn University, January 24, 1997.

Analytical Wavefunctions for Cold Collisions. ITAMP Seminar, Harvard-Smithsonian Center for Astrophysics, September 9, 1997.

Quasiclassical Rydberg Targets: New challenges for collision theory. Joint ITAMP/Harvard Physics Colloquium, Harvard University, November 19, 1997.

Analytical wavefunctions for ultracold collisions. Physics Department Seminar, University of Connecticut, December 4, 1997.

Analytical wavefunctions for ultracold collisions. JILA Seminar, University of Colorado, Boulder, CO, March 14, 1998.

Towards a Theory of Long-Range Forces. Invited Seminar, University of Nebraska, Lincoln, June, 1999.

The Interferometric Manipulation of Chemical Bonds. Invited Colloquium, University of Nebraska, Lincoln, September, 1999.

Wavepacket Description of Long-Lived Resonant States. Invited Seminar, Univ. Kentucky Center for Computational Sciences, Lexington, September 1999.

Threshold Laws for Atoms and Molecules. Invited Seminar, University of Nebraska, Lincoln, NE, September, 1999.

Driving the Ionic Bond. Invited Colloquium, University of Miami-Ohio, Oxford, OH, October, 1999.

Rules of Thumb for a Dipolar Gas. Invited Seminar. Yale University Department of Physics. September 29, 2009.

Rules of Thumb for a Dipolar Gas. Invited Seminar. Institute for Theoretical Atomic, Molecular and Optical Physics, Harvard-Smithsonian Center for Astrophysics, September 30, 2009.

What little we know about dipoles. Invited Colloquium. IUPUI, March 29, 2012.

RESEARCH GRANTS AND PROPOSALS:

University of Kentucky 1991 and 1992 Special Summer Faculty Research Fellowships from the Fund for Excellence.

The Coherent Evolution of Weakly Bound States in Collisions and Fields. M. J. Cavagnero and D. A. Harmin. Awarded from U.S. Dept. of Energy. 1992-1995: \$270,000.

The Dynamics of Weakly Bound States in Collisions and Fields. M. J. Cavagnero and D. A. Harmin. U.S. Department of Energy. 1995-1999: \$310,891.

The Dynamics of Weakly Bound States in Collisions and Fields. M. J. Cavagnero and D. A. Harmin. U.S. Department of Energy. 1999-2000: \$112,000.

Electron-Rydberg Collisions at eV and Sub-eV Energies. K. B. MacAdam and M. J. Cavagnero. Joint Experiment/Theory Grant from the National Science Foundation. 2000-2005: \$618,000.

Universal quantum few-body codes for research and education. M. Cavagnero. National Science Foundation, 2009-present: \$300,000.

HONORS AND FELLOWSHIPS:

University Scholar, University of Connecticut, 1979-1981.

Phi Beta Kappa, 1981.

Sigma Pi Sigma, 1981.

Visiting Scientist, Observatoire de Paris, 7/85-8/85.

Visiting Scientist, Harvard-Smithsonian CfA, Cambridge, 7/97-7/98.

Fellow of the American Physical Society, Elected, November 2000.

"For creative analyses of atomic collisions, fragmentation and electron correlation, which incorporate keen insight into innovative mathematical formulations; and for energizing many successful collaborations with experimental and theoretical colleagues."

MEMBERSHIPS:

American Physical Society (Fellow)

Kentucky Association of Physics Teachers

GRADUATE DEGREES AND POST-DOCTORALS MENTORED:

T. Symons, M.S. 1994-1996. Co-chair with D.A. Harmin.

Thesis: Rydberg Atom State Mixing in a Time-dependent Electric Field with Implications for Selective-Field Ionization.

D.M. Homan, Ph. D. 1993-1997. Co-Chair with Keith B. MacAdam.

Thesis: Electron Processes in Ion-Rydberg Atom Collisions with Emphasis on Directed Linear Stark States.

S.T. Cornett, Ph. D. 1994-1999.

Thesis: Multi-channel Quantum Defect Theory of Photopredissociation In Lithium Fluoride.

Catherine Newell, Ph. D. 2000-2010.

Thesis: Inelastic Collisions in Cold Dipolar Gases.

Dr. Amarjeet Bhullar Singh, Postdoc 2001-2003.

Dr. Vladimir Roudnev, Postdoc 2006-2009.

UNIVERSITY SERVICE:

Physics and Astronomy Departmental Committees (various terms):

Qualifying Exam, 1991-1992.

Graduate Recruiting, Newsletter and Publicity, 1991-1992.

Ad hoc Committee for Design of a Cumulative Exam, 1993.

Undergraduate Program and Curriculum Committee, 1992-1996.

Organizer of the Atomic, Molecular and Optical Physics Seminars, 1991-1997, 1999-2002.

Subcommittee for Undergraduate Recruiting and Scholarships,
1991-1997. (Chair)

Department Council, 1990-1991, 1996-1997, 1999-2002.

Cumulative Exam Steering Committee, 1996-1997.

Graduate Program and Curriculum Committee, 1998-1999. (Chair)

Ad Hoc GANN Fellowship Proposal Committee, 1999-2000.

Promotion and Tenure Committee, 1999-2000.

Ad Hoc New Building Committee, 2002.

Graduate Program and Curriculum Committee, 2001-present.

Graduate Recruiting Subcommittee, 1999-2003. (Chair)

Department Chair, 2005-present.

Ex-Officio member of all Department Committees, 2005-present.

Other University Service:

Organized Annual Workshop for High School Students, 1992-1997.

Lecturer/Demonstrator at the Annual Physics Spectacular, 1992-1997 and 1999-2002.

Undergraduate Advisor to several students each year, 1992-2005.

Ph. D. Advisory Committee member for several graduate students per year from 1992-2005.

University Senate. Elected to three year term, 2003-2006.

University QEP Topic Selection Team. Spring 2010 – 2011.

Department Chair, July 2005 – present.

PROFESSIONAL SERVICE:

Co-organizer, XV U.S. Department of Energy Atomic Physics Program
Workshop, Lexington, KY, October 14-15, 1994.

Co-organizer, Exotic Atoms Symposium, Spring Meeting of the American
Physical Society, 1998.

Co-organizer of the workshop on The Role of Theory in Atomic, Molecular and Optical Physics,
held at ITAMP, Harvard-Smithsonian CFA, 26-27 February, 1999.

Secretary, Theoretical Atomic, Molecular and Optical Community,
Elected by DAMOP-APS, August 1997-November 2000.

Member, Outstanding Thesis Award Committee of APS Division of Atomic,
Molecular and Optical Physics, 2007-2009.

Member, Nominating Committee, APS Topical Group on Few-body Systems, 2010-
2012.

Proposal Referee for the Department of Energy and the National Science
Foundation.

Manuscript Referee for Physical Review Letters, Physical Review A, Journal of Physics B, Journal
of Physics A, Annals of Physics and the European Physics Journals.

Kentucky Statewide EPSCoR Committee Member, November 2008 – July 2012.

Kentucky NSF EPSCoR subcommittee member, November 2008 – July 2012.

TEACHING EXPERIENCE:

Courses taught:

Freshman Seminar, Physics 105
The Science of Time, A&S 100
Measuring Science, A&S100
Stars, Galaxies and The Universe, Astronomy 192
General Physics, Physics 211
General Physics, Physics 213
General University Physics, Physics 231
General University Physics, Physics 232
Theoretical Methods of Physics, Physics 306
Classical Mechanics, Physics 404G
Undergraduate Quantum Mechanics, 520
Fundamental Atomic Physics, Physics 554
Scattering Theory, Physics 600
Graduate Quantum Mechanics, Physics 614&615
Graduate Atomic Physics, Physics 651