

CURRICULUM VITAE

Mark Anthony Caprio

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EDUCATION

Ph.D., Yale University, 2003. Physics.
M.Phil., Yale University, 1999. Physics.
M.S., Yale University, 1998. Physics.
B.S., Oglethorpe University, 1994. Physics, Mathematics. *Summa cum laude.*

POSITIONS

Assistant Professor, Department of Physics, University of Notre Dame (2007–).
Postdoctoral Associate, Physics Department, Yale University (2003–2007).

PROFESSIONAL ACTIVITIES

Referee articles for:

Physical Review Letters, Physical Review C, Physics Letters B, Nuclear Physics A, Europhysics Letters, European Physical Journal A, Journal of Physics A, Journal of Physics G, International Journal of Modern Physics E, and American Institute of Physics Conference Proceedings.

Review grant proposals for the US National Science Foundation.

Professional society memberships:

American Physical Society (APS)
American Association of Physics Teachers (AAPT)
American Astronomical Society (AAS)
Mathematical Association of America (MAA)

Visiting Fellow, European Centre for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy (Summers 2003–2007).

SCIENTIFIC COMPUTING

Extensive and varied programming experience, with relevance to several aspects of scientific computing: development of codes for numerical calculation, programming for symbolic computation, and design of data acquisition and data analysis software.

Development of widely-used scientific figure preparation system for Mathematica [Comput. Phys. Commun. 171, 107 (2005)].

Programming languages: C/C++, FORTRAN, Mathematica, Pascal, Intel 80x86 assembly language, BASIC, COBOL.

FUNDING

Nuclear properties at extreme density, temperature, spin, and isospin

US Department of Energy, Grant Number DE-FG02-95ER40934 (G. Mathews, S. Frauendorf, and M. A. Caprio), 2007–2010.

PUBLICATIONS AND PRESENTATIONS

ARTICLES

1. **$B(E2)$ values and phase coexistence in ^{152}Sm**
N. V. Zamfir, R. F. Casten, **M. A. Caprio**, C. W. Beausang, R. Krücken, J. R. Novak, J. R. Cooper, G. Cata-Danil, and C. J. Barton, Phys. Rev. C **60**, 054312 (1999).
2. **Phase/shape coexistence in ^{152}Sm in the geometric collective model**
Jing-Ye Zhang, **M. A. Caprio**, N. V. Zamfir, and R. F. Casten, Phys. Rev. C **60**, 061304(R) (1999).
3. **Evidence for superdeformation in $^{149,150}\text{Dy}$: Onset of the $Z=66$ deformed shell closure?**
D. E. Appelbe, C. W. Beausang, C. J. Barton, **M. A. Caprio**, R. F. Casten, J. Cederkäll, J. R. Cooper, R. Krücken, J. R. Novak, N. V. Zamfir, and Z. Wang, Phys. Rev. C **61**, 037303 (2000).
4. **The YRAST Ball array**
C. W. Beausang, C. J. Barton, **M. A. Caprio**, R. F. Casten, J. R. Cooper, R. Krücken, B. Liu, J. R. Novak, Z. Wang, M. Wilhelm, A. N. Wilson, N. V. Zamfir, and A. Zilges, Nucl. Instrum. Methods A **452**, 431 (2000).
5. **Morphologically distinct trajectories of structural evolution in nuclei and their empirical signatures**
R. F. Casten, Jing-Ye Zhang, N. V. Zamfir, **M. A. Caprio**, H. Zhang, and F. Du, Phys. Lett. B **481**, 1 (2000).
6. **Nuclear structure of ^{196}Au : More evidence for its supersymmetric description**
J. Gröger, J. Jolie, R. Krücken, C. W. Beausang, **M. A. Caprio**, R. F. Casten, J. Cederkäll, J. R. Cooper, F. Corminboeuf, L. Genilloud, G. Graw, C. Günther, M. de Huu, A. I. Levon, A. Metz, J. R. Novak, N. Warr, and T. Wendel, Phys. Rev. C **62**, 064304 (2000).

7. **Chiral doublet structures in odd-odd $N=75$ isotones: Chiral vibrations**
K. Starosta, T. Koike, C. J. Chiara, D. B. Fossan, D. R. LaFosse, A. A. Hecht, C. W. Beausang, **M. A. Caprio**, J. R. Cooper, R. Krücken, J. R. Novak, N. V. Zamfir, K. E. Zyranski, D. J. Hartley, D. L. Balabanski, Jing-Ye Zhang, S. Frauendorf, and V. I. Dimitrov, Phys. Rev. Lett. **86**, 971 (2001).
8. **Mass measurements of ^{70}Se , ^{71}Se , ^{72}Br , and ^{73}Br**
B. E. Tomlin, C. J. Barton, N. V. Zamfir, **M. A. Caprio**, R. L. Gill, R. Krücken, J. R. Novak, J. R. Cooper, K. E. Zyranski, G. Cata-Danil, C. W. Beausang, A. Wolf, N. A. Pietralla, H. Newman, J. Cederkäll, B. Liu, Z. Wang, R. F. Casten, and D. S. Brenner, Phys. Rev. C **63**, 034314 (2001).
9. **Evidence for chiral symmetry breaking in ^{136}Pm and ^{138}Eu**
A. A. Hecht, C. W. Beausang, K. E. Zyranski, D. L. Balabanski, C. J. Barton, **M. A. Caprio**, R. F. Casten, J. R. Cooper, D. J. Hartley, R. Krücken, D. Meyer, H. Newman, J. R. Novak, E. S. Paul, N. Pietralla, A. Wolf, N. V. Zamfir, Jing-Ye Zhang, and F. Dönau, Phys. Rev. C **63**, 051302(R) (2001).
10. **Two-phonon γ -vibrational strength in osmium nuclei**
C. Y. Wu, D. Cline, A. B. Hayes, M. W. Simon, R. Krücken, J. R. Cooper, C. J. Barton, C. W. Beausang, C. Bialik, **M. A. Caprio**, R. F. Casten, A. A. Hecht, H. Newman, J. Novak, N. Pietralla, K. Zyranski, and N. V. Zamfir, Phys. Rev. C **64**, 014307 (2001).
11. **Random interactions in the geometric collective model and the E(5) potential**
Jing-Ye Zhang, N. V. Zamfir, R. F. Casten, and **M. A. Caprio**, Phys. Rev. C **64**, 017302 (2001).
12. **Lifetimes in neutron-rich fission fragments using the differential recoil distance method**
R. Krücken, W.-T. Chou, J. R. Cooper, C. W. Beausang, C. J. Barton, **M. A. Caprio**, R. F. Casten, A. A. Hecht, J. R. Novak, N. Pietralla, A. Wolf, and N. V. Zamfir, Phys. Rev. C **64**, 017305 (2001).
13. **High-spin states in ^{203}Rn**
H. Newman, J. R. Novak, C. W. Beausang, C. J. Barton, **M. A. Caprio**, R. F. Casten, J. R. Cooper, A. A. Hecht, R. Krücken, N. Pietralla, A. Wolf, N. V. Zamfir, Jing-Ye Zhang, K. E. Zyranski, I. Birriel, and J. Saladin, Phys. Rev. C **64**, 027304 (2001).
14. **Coulomb excitation of the 2_{ms}^+ state of ^{96}Ru in inverse kinematics**
N. Pietralla, C. J. Barton, R. Krücken, C. W. Beausang, **M. A. Caprio**, R. F. Casten, J. R. Cooper, A. A. Hecht, H. Newman, J. R. Novak, and N. V. Zamfir, Phys. Rev. C **64**, 031301(R) (2001).
15. **Low-energy structure of ^{40}S through ^{40}P β decay**
J. A. Winger, P. F. Mantica, R. M. Ronningen, and **M. A. Caprio**, Phys. Rev. C **64**, 064318 (2001).
16. **Lifetimes of quasideuteron configurations in the odd-odd $N=Z$ nucleus $^{50}_{25}\text{Mn}_{25}$**
N. Pietralla, R. Krücken, C. J. Barton, C. W. Beausang, **M. A. Caprio**, R. F. Casten, J. R. Cooper, A. A. Hecht, J. R. Novak, N. V. Zamfir, A. Lisetskiy, and A. Schmidt, Phys. Rev. C **65**, 024317 (2002).
17. **Finite well solution for the E(5) Hamiltonian**
M. A. Caprio, Phys. Rev. C **65**, 031304(R) (2002).
18. **Interpretation of the 2^+ anomaly in vibrational nuclei**
M. A. Caprio, R. F. Casten, and J. Jolie, Phys. Rev. C **65**, 034304 (2002).
19. **^{102}Pd : An E(5) nucleus?**
N. V. Zamfir, **M. A. Caprio**, R. F. Casten, C. J. Barton, C. W. Beausang, Z. Berant, D. S. Brenner, W. T. Chou, J. R. Cooper, A. A. Hecht, R. Krücken, H. Newman, J. R. Novak, N. Pietralla, A. Wolf, and K. E. Zyranski, Phys. Rev. C **65**, 044325 (2002).
20. **Coulomb excitation of radioactive $^{132,134,136}\text{Te}$ beams and the low $B(E2)$ value of ^{136}Te**
D. C. Radford, C. Baktash, J. R. Beene, B. Fuentes, A. Galindo-Uribarri, C. J. Gross, P. A. Hausladen, T. A. Lewis, P. E. Mueller, E. Padilla, D. Shapira, D. W. Stracener, C.-H. Yu, C. J. Barton, **M. A.**

- Caprio, L. Coraggio, A. Covello, A. Gargano, D. J. Hartley, and N. V. Zamfir, Phys. Rev. Lett. **88**, 222501 (2002).
21. **$B(E2)$ values in ^{150}Nd and the critical point symmetry $X(5)$**
R. Krücken, B. Albanna, C. Bialik, R. F. Casten, J. R. Cooper, A. Dewald, N. V. Zamfir, C. J. Barton, C. W. Beausang, **M. A. Caprio**, A. A. Hecht, T. Klug, J. R. Novak, N. Pietralla, and P. von Brentano, Phys. Rev. Lett. **88**, 232501 (2002).
 22. **Lifetime and $B(E2)$ values for the 3_1^+ level in ^{152}Sm**
N. V. Zamfir, H. G. Börner, N. Pietralla, R. F. Casten, Z. Berant, C. J. Barton, C. W. Beausang, D. S. Brenner, **M. A. Caprio**, J. R. Cooper, A. A. Hecht, M. Krtička, R. Krücken, P. Mutti, J. R. Novak, and A. Wolf, Phys. Rev. C **65**, 067305 (2002).
 23. **Properties of the low-lying $K^\pi = 0^+$ excitations in ^{162}Er**
M. A. Caprio, N. V. Zamfir, R. F. Casten, G. C. Ball, K. P. Jackson, P.-A. Amaudruz, and J.-C. Thomas, Phys. Rev. C **66**, 014307 (2002).
 24. **High- j proton and neutron alignments in γ -soft ^{101}Ru**
A. D. Yamamoto, P. H. Regan, C. W. Beausang, F. R. Xu, **M. A. Caprio**, R. F. Casten, G. Gürdal, A. A. Hecht, C. Hutter, R. Krücken, S. D. Langdown, D. Meyer, J. J. Ressler, and N. V. Zamfir, Phys. Rev. C **66**, 024302 (2002).
 25. **Structure of low-lying states in ^{128}Ba from γ - γ angular correlations and polarization measurements**
A. Wolf, N. V. Zamfir, **M. A. Caprio**, Z. Berant, D. S. Brenner, N. Pietralla, R. L. Gill, R. F. Casten, C. W. Beausang, R. Krücken, K. E. Zyromski, C. J. Barton, J. R. Cooper, A. A. Hecht, H. Newman, J. R. Novak, and J. Cederkäll, Phys. Rev. C **66**, 024323 (2002).
 26. **Low-spin structure of ^{156}Dy through γ -ray spectroscopy**
M. A. Caprio, N. V. Zamfir, R. F. Casten, C. J. Barton, C. W. Beausang, J. R. Cooper, A. A. Hecht, R. Krücken, H. Newman, J. R. Novak, N. Pietralla, A. Wolf, and K. E. Zyromski, Phys. Rev. C **66**, 054310 (2002).
 27. **$B(E2)$ values from low-energy Coulomb excitation at an ISOL facility: The $N = 80, 82$ Te isotopes**
C. J. Barton, **M. A. Caprio**, D. Shapira, N. V. Zamfir, D. S. Brenner, R. L. Gill, T. A. Lewis, J. R. Cooper, R. F. Casten, C. W. Beausang, R. Krücken, and J. R. Novak, Phys. Lett. B **551**, 269 (2003).
 28. **Measurement of 2_1^+ level lifetimes in ^{162}Yb and ^{162}Er by fast electronic scintillation timing**
M. A. Caprio, N. V. Zamfir, E. A. McCutchan, R. F. Casten, Z. Berant, H. Amro, C. J. Barton, C. W. Beausang, D. S. Brenner, J. R. Cooper, R. L. Gill, G. Gürdal, A. A. Hecht, C. Hutter, R. Krücken, D. A. Meyer, J. R. Novak, N. Pietralla, P. H. Regan, and J. J. Ressler, Eur. Phys. J. A **16**, 177 (2003).
 29. **Detailed γ -ray spectroscopy of ^{55}Cr and ^{56}Cr : Confirmation of the subshell closure at $N=32$**
D. E. Appelbe, C. J. Barton, M. H. Muikku, J. Simpson, D. D. Warner, C. W. Beausang, **M. A. Caprio**, J. R. Cooper, J. R. Novak, N. V. Zamfir, R. A. E. Austin, J. A. Cameron, C. Malcolmson, J. C. Waddington, and F. R. Xu, Phys. Rev. C **67**, 034309 (2003).
 30. **Mass measurement of ^{80}Y by β - γ coincidence spectroscopy**
C. J. Barton, D. S. Brenner, N. V. Zamfir, **M. A. Caprio**, A. Aprahamian, M. C. Wiescher, C. W. Beausang, Z. Berant, R. F. Casten, J. R. Cooper, R. L. Gill, R. Krücken, J. R. Novak, N. Pietralla, M. Shawcross, A. Teymurazyan, and A. Wolf, Phys. Rev. C **67**, 034310 (2003).

31. **Competing core and single particle excitations in the 2_1^+ state in ^{44}Ca**
M. J. Taylor, N. Benczer-Koller, G. Kumbartzki, T. J. Mertzimekis, S. J. Q. Robinson, Y. Y. Sharon, L. Zamick, A. E. Stuchbery, C. Hutter, C. W. Beausang, J. J. Ressler, and **M. A. Caprio**, Phys. Lett. B **559**, 187 (2003).
32. **Signature for vibrational to rotational evolution along the yrast line**
P. H. Regan, C. W. Beausang, N. V. Zamfir, R. F. Casten, Jing-Ye Zhang, A. D. Yamamoto, **M. A. Caprio**, G. Gürdal, A. A. Hecht, C. Hutter, R. Krücken, S. D. Langdown, D. A. Meyer, and J. J. Ressler, Phys. Rev. Lett. **90**, 152502 (2003).
33. **$B(E2)$ values and the search for the critical point symmetry $X(5)$ in ^{104}Mo and ^{106}Mo**
C. Hutter, R. Krücken, A. Aprahamian, C. J. Barton, C. W. Beausang, **M. A. Caprio**, R. F. Casten, W.-T. Chou, R. M. Clark, D. Cline, J. R. Cooper, M. Cromaz, A. A. Hecht, A. O. Macchiavelli, N. Pietralla, M. Shawcross, M. A. Stoyer, C. Y. Wu, and N. V. Zamfir, Phys. Rev. C **67**, 054315 (2003).
34. **Collectivity at high spins in ^{156}Dy**
P. Petkov, A. Dewald, O. Möller, B. Saha, A. Fitzler, K. Jessen, D. Tonev, T. Klug, S. Heinze, J. Jolie, P. von Brentano, D. Bazzacco, C. Ur, E. Farnea, M. Axiotis, S. Lunardi, C. Rossi-Alvarez, G. de Angelis, D. R. Napoli, N. Marginean, T. Martinez, **M. A. Caprio**, and R. F. Casten, Phys. Rev. C **68**, 034328 (2003).
35. **Simplified approach to the application of the geometric collective model**
M. A. Caprio, Phys. Rev. C **68**, 054303 (2003).
36. **Evidence for chiral symmetry breaking in ^{140}Eu ?**
A. A. Hecht, C. W. Beausang, H. Amro, C. J. Barton, Z. Berant, **M. A. Caprio**, R. F. Casten, J. R. Cooper, D. J. Hartley, R. Krücken, D. A. Meyer, H. Newman, J. R. Novak, N. Pietralla, J. J. Ressler, A. Wolf, N. V. Zamfir, Jing-Ye Zhang, and K. E. Zyromski, Phys. Rev. C **68**, 054310 (2003).
37. **Low spin states in ^{162}Yb and the $X(5)$ critical point symmetry**
E. A. McCutchan, N. V. Zamfir, **M. A. Caprio**, R. F. Casten, H. Amro, C. W. Beausang, D. S. Brenner, A. A. Hecht, C. Hutter, S. D. Langdown, D. A. Meyer, P. H. Regan, J. J. Ressler, and A. D. Yamamoto, Phys. Rev. C **69**, 024308 (2004).
38. **Transition from the seniority regime to collective motion**
J. J. Ressler, R. F. Casten, N. V. Zamfir, C. W. Beausang, R. B. Cakirli, H. Ai, H. Amro, **M. A. Caprio**, A. A. Hecht, A. Heinz, S. D. Langdown, E. A. McCutchan, D. A. Meyer, C. Plettner, P. H. Regan, M. J. S. Sciacchitano, and A. D. Yamamoto, Phys. Rev. C **69**, 034317 (2004).
39. **g factor of the 2_1^+ state of ^{164}Yb**
Z. Berant, A. Wolf, N. V. Zamfir, **M. A. Caprio**, D. S. Brenner, N. Pietralla, R. L. Gill, R. F. Casten, C. W. Beausang, R. Krücken, C. J. Barton, J. R. Cooper, A. A. Hecht, D. M. Johnson, J. R. Novak, H. Cheng, B. F. Albanna, and G. Gürdal, Phys. Rev. C **69**, 034320 (2004).
40. **Isomer decay tagging in the heavy nuclei: ^{210}Ra and ^{209}Ra**
J. J. Ressler, C. W. Beausang, H. Ai, H. Amro, **M. A. Caprio**, R. F. Casten, A. A. Hecht, S. D. Langdown, E. A. McCutchan, D. A. Meyer, P. H. Regan, M. J. S. Sciacchitano, A. Yamamoto, and N. V. Zamfir, Phys. Rev. C **69**, 034331 (2004).
41. **Consequences of wall stiffness for a β -soft potential**
M. A. Caprio, Phys. Rev. C **69**, 044307 (2004).
42. **Test of calculations with single-particle density dependent pairing in ^{132}Te**
R. O. Hughes, N. V. Zamfir, R. F. Casten, D. C. Radford, C. J. Barton, C. Baktash, **M. A. Caprio**, A. Galindo-Uribarri, C. J. Gross, P. A. Hausladen, E. A. McCutchan, J. J. Ressler, D. Shapira, D. W. Stracener, and C.-H. Yu, Phys. Rev. C **69**, 051303(R) (2004).

43. **Possible assignment of chiral twin bands in ^{188}Ir**
D. L. Balabanski, M. Danchev, D. J. Hartley, L. L. Riedinger, O. Zeidan, Jing-Ye Zhang, C. J. Barton, C. W. Beausang, **M. A. Caprio**, R. F. Casten, J. R. Cooper, A. A. Hecht, R. Krücken, J. R. Novak, N. V. Zamfir, and K. E. Zyromski, *Phys. Rev. C* **70**, 044305 (2004).
44. **Phase structure of the two-fluid proton-neutron system**
M. A. Caprio and F. Iachello, *Phys. Rev. Lett.* **93**, 242502 (2004).
45. **γ -ray spectroscopy of ^{166}Hf : X(5) in $N > 90$?**
E. A. McCutchan, N. V. Zamfir, R. F. Casten, **M. A. Caprio**, H. Ai, H. Amro, C. W. Beausang, A. A. Hecht, D. A. Meyer, and J. J. Ressler, *Phys. Rev. C* **71**, 024309 (2005).
46. **γ -ray spectroscopy of ^{132}Te through β decay of a ^{132}Sb radioactive beam**
R. O. Hughes, N. V. Zamfir, D. C. Radford, C. J. Gross, C. J. Barton, C. Baktash, **M. A. Caprio**, R. F. Casten, A. Galindo-Uribarri, P. A. Hausladen, E. A. McCutchan, J. J. Ressler, D. Shapira, D. W. Stracener, and C.-H. Yu, *Phys. Rev. C* **71**, 044311 (2005).
47. **Phase structure of a two-fluid bosonic system**
M. A. Caprio and F. Iachello, *Ann. Phys. (N.Y.)* **318**, 454 (2005).
48. **Application of the coherent state formalism to multiply excited states**
M. A. Caprio, *J. Phys. A* **38**, 6385 (2005).
49. **LevelScheme: A level scheme drawing and scientific figure preparation system for Mathematica**
M. A. Caprio, *Comput. Phys. Commun.* **171**, 107 (2005).
50. **Effects of β - γ coupling in transitional nuclei and the validity of the approximate separation of variables**
M. A. Caprio, *Phys. Rev. C* **72**, 054323 (2005).
51. **Electromagnetic transition strengths in ^{156}Dy**
O. Möller, A. Dewald, P. Petkov, B. Saha, A. Fitzler, K. Jessen, D. Tonev, T. Klug, S. Heinze, J. Jolie, P. von Brentano, D. Bazzacco, C. A. Ur, E. Farnea, M. Axiotis, S. Lunardi, G. de Angelis, D. R. Napoli, N. Marginean, T. Martinez, **M. A. Caprio**, and R. F. Casten, *Phys. Rev. C* **74**, 024313 (2006).
52. **Analytic descriptions for transitional nuclei near the critical point**
M. A. Caprio and F. Iachello, *Nucl. Phys. A* **781**, 26 (2007).
53. **Excited state quantum phase transitions in many-body systems**
M. A. Caprio, P. Cejnar, and F. Iachello, *Ann. Phys. (N.Y.)* **323**, 1106 (2008).
54. **Construction of $\text{SO}(5) \supset \text{SO}(3)$ spherical harmonics and Clebsch-Gordan coefficients**
M. A. Caprio, D. J. Rowe, and T. A. Welsh, *Comput. Phys. Commun.* **180**, 1150 (2009).
55. **Phonon and multi-phonon excitations in rotational nuclei by exact diagonalization of the Bohr Hamiltonian**
M. A. Caprio, *Phys. Lett. B* **672**, 396 (2009).
56. **Bohr model as an algebraic collective model**
D. J. Rowe, T. A. Welsh, and **M. A. Caprio**, *Phys. Rev. C* **79**, 054304 (2009).

BOOK CHAPTERS

Quantum phase transitions in nuclei

F. Iachello and M. A. Caprio, in *Developments in Quantum Phase Transitions*, ed. L. D. Carr (Taylor and Francis, in press).

INVITED TALKS

Conferences and meetings

1. Experiments on critical point nuclei

International Conference on Nuclear Structure, Moran, Wyoming, May 2002;

in *Mapping the Triangle*, ed. A. Aprahamian, J. A. Cizewski, S. Pittel, and N. V. Zamfir, AIP Conf. Proc. No. 638 (AIP, Melville, New York, 2002), p. 17.

2. Quantum phase transitions in two-fluid systems

Workshop on Nuclei and Mesoscopic Physics, East Lansing, Michigan, October 2004;

in *Nuclei and Mesoscopic Physics*, ed. V. Zelevinsky, AIP Conf. Proc. No. 777 (AIP, Melville, New York, 2005), p. 199.

3. Dynamical symmetries in proton-neutron systems

Gordon Research Conference on Nuclear Chemistry, New London, New Hampshire, June/July 2005.

4. Phase structure of the proton-neutron system

Symmetries and Low-Energy Phase Transitions in Nuclear Structure Physics, Camerino, Italy, October 2005;

in *Symmetries and Low-Energy Phase Transitions in Nuclear Structure Physics*, ed. G. Lo Bianco (U. Camerino, 2006), p. 8.

5. Proton-neutron asymmetry in exotic nuclei

Rare Isotope Accelerator Theory Meeting, Argonne, Illinois, April 2006;

in *Opportunities with Exotic Beams*, ed. T. Duguet, H. Esbensen, K. M. Nollett, and C. D. Roberts, Proceedings from the Institute for Nuclear Theory Vol. 15 (World Scientific, Singapore, 2007), p. 81.

6. Excited state quantum phase transitions: Level density singularity and finite size scaling

Workshop on Shape Phase Transitions and Critical Point Phenomena in Nuclei, Athens, Greece, November 2006.

7. Nuclear quantum phase transitions

Excellence in Basic and Applied Nuclear Science, Monterey, California, June 2007.

8. Excited state quantum phase transitions in pairing systems

New Approaches in Nuclear Many-Body Theory (INT-07-3), Seattle, Washington, October 2007.

9. Quantum phase transitions in finite many-body systems

American Chemical Society, New Orleans, Louisiana, April 2008.

10. **Phonon and multiphonon excitations by exact diagonalization of the Bohr Hamiltonian**
Gordon Research Conference on Nuclear Chemistry, New London, New Hampshire, June 2009.
11. **Coupling coefficients for SO(5) with applications to nuclear physics**
International Symposium Symmetries in Science XIV, Bregenz, Austria, July 2009;

J. Phys. Conf. Ser. (in press).
12. **Geometric models: New results, opportunities, and challenges**
Workshop on Shape Phase Transitions and Critical Point Phenomena in Nuclei, İstanbul, Turkey, September 2009.

Seminars, colloquia, lectures, and panels

1. **Experiments on critical point nuclei**
Seminar, *Argonne National Laboratory*, Argonne, Illinois, March 2002.
2. **Softness to deformation in transitional nuclear structure**
Seminar, *European Centre for Theoretical Studies in Nuclear Physics and Related Areas*, Villazzano (Trento), Italy, July 2003.
3. **Phase structure of the proton-neutron system**
Seminar, *State University of New York at Stony Brook*, Stony Brook, New York, February 2005.
4. **Phase structure of the proton-neutron system**
Seminar, *Institute for Nuclear Theory, University of Washington*, Seattle, Washington, January 2006.
5. **Phase structure of a two-fluid bosonic system**
Seminar, *Rutgers University*, Piscataway, New Jersey, January 2006.
6. **Proton-neutron asymmetry in nuclei**
Seminar, *University of Notre Dame*, Notre Dame, Indiana, March 2006.
7. **Collective nuclear structure and proton-neutron asymmetry**
Colloquium, *Saint Mary's University*, Halifax, Nova Scotia, Canada, May 2006.
8. **Proton-neutron asymmetry in nuclear structure**
Seminar, *University of York*, Heslington, York, United Kingdom, June 2006.
9. **Nuclei, quantum phase transitions, and mesoscopic systems**
Colloquium, *University of Notre Dame*, Notre Dame, Indiana, November 2006.
10. **Excited state quantum phase transitions in mesoscopic systems**
Mesoscopic Theory Lecture, *Michigan State University*, East Lansing, Michigan, November 2007.
11. **Excited state quantum phase transitions**
Seminar, *Argonne National Laboratory*, Argonne, Illinois, December 2007.
12. **Modern trends in physics education**
Panel, *Today's Physics for Tomorrow's World* (Yale Physics Alumni Conference), New Haven, Connecticut, November 2008.
13. **Algebraic methods for the Bohr Hamiltonian**
Seminar, *Università degli Studi di Padova*, Padova, Italy, May 2009.
14. **Nuclear structure with the algebraic collective model**
Seminar, *University of York*, Heslington, York, United Kingdom, May 2009.

15. **Algebraic methods for the geometric Hamiltonian**
Seminar, *Yale University*, New Haven, Connecticut, October 2009.

CONTRIBUTED TALKS

1. **Investigation of excited $K=0$ bands using the Yale Moving Tape Collector**
M. A. Caprio, *Nuclear Structure Physics near the Coulomb Barrier*, New Haven, Connecticut, June 1999.
2. **Mass measurements along the rp-process path**
D. S. Brenner, B. E. Tomlin, C. J. Barton, N. V. Zamfir, R. L. Gill, G. Cata-Danil, R. Krücken, C. W. Beausang, R. F. Casten, J. Cedarkäll, B. Liu, M. A. Caprio, J. R. Novak, J. R. Cooper, and Z. Wang, *Tenth International Symposium on Capture Gamma Ray Spectroscopy and Related Topics*, Santa Fe, New Mexico, August/September 1999;

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3. **Evidence for chiral symmetry in the mass $A\sim 130$ region**
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6. **Study of collective 0^+ excitations in ^{162}Er at ISAC**
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7. **Study of collective 0^+ excitations in ^{162}Er at ISAC**
M. A. Caprio, *Gordon Research Conference on Nuclear Chemistry*, New London, New Hampshire, June 2001.
8. **Physics with heavy neutron-rich RIBs at the HRIBF**
D. C. Radford, C. Baktash, A. Galindo-Uribarri, C. J. Gross, T. A. Lewis, P. E. Mueller, P. A. Hausladen, D. Shapira, D. W. Stracener, C.-H. Yu, B. Fuentes, E. Padilla, D. J. Hartley, C. J. Barton,

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9. **Shape changes and test of the critical-point symmetry X(5) in $N = 90$ nuclei**

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30. **Nuclear structure and triaxiality with the algebraic collective model**

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31. **Nuclear structure with the algebraic collective model**

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Author or coauthor of an additional 49 contributions at professional society meetings (American Physical Society, American Chemical Society, Mathematical Association of America, and Deutsche Physikalische Gesellschaft), including the following presented as primary author:

Study of excited 0^+ states in ^{164}Er using the Yale Moving Tape Collector

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Lifetime measurements in transitional nuclei by fast electronic scintillation timing

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APS Division of Nuclear Physics, Oakland, California, October 2008.

DISSERTATION

Structure of collective modes in transitional and deformed nuclei

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