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Education

Ph.D.: June 1985, Yale University, Physics Department, New Haven, CT
M.S.: June 1981, Yale University, Physics Department, New Haven, CT
M.Phil.: June 1981, Yale University, Physics Department, New Haven, CT
B.S.: June 1979, Bogazici University, Istanbul, Turkey

Positions

Professor of Physics (2000-present)
Vanderbilt University, Department of Physics and Astronomy, Nashville, TN
Associate Professor of Physics (1993-2000)
Vanderbilt University, Department of Physics and Astronomy, Nashville, TN
Assistant Professor of Physics (1986-1993)
Vanderbilt University, Department of Physics and Astronomy, Nashville, TN
Research Investigator (1985-1986)
University of Pennsylvania, Physics Department, Philadelphia, PA
Research Assistant (1983-1985)
Oak Ridge National Laboratory, Physics Division, Oak Ridge, TN
Research Assistant (1981-1983)
Wright Nuclear Structure Laboratory, Yale University, New Haven, CT
Teaching Assistant (1979-1981)
Physics Department, Yale University, New Haven, CT
Research Assistant (June-September 1978)
Rutherford Laboratory, Oxford, UK

Specialization and Memberships

Main Field: Theoretical Nuclear Physics
Other Fields: Computational Physics
Memberships: APS-DNP, FRIB Theory Alliance, TALENT

Recent Conference Scientific Committee/IAC Memberships

1. Co-organizer, session on Fusion/Fission, *Gordon Research Conference (GRC2015)*
2. International Advisory Committee, **ICFN6** (November, 2016)
3. International Advisory Committee, **FUSION17** (February 2017)
4. Scientific Committee, **SHE2017** (September 2017)
5. Scientific Committee, **NNPA2018**, Antalya, Turkey (June 2018)
6. Scientific Committee, **TAN '19**, Wilhelmshaven, Germany (August 2019)
7. International Advisory Committee, **FUSION20** (November 2020)

Publication Summary

Articles Published in Refereed Journals: 139

Articles Published in Books: 55

Abstracts and Seminars: 79

International Conferences: 83

Editor of Conference Proceedings: 2

Physical Review C	70
Physical Review A	6
Physical Review B	1
Physical Review E	2
Physical Review Letters	7
Physics Letters A,B	12
Nuclear Physics A	4
Prog. Part. Nucl. Phys.	1
J. Phys. G	3
Front. Phys.	2
Intl. Journal of Mod. Phys.	3
J. of Computational Phys.	2
Comp. Phys. Comm.	5
Astrophysical Journal	2
Eur. Phys. J	15
Physics Reports	1
Annals of Physics	1
Nucl. Inst. Meth. B	1

Ph.D. Students

David Dean: 1987-1991, Associate Director, ORNL Physical Sciences

Cem Güçlü: 1989-1995, Professor, ITU, Istanbul, Turkey

Alan Calder: 1992-1997, Associate Professor, Stony Brook

Edgar Teran: 1998-2003, Scientist, PROS Software, Houston, TX

David Pigg: 2007-2012, Assistant Professor, Lee University

Kyle Godbey: 2016-2019, Research Associate, Texas A&M University

Research Funding and Fellowships

DOE-NP

Helmholtz Visiting Fellow

DOE Grand Challenge Award

Consultant:

Graduate Fellowship:

Undergraduate Fellowship:

Funded continuously since 1987

Frankfurt/GSI, January – May, 2010

High Performance Computing and Communications
The Quantum Structure of Matter (with ORNL, 1992)

Oak Ridge National Laboratory, 1986-1994

Yale University, 1979-1981

Turkish Science Research Council, 1976-1979

Articles Published in Refereed Journals

1. [Time-Dependent Hartree-Fock Picture of Nuclear Molecular Resonances](#), Phys. Lett. 135B, 261-265 (1984), M.R. Strayer, R.Y. Cusson, A.S. Umar, P.-G. Reinhard, D.A. Bromley, and W. Greiner.
2. [A Time-Dependent External Field Model for Particle Emission in Heavy-Ion Reactions](#), Phys. Lett. 140B, 290-294 (1984), A.S. Umar, M.R. Strayer, and D.J. Ernst.
3. [Mean-Field Theory of Prompt, High-Energy Nucleon Emission](#), Phys. Rev. C30, 1934-1948 (1984), A.S. Umar, M.R. Strayer, D.J. Ernst, and K.R.S. Devi.
4. [Time-Dependent Hartree-Fock Calculations of \$4\text{He}+^{14}\text{C}\$, \$^{12}\text{C}+^{12}\text{C}\(0^+\)\$, \$4\text{He}+^{20}\text{Ne}\$ Molecular Formations](#), Phys. Rev. C32, 172-183 (1985), A.S. Umar, M.R. Strayer, R.Y. Cusson, P.-G. Reinhard, and D.A. Bromley.
5. [Correlations Between Preequilibrium Nucleons](#), Phys. Rev. Lett. 55, 584-587 (1985), D.J. Ernst, M.R. Strayer, and A.S. Umar.
6. [Nuclear Shape-Isomeric Vibrations](#), Phys. Lett. B171, 353-357 (1986), A.S. Umar and M.R. Strayer.
7. [Application of a Self-Consistent Theory of Large Amplitude Collective Motion to the Generalized Lipkin Model](#), Nucl. Phys. A458, 246-258 (1986), A.S. Umar and Abraham Klein.
8. [Resolution of the Fusion Window Anomaly in Heavy-Ion Reactions](#), Phys. Rev. Lett. 56, 2793-2796 (1986), A.S. Umar, M.R. Strayer, and P.-G. Reinhard.

9. [Relativistic Hartree Calculations for Axially Deformed Nuclei](#), Phys. Rev. Lett. 57, 2916-2919 (1986), S.-J. Lee, J. Fink, A.B. Balantekin, M.R. Strayer, A.S. Umar, P.-G. Reinhard, J.A. Maruhn, and W. Greiner.
10. [Physical Interpretation and Quantization of Periodic TDHF Solutions](#), Phys. Rev. C34, 1965-1968 (1986), Abraham Klein and A.S. Umar.
11. [Physical Interpretation of Time-Dependent Hartree-Fock Density Matrix for Heavy-Ion Scattering](#), Phys. Rev. C35, 1672-1677 (1987), Abraham Klein and A.S. Umar.
12. [Enhanced Dissipation in New Mean Field Studies of Strongly Damped Collisions](#), Phys. Lett. B196, 419-423 (1987), S.-J. Lee, A.S. Umar, K.T.R. Davies, M.R. Strayer, and P.-G. Reinhard.
13. [Relativistic Hartree Calculations for Axially Deformed Nuclei](#), Phys. Rev. Lett. E59, 1171-1172 (1987), S.-J. Lee, J. Fink, A.B. Balantekin, M.R. Strayer, A.S. Umar, P.-G. Reinhard, J.A. Maruhn, and W. Greiner.
14. [Dissipation and Forces in TDHF](#), Phys. Rev. C37, 1026-1035 (1988), P.-G. Reinhard, A.S. Umar, K.T.R. Davies, M.R. Strayer, and S.-J. Lee.
15. [Numerical Method for the Calculation of Continuum Excitation Amplitudes for Time-Dependent External Field Problems](#), Phys. Rev. C37, 2487-2494 (1988), C. Bottcher, M.R. Strayer, A.S. Umar, V.E. Oberacker.
16. [Spin-Orbit Force in TDHF Calculations of Heavy-Ion Collisions](#), Phys. Rev. C40, 706-714 (1989), A.S. Umar, P.-G. Reinhard, M.R. Strayer, K.T.R. Davies, and S.-J. Lee.
17. [Velocity Dependence of Prompt, High-Energy Nucleon Emission](#), Phys. Rev. C40, 1213-1218 (1989), D.J. Dean, A.S. Umar, and M.R. Strayer.
18. [Damped Relaxation Method to Calculate Relativistic Bound States](#), Phys. Rev. A40, 4182-4189 (1989), C. Bottcher, M.R. Strayer, A.S. Umar, and P.-G. Reinhard.
19. [Lattice Calculation of Muon-Pair Production with Capture In Relativistic Heavy-Ion Collisions](#), Phys. Rev. A41, 1399-1407 (1990), M.R. Strayer, C. Bottcher, V.E. Oberacker, and A.S. Umar.
20. [Basis-Spline Collocation Method for the Lattice Solution of Boundary Value Problems, J. Comp. Phys.](#) 93, 426-448 (1991), A.S. Umar, J. Wu, M.R. Strayer, and C. Bottcher.
21. [Numerical Methods for Nuclear Mean Field Dynamics, A thematic issue on Time Dependent Methods for Quantum Dynamics](#), Comp. Phys. Comm. 63, 179-188 (1991), A.S. Umar and M.R. Strayer.
22. [Nuclear Hartree-Fock Calculations with Splines](#), Phys. Rev. C44, 2512-2521 (1991), A.S. Umar, M.R. Strayer, J.-S. Wu, D.J. Dean, and C. Güçlü.
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30. [*Dynamical Evolution of Hadronic Matter in Relativistic Collisions*](#), Phys. Rev. C48, 2433-2442 (1993), D.J. Dean, A.S. Umar, and M.R. Strayer.
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60. [Time-Dependent Response Calculations of Nuclear Resonances](#), A.S. Umar and V.E. Oberacker, Phys. Rev. C 71, 034314 (2005).
61. [Prompt Muon-Induced Fission: A Sensitive Probe for Nuclear Energy Dissipation and Fission Dynamics](#), V.E. Oberacker and A.S. Umar, **Muons: New Research**, (Nova Science Publishers, New York, 2005) pp. 179-208.
62. [Three-Dimensional Unrestricted Time-Dependent Hartree-Fock Fusion Calculations Using the Full Skyrme Interaction](#), A.S. Umar and V.E. Oberacker, Phys. Rev. C 73, 054607 (2006).
63. [Time-Dependent Hartree-Fock Fusion Calculations for Spherical, Deformed Systems](#), A.S. Umar and V.E. Oberacker, Phys. Rev. C74, 024606 (2006).
64. [Heavy-Ion Interaction Potential Deduced From Density-Constrained Time-Dependent Hartree-Fock Calculation](#), A.S. Umar and V.E. Oberacker, Phys. Rev. C74, 021601(R) (2006).
65. [Dynamic Deformation Effects in Subbarrier Fusion of \$^{64}\text{Ni}+^{132}\text{Sn}\$](#) , A.S. Umar and V.E. Oberacker, Phys. Rev. C74, 061601 (Rapid Communication) (2006).
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75. [Microscopic Study of the Triple-Alpha Reaction](#), A. S. Umar, J. A. Maruhn, N. Itagaki, and V. E. Oberacker, Physical Review Letters 104, 212503 (2010).
76. [Entrance Channel Dynamics of Hot and Cold Fusion Reactions Leading to Superheavy Elements](#), A. S. Umar, V. E. Oberacker, J. A. Maruhn, and P.-G. Reinhard, Phys. Rev. C 81, 064607 (2010).
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78. [Microscopic study of the \$^{132,124}\text{Sn}+^{96}\text{Zr}\$ reactions: Dynamic excitation energy, energy-dependent heavy-ion potential, and capture cross section](#), V.E. Oberacker, A.S. Umar, J. A. Maruhn, and P.-G. Reinhard, Phys. Rev. C 82. 034603 (2010).
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80. [Microscopic Calculation of Heavy-Ion Potentials Based on TDHF](#), A.S. Umar, V.E. Oberacker, J.A. Maruhn, and P.-G. Reinhard, Eur. Phys. J. 17, 09001 (2011).
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83. [Dynamic Microscopic Study of Pre-equilibrium Giant Resonance Excitation and Fusion in the Reactions \$^{132}\text{Sn} + ^{48}\text{Ca}\$ and \$^{124}\text{Sn} + ^{40}\text{Ca}\$](#) , V. E. Oberacker, A. S. Umar, J. A. Maruhn, and P.-G. Reinhard, Phys. Rev. C 85, 034609 (2012).
84. [Microscopic Study of Ca + Ca Fusion](#), R. Keser, A. S. Umar, and V. E. Oberacker, Phys. Rev. C 85, 044606 (2012).
85. [Microscopic sub-barrier fusion calculations for the neutron star crust](#), A. S. Umar, V. E. Oberacker, and C. J. Horowitz, Phys. Rev. C 85, 055801 (2012).
86. [Single-particle dissipation in a time-dependent Hartree-Fock approach studied from a phase-space perspective](#), N. Loebl, A. S. Umar, J. A. Maruhn, P.-G. Reinhard, P. D. Stevenson, and V. E. Oberacker, Phys. Rev. C 86, 024608 (2012).
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92. [Formation and Dynamics of Fission Fragments](#), C. Simenel and A.S. Umar, Phys. Rev. C 89, 031601(R) (2014).
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100. [Time-dependent HF approach to SHE dynamics](#), A.S. Umar and V.E. Oberacker, Nucl. Phys. A 944, 238-256 (2015).
101. [Quantal description of nucleon exchange in a stochastic mean-field approach](#), S. Ayik, O. Yilmaz, B. Yilmaz, A. S. Umar, A. Gokalp, G. Turan, and D. Lacroix, Phys. Rev. C 91, 054601 (2015).
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46. *Fusion with DC-TDHF*, A.S. Umar and V.E. Oberacker, **2nd LACM-EFES-JUSTIPEN Workshop**, Oak Ridge, TN, January 23-25, 2008.
47. *Mean Field Dynamics of Nuclear Reactions*, **Summer School IV on Nuclear Collective Dynamics, Istanbul**, Turkey, June 30-July 4, 2008.
48. *Density-Constrained TDHF Calculations of Fusion and Fission Barriers*, A.S. Umar, V.E. Oberacker, P.-G. Reinhard, and J.A. Maruhn, **Nuclear Structure and Dynamics (NSD09)**, Dubrovnik, Croatia, May 4-8, 2009.
49. *Multi-Nucleon Transfer as Doorway to Fusion of Neutron-Rich Nuclei*, V.E. Oberacker and A.S. Umar, **8th Intl. Conf. Radioactive Nuclear Beams (RNB8)**, Grand Rapids, Michigan, May 2009.
50. **International Symposium on Frontiers of Researches in Exotic Nuclear Structures, Microscopic Study of the triple- α Reaction**, J. A. Maruhn, N. Loeb, A. S. Umar, N. Itagaki, M. Kimura, H. Horiuchi, and A. Tohsaki, **Niigata 2010**, March 1-4, Niigata, Japan.
51. Invited Lecturer at "**Summer School V on Nuclear Collective Dynamics**", July 4-10, 2010, Istanbul Turkey. Presented three lectures on TDHF method.

52. *Microscopic Calculation of Heavy-Ion Potentials Based on TDHF*, A.S. Umar, V.E. Oberacker, J.A. Maruhn, and P.-G. Reinhard, **FUSION11**, May 2nd – 6th, 2011, Saint-Malo, France.
53. *Static and Dynamic Chain Structures in Mean-Field Theory*, T. Ichikawa, N. Itagaki, N. Loeffl, J.A. Maruhn, V.E. Oberacker, S. Ohkubo, B. Schuetrumpf, and A.S. Umar. **FUSION11**, May 2nd – 6th, 2011, Saint-Malo, France.
54. *Microscopic calculation of heavy-ion potentials based on TDHF*, A.S. Umar and V.E. Oberacker, **Conference on Computational Physics 2011 (CCP 2011)** Gatlinburg, Tennessee, 30 October – 3 November 2011.
55. Invited Lecturer at "**Summer School VI on Nuclear Collective Dynamics**", June 24-30, 2012, Istanbul Turkey. Presented three lectures on TDHF method.
56. *Dynamic Microscopic Theory of Fusion Using DC-TDHF*, A.S. Umar, V.E. Oberacker, R. Keser, P.-G. Reinhard, and J.A. Maruhn, **Nuclear Structure and Dynamics (NSD12)**, Opatija, Croatia, July 9-13, 2012.
57. *Microscopic DC-TDHF study of heavy-ion potentials and fusion cross sections*, V E Oberacker, A S Umar, and R Keser, **11th International Conference on Nucleus-Nucleus Collisions (NN2012)**, San Antonio, TX, May 21 – June 1, 2012.
58. *Heavy-ion Fusion and Fission Using Density-Constrained TDHF*, **Fifth International Conference on Fission and Properties of Neutron-Rich Nuclei**, A.S. Umar, V.E. Oberacker, J.A. Maruhn, and R. Keser, Sanibel Island, FL, November 4-12 (2012).
59. *Fusion using time-dependent density-constrained DFT*, R. Keser, A.S. Umar, V.E. Oberacker, J.A. Maruhn, and P.-G. Reinhard, **INPC 2013**, Florence, Italy (June 2-7, 2013).
60. *Density-constrained TDDFT with application to fission*, A.S. Umar and V.E. Oberacker, **Quantitative Large Amplitude Shape Dynamics: fission and heavy ion fusion**, INT, Seattle, WA (October 7-12, 2013).
61. *Fusion and other applications of density-constrained TDDFT*, V.E. Oberacker and A.S. Umar, **Quantitative Large Amplitude Shape Dynamics: fission and heavy ion fusion**, INT, Seattle, WA (October 7-12, 2013).
62. *Applications of time-dependent density-constrained DFT*, A.S. Umar, **Advances in Time-Dependent Methods for Quantum Dynamics**, ECT*, Trento, Italy, (October 14-18, 2013).
63. *Dynamics of Quasifission and Fission*, A.S. Umar, **International Symposium on Super Heavy Nuclei**, Texas A & M University, College Station TX, USA, (March 31 - April 02, 2015)
64. *Session on Fusion and Fission*, **GRC2015 Nuclear Chemistry**, Colby-Sawyer College, New London, NH, USA (May 31 - June 5, 2015).
65. *Dynamics of Fission and Quasifission*, A.S. Umar, V.E. Oberacker, and C. Simenel, **Nuclear Structure and Dynamics III (NSD15)**, Portoroz, Slovenia, (June 14-19, 2015).
66. *Dynamics of Fusion, Fission, and Quasifission*, A.S. Umar, V.E. Oberacker, and C. Simenel, **Nucleus-Nucleus 2015 (NN2015)**, Catania, Italy, (June 21-26, 2015).

67. *Time-dependent HF approach to SHE dynamics*, A.S. Umar, **Computational Advances in Nuclear and Hadron Physics (CANHP 2015)**, Kyoto, Japan, (19-23, October, 2015)
68. *Superfluid fission dynamics with microscopic approaches*, C. Simenel, G. Scamps, D. Lacroix, and A. S. Umar, **Nuclear Structure and Related Topics (NSRT2015)**, Dubna, Russia, (14-18 July, 2015)
69. *Dynamics of quasifission in TDHF*, **Sixth International Conference on Fission and Properties of Neutron-Rich Nuclei**, A.S. Umar and C. Simenel, Sanibel Island, FL, November 6-13 (2016).
70. *Microscopic Approach To Heavy-ion Fusion: role of the Pauli principle*, **International Nuclear Physics Conference (INPC2016)**, C. Simenel, M. Dasgupta, D.J. Hinde, A.S. Umar and K. Godbey, Adelaide, Australia, September 11-16 (2016).
71. *Dependence of fusion on isospin dynamics*, A.S. Umar, C. Simenel, and S. Ayik, **FUSION17**, Hobart, Tasmania, AU, February 20-24 (2017).
72. *Effect of Pauli repulsion and transfer on fusion*, C. Simenel, K. Godbey, A. S. Umar, K. Vo-Phuoc, M. Dasgupta, D. J. Hinde, and E. C. Simpson, **FUSION17**, Hobart, Tasmania, AU, February 20-24 (2017).
73. *Fusion of neutron-rich oxygen nuclei*, Romualdo deSouza, Justin Vadas, Varinderjit Singh, Blake Wiggins, Tracy Steinbach, Zid Lin, Chuck Horowitz, Lagy Baby, Sean Kuvin, Vandana Tripathi, Ingo Wiedenhover, and Sait Umar, **FUSION17**, Hobart, Tasmania, AU, February 20-24 (2017).
74. *DC-TDHF Studies for Fusion Reactions*, A.S. Umar, **Low-Energy Nuclear Reaction Theory (LENRT17)**, Australian National University, Canberra, February 15-17 (2017).
75. *TDHF investigations of the U+ U quasifission process*, A.S. Umar and C. Simenel, **SHE2017**, Kazimierz Dolny, Poland, September 10-14 (2017).
76. *Dynamics of quasifission in TDHF*, A.S. Umar and C. Simenel, **XXXV'th Mazurian Lakes Conference on Physics**, Piaski, Poland, September 3-9 (2017).
77. *Using TDHF to study quasifission*, A.S. Umar, **GRC2017 Nuclear Chemistry**, Colby-Sawyer College, New London, NH, USA (June 18 - June 23, 2017).
78. *Equilibration dynamics and isospin effects in nuclear reactions*, A.S. Umar and C. Simenel, **IWM-EC 2018**, Catania, Italy (May 22-26, 2018).
79. *Isospin effects in nuclear reaction*, A.S. Umar, **NNPA 2018**, Antalya, Turkey (May 28-June 1st, 2018).
80. *Equilibration dynamics in nuclear reactions*, A.S. Umar, C. Simenel, and K. Godbey, **NSD 2019**, Venice, Italy (May 13-18, 2019).
81. **Future of Theory in Fission**, University of York, U.K. (Oct. 14-16. 2019).
82. **NUCLEUS2020**, Yildiz University, Istanbul, Turkey (June 1-4, 2020).
83. **FUSION20**, Shizuoka, Japan, (Nov. 15-20, 2020).

