

# JOSEPH I. KAPUSTA

Curriculum Vitae

1 May 2009

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# 1 Biographical Data

## Office

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## Birthdate

21 June 1952 Antigo, Wisconsin

## Education

PhD (Physics) - University of California/Berkeley 1978.

MA (Physics) - University of California/Berkeley 1976.

BA (Mathematics and Physics) - University of Wisconsin/Madison 1974.

## Positions

Professor - University of Minnesota, 1986 - present.

Associate Professor - University of Minnesota, 1985-86.

Assistant Professor - University of Minnesota, 1982-85.

NATO-NSF Postdoctoral Fellow and Scientific Associate in Theory Division at  
CERN, 1981-82.

Postdoctoral Fellow in Nuclear Theory Group at Los Alamos National Laboratory,  
1979-81.

Postdoctoral Fellow in Nuclear Theory Group at Lawrence Berkeley Laboratory,  
1978-79.

## Visiting Positions

Theory Division, CERN, Geneva, Switzerland, April-June 1999.

Institute for Theoretical Physics, UC Santa Barbara, August-December 1993.

Nuclear Theory Group, Brookhaven National Laboratory, August 1984.

Nuclear Theory Group, Lawrence Berkeley Laboratory, June-August 1983.

Physics Department, McGill University, July 1981.

## 2 Honors and Awards

- Member of the American Association for the Advancement of Science. I was elected a Fellow on Oct. 1, 2003. The award reads:

*For distinguished contributions to the study of hot dense matter and for editorial leadership at Physical Review C.*

- Institute of Technology Professor Award 2001.
- Member of the American Physical Society, Divisions of Nuclear Physics and of Particles and Fields. I was elected a Fellow on Nov. 14, 1992. The award reads:

*For contributions to finite-temperature field theory and its application to our understanding of the behavior of matter and radiation under extreme physical conditions.*

- George Taylor/Institute of Technology Alumni Society  
Research Award, University of Minnesota, June 1984. The award reads:

*The George Taylor Distinguished Research Award 1984 is presented to Joseph I. Kapusta, who has established himself as a leader in the field of high energy and high density nuclear physics through his work at the forefront of quantum statistical mechanics, quantum field theory, nuclear physics, relativistic many-body physics, hydrodynamics, and thermodynamics.*

- Regents Fellow, University of California/Berkeley, 1974-75.
- Graduated with Honors in both Mathematics and Physics Departments at the University of Wisconsin/Madison, May 1974.
- First Annual Radtke Scholarship in Physics, University of Wisconsin/Madison, 1974.
- One of eight Juniors elected to the University of Wisconsin/Madison chapter of Phi Beta Kappa, 1973.

### 3 Service and Organizing Activities

Organizing Committee for the *Tenth Conference on the Intersections of Particle and Nuclear Physics*, Torrey Pines, San Diego, May 2009.

Organizing Committee for the conference *Strange Quark Matter 2006*, UCLA, Los Angeles, March 2006.

International Advisory Committee for the *Fifth International Conference on the Physics and Astrophysics of Quark Gluon Plasma*, Calcutta, India, February 2005.

Publication Oversight Committee of the American Physical Society, 2003-2007; Chair of POC during 2006.

International Advisory Committee for the conference *Topics in Heavy Ion Collisions*, McGill University, Canada, June 25-28, 2003.

Co-organizer (with B. Jacak and X. N. Wang) of the workshop *First Two Years of RHIC: Theory vs. Experiments*, National Institute for Nuclear Theory, University of Washington, Seattle, December 13-15, 2002.

International Board of Advisors for the Pan-American Advanced Study Institute on *New States of Matter in Hadronic Collisions*, Brazil, January 2002.

International Advisory Committee for the *Fourth International Conference on the Physics and Astrophysics of Quark Gluon Plasma*, Jaipur, India, November 2001.

Co-author of the Gamma-Ray Summary Report from Snowmass 2001: *The Future of Particle Physics*, astro-ph/0201160.

Nuclear Science Division Review Committee, Lawrence Berkeley National Laboratory, 1996 and 2000-2002.

Associate Editor of *Physical Review C*, 1997-present.

Co-organizer (with B. Jacak and X. N. Wang) of *Probes of Dense Matter in Ultra-relativistic Heavy Ion Collisions*, National Institute for Nuclear Theory, University of Washington, Seattle, March 16 - June 12, 1998.

International Advisory Board for the Fifth Rio de Janeiro International Workshop on *Relativistic Aspects of Nuclear Physics*, July 1997.

Session Coordinator for the *Sixth International Conference on the Intersections of Particle and Nuclear Physics*, Big Sky, MT, May 1997.

National Advisory Committee for the *Sixth International Conference on Nucleus-Nucleus Collisions*, Gatlinburg, TN, May 1997.

International Advisory Committee for the *Third International Conference on the Physics and Astrophysics of Quark Gluon Plasma*, Jaipur, India, March 1997.

Co-organizer of *RHIC Summer Study '96*, Brookhaven National Laboratory, July 1996.

Advisory Committee for *HIPAGS '96*, Detroit, August 1996.

Editorial Board of *Physical Review C*, 1995-1997.

Editor, with W. Marciano, of *Comments on Nuclear and Particle Physics*, 1995-99.

Editorial Board of *Heavy Ion Physics*, a new series of *Acta Physica Hungarica*, published by the Hungarian Academy of Sciences, 1995-present.

Executive Committee of the Division of Nuclear Physics of the American Physical Society, 1995-97.

International Advisory Board for the Fourth Rio de Janeiro International Workshop on *Relativistic Aspects of Nuclear Physics*, August 1995.

Co-organizer and chair of the session *Cosmology, Heavy Ion Colliders, and Phases of Matter*, APS Meeting - Washington, D.C. April 18-21, 1995.

Nuclear Physics Section of *Physics News '94*.

Program Committee of the Division of Nuclear Physics of the American Physical Society, 1994-95.

High Energy and Nuclear Physics Program Advisory Committee, Brookhaven National Laboratory, 1993-96.

Co-organizer (with E. Shuryak) of *Strong Interactions at Finite Temperature*, Institute for Theoretical Physics, University of California/Santa Barbara, August 2 - December 17, 1993.

Co-organizer (with W. Bauer) of *Winter Workshop on Nuclear Dynamics VII*, Key West, Florida, January 26 - February 2, 1991.

Co-organizer (with J. Thompson) of *Pittsburgh Workshop on Soft Lepton Pair and Photon Production*, University of Pittsburgh, September 6-8, 1990.

Co-organizer (with G. Westfall) of *Winter Workshop on Nuclear Dynamics VI*, Jackson Hole, Wyoming, February 17-24, 1990.

Co-organizer (with G. Westfall) of *Winter Workshop on Nuclear Dynamics V*, Sun Valley, Idaho, February 22-26, 1988.

RHIC Preconstruction Advisory Panel, 1987-88.

Organizer of Theoretical Physics Institute Workshop 87/4, *High Temperature QCD and Relativistic Many-Body Theory*, Univ. Minnesota, October 8-10, 1987.

DOE Nuclear Theory Review Panel (chaired by J. D. Walecka; ANL, BNL, LANL, LBL, MIT, ORNL, Univ. Washington, Univ. Maryland, SUNY - Stony Brook) 1987.

Bevalac Program Advisory Committee, Lawrence Berkeley Laboratory, 1986- 88.

International Advisory Committee, *Fifth International Conference on Ultrarelativistic Nucleus-Nucleus Collisions*, Monterey, CA, 1986.

## 4 Research Support

Theoretical Nuclear Physics Grant - Department of Energy:

- 2009...\$402,000 [with A. Heger and Y. Qian]
- 2008...\$310,000 [with A. Heger and Y. Qian]
- 2007...\$320,000 [with Y. Qian]
- 2006...\$350,000 [with Y. Qian]
- 2005...\$415,000 [with P. Ellis (now deceased) and Y. Qian]
- 2004...\$365,000 [with P. Ellis and Y. Qian]
- 2003...\$363,000 [with P. Ellis and Y. Qian]
- 2002...\$354,000 [with P. Ellis and Y. Qian]
- 2001...\$360,000 [with P. Ellis and Y. Qian]
- 2000...\$360,000 [with P. Ellis and Y. Qian]
- 1999...\$425,000 plus \$10,000 supplement for computer equipment

[with P. Ellis, L. McLerran and Y. Qian]  
1998...\$360,000 [with P. Ellis and L. McLerran]  
1997...\$360,000 [with P. Ellis and L. McLerran]  
1996...\$355,000 [with P. Ellis and L. McLerran]  
1995...\$340,000 [with P. Ellis and L. McLerran]  
1994...\$340,000 [with P. Ellis and L. McLerran]  
1993...\$340,000 [with P. Ellis and L. McLerran]  
1992...\$305,000 plus \$15,000 supplement for P. Ellis [with L. McLerran]  
1991...\$300,000 [with L. McLerran]  
1990...\$300,000 plus \$28,000 supplement for 2 workstations [with L. McLerran]  
1989...\$254,000 [with B. Bayman, P. Ellis, L. McLerran and Y. C. Tang]  
1988...\$200,000 plus \$12,000 supplement for visiting faculty support  
[with B. Bayman, P. Ellis and Y. C. Tang]  
1987...\$175,000 [with B. Bayman, P. Ellis and Y. C. Tang]  
1986...\$173,000 [with B. Bayman, P. Ellis and Y. C. Tang]  
1985...\$170,000 [with B. Bayman, P. Ellis and Y. C. Tang]  
1984...\$157,000 [with B. Bayman, P. Ellis and Y. C. Tang]  
1983...\$145,000 [with B. Bayman, P. Ellis and Y. C. Tang]

U. S. Civilian Research and Development Fund for the Independent States of the Former Soviet Union:

1996-98...\$49,660 [with B. Ioffe et al. at ITEP in Moscow]  
1998...\$6,000 [supplemental grant for visit of junior scientist I. Shushpanov to University of Minnesota]

NSF Nordic Cooperative Research Grant:

1997-00...\$20,000 [with P. Ellis and E. Osnes, L. P. Csernai, J. Bondorf, I. Mishushtin on the Nordic side]

NATO Collaborative Research Grant:

1992-94...\$7,800 [with C. Gale, McGill University]

University of Minnesota Graduate School Research Award:

1982-83...\$7,500

University of Minnesota Graduate School Summer Research Award:

1983...\$3300

Minnesota Supercomputer Institute:

Continuous grants of supercomputer time from 1986 to 1995.

Institute Fellowships for C. Gale in 1987 and K. Geiger in 1993.

## 5 Most Highly Cited Publications

According to the ISI Web of Knowledge as accessed on May 1, 2009, my monograph *Finite Temperature Field Theory* (first published by Cambridge University Press in 1989) has been cited 956 times by refereed papers published in the ISI list of science journals. I had 14 “famous” refereed papers that were cited by other refereed papers more than 100 times, and another 12 “well-known” papers that were cited between 50 and 99 times. I have 5,487 total citations and an h-index of 36. The top ten cited papers are:

1. “Quantum Chromodynamics at High Temperature”, Nucl. Phys. **B148**, 461 (1979) [J. Kapusta] **379 citations**.
2. “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Gas”, Phys. Rev. **D44**, 2774 (1991) [J. Kapusta, P. Lichard, and D. Seibert] **294 citations**.
3. “Entropy and Cluster Production in Nuclear Collisions”, Phys. Rep. **131**, 231 (1986) [L. Csernai and J. Kapusta] **231 citations**.
4. “Dilepton Emission and the QCD Phase Transition in Ultrarelativistic Nuclear Collisions”, Phys. Rev. **D34**, 2746 (1986) [K. Kajantie, J. Kapusta, L. McLerran, and A. Mekjian] **221 citations**.
5. “Calculations with the Nuclear Firestreak Model”, Phys. Rev. **C18**, 844 (1978) [J. Gosset, J. Kapusta, and G. Westfall] **215 citations**.
6. “Vector Dominance Model at Finite Temperature”, Nucl. Phys. **B357**, 65 (1991) [C. Gale and J. Kapusta] **213 citations**.
7. “Liquid-Gas Phase Instabilities and Droplet Formation in Nuclear Reactions”, Phys. Rev. **C30**, 851 (1984) [A. Goodman, J. Kapusta, and A. Mekjian] **199 citations**.
8. “Dilepton Radiation from High Temperature Nuclear Matter”, Phys. Rev. **C35**, 2107 (1987) [C. Gale and J. Kapusta] **193 citations**.
9. “Evidence for a Soft Nuclear Matter Equation of State”, Phys. Rev. Lett. **43**, 1486 (1979) [P. Siemens and J. Kapusta] **176 citations**.

10. “Behavior of Gluons at High Temperature”, *Annals of Physics* **160**, 477 (1985) [K. Kajantie and J. Kapusta] **176 citations**.

## 6 Publications

1. “Best Measuring Time for a Millikan Oil Drop Experiment”, *Amer. J. Phys.* **43**, 799 (1975).

2. “Post-Acceleration and Energy Balance in the Time-Delayed Lorentz Equation”, *Nuov. Cim.* **B31**, 225 (1976).

3. “Bremsstrahlung in the Nuclear Fireball Model”, *Phys. Rev.* **C15**, 1580 (1977).

4. “Particle Production in the Nuclear Fireball Model”, *Phys. Rev.* **C16**, 1493 (1977).

5. “Calculations with the Nuclear Firestreak Model”, *Phys. Rev.* **C18**, 844 (1978) [with J. Gosset and G. Westfall].

6. “Quantum Chromodynamics at High Temperature”, *Nucl. Phys.* **B148**, 461 (1979).

7. “Infrared Properties of Quark Gas”, *Phys. Rev.* **D20**, 989 (1979).

8. “Mechanisms for Deuteron Production in Relativistic Nuclear Collisions”, *Phys. Rev.* **C21**, 1301 (1980).

9. “Evidence for a Soft Nuclear Matter Equation of State”, *Phys. Rev. Lett.* **43**, 1486 (1979) [with P. Siemens].

10. “Bose-Einstein Condensation, Spontaneous Symmetry Breaking and Gauge Theories”, *Phys. Rev.* **D24**, 426 (1981).

11. “Entropy Generation and Hydrodynamic Flow in Relativistic Heavy Ion Collisions”, *Phys. Rev.* **C23**, 1282 (1981) [with D. Strottman].

12. “Effect of Exchange Energy Corrections on Self-Consistent Meson Masses and on the Equation of State of Nuclear Matter”, *Phys. Rev.* **C23**, 1648 (1981).

13. “Thermodynamics of Chromomagnetism”, Nucl. Phys. **B190**, 425 (1981).
14. “Infrared Properties of a Quark Gas”, in *Statistical Mechanics of Quarks and Hadrons*, ed. H. Satz (North-Holland, 1981) p. 395.
15. “Thermodynamics of Chromomagnetism”, in *Statistical Mechanics of Quarks and Hadrons*, ed. H. Satz (North-Holland, 1981) p. 421.
16. “Asymptotic Mass Spectrum and Thermodynamics of the Abelian Bag Model”, Phys. Rev. **D23**, 2444 (1981).
17. “Global Analysis of Relativistic Heavy Ion Collisions”, Phys. Lett. **B106**, 33 (1981) [with D. Strottman] Associated with this paper is a computer generated color 16mm movie depicting collisions between heavy nuclei in a relativistic hydrodynamic model.
18. “Viscous Heating of Expanding Fireballs”, Phys. Rev. **C24**, 2545 (1981).
19. “Predicting the Number of Deuterons from Cascade Calculations of Relativistic Heavy Ion Collisions”, Phys. Rev. **C26**, 274 (1982) [with S. Das Gupta and B. K. Jennings].
20. “Asymptotic Level Density of Constrained and Interacting Fields”, Nucl. Phys. **B196**, 1 (1982).
21. “Infrared Limit of the Axial Gauge Gluon Propagator at High Temperature”, Phys. Lett. **B110**, 299 (1982) [with K. Kajantie].
22. “Retarded Square-Well Potential”, Amer. J. Phys. **51**, 460 (1983).
23. “Behavior of Gluons at High Temperature”, Annals of Physics **160**, 477 (1985) [with K. Kajantie].
24. “Heavy Ion Collisions in the Hydrodynamical Model” in *Proceedings of the XVII Rencontre de Moriond*, ed. J. Tran Thanh Van (Dreux, Ed. Frontieres, 1982) Vol. 2.
25. “Quark Matter Formation and Heavy Ion Collisions”, Phys. Rep. **88**, 321 (1982) [with M. Faessler, L. McLerran, J. Rafelski, H. Satz, and W. Willis: ed. M. Jacob and J. Tran Thanh Van].
26. “Collective Aspects of Hadrons and Quarks in Nucleus-Nucleus Collisions”, in

*Proceedings of the Workshop on Quark Matter Formation and Heavy Ion Collisions*, ed. H. Satz (World Scientific Publishing Co., Singapore, 1982).

27. “Soft Fermionic Modes in Chiral-and Super-Symmetries at Positive Temperature”, Phys. Lett. **B118**, 343 (1982).

28. “Thermodynamics of Hadrons: Delimiting the Temperature”, Nucl. Phys. **A408**, 478 (1983) [with K. Olive].

29. “Baryon Rapidity Distribution and Stopping Power of High-Energy Colliding Nuclei”, Phys. Rev. **C27**, 2037 (1983).

30. “Finite-Temperature and Supercharged Ideal Supersymmetric Matter”, Phys. Rev. **D28**, 3093 (1983) [with S. Pratt and V. Visnjic].

31. “Deuteron and Entropy Production and the Nuclear Liquid-Gas Phase Transition”, Phys. Rev. **C29**, 1735 (1984).

32. “Liquid-Gas Phase Instabilities and Droplet Formation in Nuclear Reactions”, Phys. Rev. **C30**, 851 (1984) [with A. Goodman and A. Mekjian].

33. “Electron-Positron Pair Production and Chiral Symmetry in the Hot QCD Plasma”, Phys. Lett. **B136**, 201 (1984).

34. “Hydrodynamics of Nucleus-Nucleus Collisions”, Nucl. Phys. **A418**, 573c (1984).

35. “Birth of the QCD Plasma in a Supersaturated Pion Vapor”, Phys. Lett. **B143**, 233 (1984).

36. “Nucleation Rate for Black Holes”, Phys. Rev. **D30**, 831 (1984).

37. “Proton Stopping Power of Heavy Nuclei”, Phys. Rev. **D29**, 2664 (1984), [with L. P. Csernai].

38. “Deceleration of High Energy Protons by Heavy Nuclei”, Phys. Rev. **D31**, 2795 (1985) [with L. P. Csernai].

39. “ $\pi^+$  -  $\pi^-$  Mass Difference at Finite Temperature”, Phys. Lett. **B147**, 181 (1984) [with V. Visnjic].

40. “Status of the Theory of QCD Plasma”, in *Proceedings of the XV Symposium on Multiparticle Dynamics*, ed. B. Jacobsson (World Scientific Publishing Co., Singapore, 1985).
41. “Transition from Weak to Strong Coupling in QCD and in Grand Unified Models at High Temperature”, *Nucl. Phys.* **B263**, 207 (1986) [with D. Reiss and S. Rudaz].
42. “Entropy and Cluster Production in Nuclear Collisions”, *Phys. Rep.* **131**, 223 (1986) [with L. P. Csernai].
43. “Parametrizing the Equation of State of Cold and Dense Nuclear Matter”, *Phys. Rev.* **C32**, 663 (1985) [with C. Grant].
44. “How Much Strangeness Production is there in Ultrarelativistic Nucleus-Nucleus Collisions?”, *Phys. Rev.* **D33**, 1304 (1986) [with A. Mekjian].
45. “Correlation between Transverse Momentum and Multiplicity for Spherically Exploding Quark-Gluon Plasmas”, *Phys. Lett.* **B163**, 253 (1985) [with S. Pratt, L. McLerran and H. von Gersdorff].
46. “Kaon Production in Superheated Pion Vapor”, in *Physics of Multiparticle Systems*, edited by the Academy of Sciences of the Ukrainian SSR [with A. Mekjian].
47. “Quark-Gluon Plasma”, in *Proceedings of the Workshop on Nuclear Chromodynamics*, ed. S. Brodsky and E. Moniz (World Scientific Publishing Co., Singapore, 1986).
48. “Liquid-Gas Phase Separation in Nuclear Collisions”, *Phys. Rev.* **C33**, 1299 (1986) [with L. Csernai and N. Glendenning].
49. “Pion Production as a Test of Nuclear Matter Properties”, *Phys. Rev.* **C33**, 1288 (1986) [with D. Strottman].
50. “Dilepton Emission and the QCD Phase Transition in Ultrarelativistic Nuclear Collisions”, *Phys. Rev.* **D34**, 2746 (1986) [with K. Kajantie, L. McLerran and A. Mekjian].
51. “Dynamics of Quarks and Gluons in Ultrarelativistic Nuclear Collisions”, in *Proceedings of the International Summer School on Nuclear Phase Transitions and Heavy Ion Reactions*, Changchun, China (World Scientific Publishing Co., Singapore, 1987).

52. “Quantitative Analysis of the Relation between Entropy and Nucleosynthesis in Central Ca + Ca and Nb + Nb Collisions”, Phys. Rev. **C35**, 1297 (1987) [with L. P. Csernai, G. Fai, D. Hahn, J. Randrup and H. Stocker].
53. “Transverse Momentum Spectrum of Mesons Produced in High Energy Nucleus-Nucleus Collisions”, Phys. Lett. **B199**, 30 (1987) [with T. Atwater and P. Freier].
54. “Dilepton Radiation from High Temperature Nuclear Matter”, Phys. Rev. **C35**, 2107 (1987) [with C. Gale].
55. “Electron-Positron Pair Production in High Temperature Nuclear Matter”, Nucl. Phys. **A471**, 35c (1987) [with C. Gale].
56. “Does Quark-Gluon Plasma Formation Suppress Charmonium Production?”, Phys. Rev. **D36**, 2857 (1987).
57. “Modification of Debye Screening in Gluon Plasma”, Phys. Lett. **B198**, 89 (1987) [with C. Gale].
58. “Screening and Plasmon in QCD on a Finite Lattice”, Nucl. Phys. **B304**, 832 (1988) [with H.-Th. Elze and K. Kajantie].
59. “Friedel Oscillations in Relativistic QED and QCD”, Phys. Rev. **D37**, 3731 (1988) [with T. Toimela].
60. “Baryon Density Contrast and Strangeness Abundance during the Big Bang Confinement Phase Transition”, Phys. Lett. **B209**, 295 (1988) [with K. Olive].
61. “Dilepton Production as a Probe of Pion, Kaon, Nucleon and Antinucleon Dynamics in Nuclear Matter”, Phys. Rev. **C38**, 2659 (1988) [with C. Gale].
62. “Finite-Temperature Field Theory”, J. Phys. G: Nucl. Part. Phys. **15**, 267 (1989) [with P. V. Landshoff].
63. “Single Particle and Multi-Particle Analysis of Nucleus-Nucleus Collisions at 14.6, 60 and 200 GeV per Nucleon”, Phys. Rev. **C39**, 1385 (1989) [with KLM collaboration].
64. “Finite Lattice Size Effects on QCD Thermodynamics”, Physica **A158**, 125 (1989).

65. “Dilepton Production”, Nucl. Phys. **A495**, 423c (1989) [with C. Gale].
66. “Dilepton Radiation from Nucleon-Nucleon Collisions”, Phys. Rev. **C40**, 2397 (1989) [with C. Gale].
67. “Gauge Invariant Correlation Functions”, Phys. Rev. **D39**, 3197 (1989) [with T. Toimela].
68. “Covariant Computation of  $e^+e^-$  Production in Nucleon-Nucleon Collisions”, Phys. Lett. **B224**, 433 (1989) [with K. Haglin and C. Gale].
69. “Dileptons as a Probe of Excited Nuclear Matter”, Can. J. Phys. **67**, 1200 (1989) [with C. Gale].
70. “Contribution of Two-Pion Annihilation to Dilepton Emission from Proton-Nucleon Collisions”, Phys. Rev. **C40**, R1574 (1989) [with P. Lichard].
71. “High Temperature QCD”, in *Lecture Proceedings of the 1989 Theoretical Advanced Study Institute on Elementary Particle Physics: From Actions to Answers* (ed. T. DeGrand and D. Toussaint, World Scientific, 1990).
72. “Fermions at High Temperature”, Phys. Rev. **D41**, 611 (1990) [with G. Gatoff].
73. “Effects of Strange Particles on Neutron Star Cores”, Phys. Rev. Lett. **64**, 13 (1990) [with K. Olive].
74. “Phase Diagram of Electroweak Theory”, Phys. Rev. **D42**, 919 (1990).
75. “Superconducting Phase Transition in a 2D Chern-Simons Theory”, Phys. Rev. **B44**, 7519 (1991) [with M. Carrington, B. Bayman, D. Seibert and C. S. Song].
76. “Strangeness, Glue and Quark Matter Content of Neutron Stars”, Nucl. Phys. **B348**, 345 (1991) [with J. Ellis and K. Olive].
77. “Vector Dominance Model at Finite Temperature”, Nucl. Phys. **B357**, 65 (1991) [with C. Gale].
78. “Electromagnetic Resonances in a Hot Pion Gas”, Phys. Rev. **D43**, 3080 (1991) [with C. Gale].

79. “Scale Breaking in Dense Nuclear Matter”, Phys. Rev. **C44**, 870 (1991) [with R. Rodriguez].
80. “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Gas”, Phys. Rev. **D44**, 2774 (1991) [with P. Lichard and D. Seibert].
81. “High Temperature Quantum Chromodynamics”, in *Trends in Theoretical Physics*, Vol. **2**, Addison Wesley, 1991.
82. “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Gas”, in *Advances in Nuclear Dynamics*, World Scientific, 1991 [with P. Lichard and D. Seibert].
83. “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Gas”, Nucl. Phys. **A544**, 485c (1992) [with P. Lichard and D. Seibert].
84. “Relativistic Nuclear Matter with Composite Nucleons”, Phys. Rev. **C45**, 2518 (1992) [with P. J. Ellis and M. Prakash].
85. “Phase Transition in Dense Nuclear Matter with Quark and Gluon Condensates”, Phys. Lett. **B273**, 123 (1991) [with J. Ellis and K. Olive].
86. “Parametrization of Thermal Photon Emission Rates from Mesonic Matter”, Phys. Rev. **C45**, 3034 (1992) [with H. Nadeau and P. Lichard].
87. “Rates for Dilepton Production at RHIC and LHC between the  $J/\Psi$  and  $\Upsilon$  are Big”, Phys. Lett. **B283**, 145 (1992) [with L. McLerran and D. K. Srivastava].
88. “Nucleation of Relativistic First-Order Phase Transitions”, Phys. Rev. **D46**, 1379 (1992) [with L. Csernai].
89. “Dynamics of the QCD Phase Transition”, Phys. Rev. Lett. **69**, 737 (1992) [with L. Csernai].
90. “Screening of Static QED Electric Fields in Hot QCD”, Phys. Rev. **D46**, 4749 (1992).
91. “Temperature Dependence of Electric and Magnetic Gluon Condensates”, Phys. Rev. **D47**, 895 (1993) [with V. L. Eletsky and P. J. Ellis].
92. “Screening of Static QED Electric Fields in Hot QCD”, in *Proceedings of the*

*Winnipeg Workshop on Perturbative Methods in Hot Gauge Theories*, Canadian Journ. Phys. **71**, 248 (1993).

93. “Phase Transition Dynamics in Ultrarelativistic Heavy Ion Collisions”, Z. Phys. **C58**, 453 (1993) [with L. P. Csernai, G. Kluge and E. E. Zabrodin].

94. “Dilepton Radiation from Cascading Partons in Ultrarelativistic Nuclear Collisions”, Phys. Rev. Lett. **70**, 1920 (1993) [with K. Geiger].

95. “Dynamics of the Electroweak Phase Transition”, Phys. Rev. **D47**, 5304 (1993) [with M. Carrington].

96. “Chemical Equilibration of Partons in High Energy Heavy Ion Collisions?”, Phys. Rev. **D47**, 4905 (1993) [with K. Geiger].

97. “Photon Interferometry of Quark-Gluon Dynamics”, Phys. Lett. **B307**, 1 (1993) [with D. K. Srivastava].

98. “Supercooling and Final State Effects on Dilepton Spectra”, Phys. Rev. **C48**, 385 (1993) [with D. K. Srivastava].

99. “History of Quark-Gluon Plasma Evolution from Photon Interferometry”, Phys. Rev. **C48**, 1335 (1993) [with D. K. Srivastava].

100. “Screening Mass from Chiral Perturbation Theory, Virial Expansion, and the Lattice”, Phys. Rev. **D48**, 4398 (1993) [with V. L. Eletsky and R. Venugopalan].

101. “Photons and Lepton Pairs from High Energy Nuclear Collisions”, Nucl. Phys. **A566**, 45c (1994).

102. “Weinberg-type Sum Rules at Zero and Finite Temperature”, Phys. Rev. **D49**, 4694 (1994) [with E. V. Shuryak].

103. “Nature of the Photon Correlation Function for Quark-Gluon Plasma”, Phys. Rev. **C50**, 505 (1994) [with D. K. Srivastava].

104. “The Proximal Chiral Phase Transition”, Phys. Rev. **D50**, 5379 (1994) [with A. M. Srivastava].

105. “Weinberg-type Sum Rules at Zero and Finite Temperature”, in *Continuous Advances in QCD*, ed. A. V. Smilga, World Scientific, 1994.

106. “Baryon-Antibaryon Production by Disordered Chiral Condensates”, Phys. Rev. **D52**, 2977 (1995) [with A. M. Srivastava].
107. “Dynamical Evolution of the Electroweak Phase Transition”, in *Electroweak Physics in the Early Universe*, NATO ASI Series B: Physics Vol. 338, ed. J. C. Romao and F. Freire, Plenum, 1995.
108. “Nucleation of Quark-Gluon Plasma from Hadronic Matter”, Phys. Rev. **C51**, 901 (1995) [with R. Venugopalan and A. P. Vischer].
109. “Return of the Prodigal Goldstone Boson”, Phys. Rev. **D53**, 5028 (1996) [with D. Kharzeev and L. McLerran].
110. “Inhomogeneous Nucleation of Quark-Gluon Plasma in High Energy Nuclear Collisions”, Phys. Rev. **C52**, 2725 (1995) [with A. P. Vischer].
111. “Chiral Symmetry at Finite Temperature: Linear vs. Nonlinear  $\sigma$ -Models”, Phys. Rev. **D54**, 4066 (1996) [with A. Bochkarev].
112. “Pion Decay Constant at Finite Temperature in the Nonlinear Sigma Model”, Phys. Rev. **D54**, 6475 (1996) [with S. Jeon].
113. “Dynamical Formation of Disoriented Chiral Condensates”, Z. Physik **C75**, 507 (1997) [with A. P. Vischer].
114. “Linear Extrapolation of Ultrarelativistic Nucleon-Nucleon Scattering to Nucleus-Nucleus Collisions”, Phys. Rev. **C56**, 468 (1997) [with S. Jeon].
115. “ $\omega - \phi$  Mixing at Finite Temperature”, Phys. Rev. **D56**, 508 (1997) and Erratum [C. Gale, J. Kapusta and D. Seibert].
116. “Coulomb Effects on Charged Kaon Distributions from Vlasov Dynamics”, Phys. Rev. **C56**, 407 (1997) [with A. Ayala].
117. “LEXUS”, in *Physics and Astrophysics of the Quark-Gluon Plasma*, ed. B. C. Sinha, D. K. Srivastava and Y. P. Viyogi, Narosa Publishing House, 1998 [with S. Jeon].
118. “Fluctuation and Dissipation in Classical Many-Particle Systems”, Phys. Rev. **E56**, 6668 (1997) [with L. P. Csernai and S. Jeon].

119. “Nucleus-Nucleus Bremsstrahlung from Ultrarelativistic Collisions”, Phys. Rev. **C58**, 1666 (1998) [with S. Jeon, A. Chikanian and J. Sandweiss].
120. “Mass Shift and Width Broadening of Rho-Mesons Produced in Heavy Ion Collisions”, Eur. Phys. J. **A3**, 381 (1998) [with V. Eletsky and B. Ioffe].
121. “Low Energy Theorems for Gluodynamics at Finite Temperature”, Phys. Lett. **B443**, 63 (1998) [with P. J. Ellis and H.-B. Tang].
122. “Size of Fireballs Created in High Energy Lead-Lead Collisions as Inferred from Coulomb Distortions of Pion Spectra”, Phys. Rev. **C59**, 3324 (1999) [with A. Ayala and S. Jeon].
123. “Coherence Time in High Energy Proton-Nucleus Collisions”, Phys. Rev. Lett. **82**, 1626 (1999) [with C. Gale and S. Jeon].
124. “Dispersion Relation of the Rho-Meson at Finite Temperature and Density”, Phys. Rev. **C59**, 2757 (1999) [with V. L. Eletsky].
125. “Hydrogen-like Atoms from Ultrarelativistic Collisions”, Phys. Rev. **C59**, 2937 (1999) [with A. Mocsy].
126. “ $J/\psi$  Production and Absorption in High Energy Proton-Nucleus Collisions”, Phys. Lett. **B459**, 455 (1999) [with C. Gale and S. Jeon].
127. “Low-Energy Theorems for QCD at Finite Temperature and Chemical Potential”, Phys. Rev. **C59**, 2931 (1999) [with I. A. Shushpanov and P. J. Ellis].
128. “Imaging the Space-Time Evolution of High Energy Nucleus-Nucleus Collisions with Bremsstrahlung”, Phys. Rev. **C59**, 3317 (1999) [with S. M. H. Wong].
129. “Baryon, Charged Hadron, Drell-Yan and  $J/\psi$  Production in High Energy Proton-Nucleus Collisions”, in *RHIC Physics and Beyond*, ed. B. Müller and R. Pisarski, AIP Conf. Proc. **482**, 53 (1999).
130. “Neutral Kaon System in Dense Matter and Heavy Ion Collisions”, Phys. Lett. **B465**, 291 (1999) [with G. Amelino-Camelia].
131. “Drell-Yan and  $J/\psi$  Production in High Energy Proton-Nucleus and Nucleus-Nucleus Collisions”, Nucl. Phys. **A661**, 558c (1999) [with C. Gale and S. Jeon].

132. “Dynamical Evolution of the Scalar Condensate in Heavy Ion Collisions”, Phys. Rev. **C61**, 054901 (2000) [with L. P. Csernai, P. J. Ellis and S. Jeon].
133. “Coherence Time Effects on  $J/\psi$  Production and Suppression in Relativistic Heavy Ion Collisions”, Phys. Rev **C63**, 024901 (2001) [with C. Gale and S. Jeon].
134. “Theoretical Development of Quark-Gluon Plasma”, Commentationes PHYSICOMATHEMATICAE 162/2000 (essays in honor of Professor Keijo Kajantie published by the Finnish Society of Sciences and Letters) January 31, 2000.
135. “Modification of Z Boson Properties in Quark-Gluon Plasma”, Phys. Rev. **D62**, 037301 (2000) [with S. M. H. Wong].
136. “Two-Loop Contribution to High Mass Dilepton Production by Quark-Gluon Plasma”, Phys. Rev. **C62**, 027901 (2000) [with S. M. H. Wong].
137. “Relativistic Viscous Fluid Description of Microscopic Black Hole Wind”, Phys. Rev. Lett. **86**, 1670 (2001).
138. “Bremsstrahlung from a Microscopic Model of Relativistic Heavy Ion Collisions”, Phys. Rev. **C63**, 014903 (2000) [with S. M. H. Wong, M. Belkacem, S. Bass, M. Bleicher and H. Stöcker].
139. “Interpretation of the First Data on Central Au+Au Collisions at  $\sqrt{s} = 56$  and 130 A GeV”, Phys. Rev. **C63**, 011901(Rapid Communications) (2000) [with S. Jeon].
140. “Will Strangeness Win the Prize?”, J. Phys. **G27**, 593 (2001).
141. “Is Anomalous Production of  $\Omega$  and  $\bar{\Omega}$  Evidence for Disoriented Chiral Condensates?”, Phys. Rev. Lett. **86**, 4251 (2001) [with S. M. H. Wong].
142. “Primordial Black Holes and Hot Matter”, Proceedings of the International School of Astrophysics D. Chalonge, 8th Course, *Phase Transitions in the Early Universe: Theory and Observations*, Erice, Sicily, ed. H.J. de Vega, I. Khalatnikov, N. Sanchez (Kluwer Academic Pub.)
143. “Quark-Gluon Plasma in the Early Universe”, Proceedings of the International School of Astrophysics D. Chalonge, 8th Course, *Phase Transitions in the Early Universe: Theory and Observations*, Erice, Sicily, ed. H.J. de Vega, I. Kha-

latnikov, N. Sanchez (Kluwer Academic Pub.)

144. “Two-Loop Self-Energy and Multiple Scattering at Finite Temperature”, Phys. Rev. **D64**, 045008 (2001) [with S. M. H. Wong].

145. “Properties of  $\rho$  and  $\omega$  Mesons at Finite Temperature and Density as Inferred from Experiment”, Phys. Rev. **C64**, 035202 (2001) [with V. L. Eletsky, M. Belkacem and P. J. Ellis].

146. “High Temperature Matter and Gamma Ray Spectra from Microscopic Black Holes”, Phys. Rev. **D65**, 064028 (2002) [with R. G. Daghigh].

147. “Collective Deceleration of Ultrarelativistic Nuclei and Creation of Quark-Gluon Plasma”, Phys. Rev. Lett. **88**, 112501 (2002) [with I. N. Mishustin].

148. “Cosmic Shells”, Phys. Rev. **D66**, 104020 (2002) [with Y. Hosotani, T. Nakajima and R. G. Daghigh].

149. “Kaon and Pion Fluctuations from Small Disoriented Chiral Condensates”, Phys. Rev. **C65**, 054910 (2002) [with S. Gavin].

150. “Domain Wall Dynamics of Phase Interfaces”, Phys. Rev. **D67**, 045003 (2003) [with L. P. Csernai and E. Osnes].

151. “Dileptons and Photons from Coarse-Grained Microscopic Dynamics and Hydrodynamics Compared to Experimental Data”, Phys. Rev. **C66**, 014903 (2002) [with P. Huovinen, M. Belkacem and P. J. Ellis].

152. “Dileptons and Photons from Coarse-Grained Microscopic Dynamics and Hydrodynamics Compared to Experimental Data”, Nucl. Phys. **A715**, 709c (2003).

153. “Thermal Rates for Baryon and Anti-Baryon Production”, Phys. Rev. **C68**, 014901 (2003) [with I. Shovkovy].

154. “High Temperature Matter and Neutrino Spectra from Microscopic Black Holes”, Phys. Rev. **D67**, 044006 (2003) [with R. G. Daghigh].

155. “Thermal Rates for Baryon and Anti-Baryon Production”, J. Phys. G **30**, S351 (2004).

156. “Rescattering Effects on HBT Interferometry”, J. Phys. G **30**, S1069 (2004)

[with Y. Li].

157. “Rate Equation Network for Baryon Production in High Energy Nuclear Collisions”, Phys. Rev. **C69**, 014902 (2004) [with P. Huovinen].

158. “HBT Interferometry with Rescattering in the Medium”, Acta Phys. Hung. A **24**, 125 (2005) [with Y. Li].

159. “Neutrino Superfluidity”, Phys. Rev. Lett. **93**, 251801 (2004).

160. “Rescattering Effects on Intensity Interferometry”, Phys. Rev. **C72**, 064902 (2005) [with Y. Li].

161. “Hot Matter from Exploding Black Holes”, Nucl. Phys. A **774**, 831 (2006).

162. “From Color Fields to Quark Gluon Plasma”, Nucl. Phys. A **774**, 861 (2006) [with R. J. Fries and Y. Li].

163. “On the Strongly-Interacting Low-Viscosity Matter Created in Relativistic Nuclear Collisions”, Phys. Rev. Lett. **97**, 152303 (2006) [with L. P. Csernai and L. D. McLerran].

164. “Antimatter from Microscopic Black Holes”, Phys. Rev. D **73**, 124024 (2006) [with R. G. Daghigh].

165. “Electromagnetic Probes of Strongly Interacting Matter”, Nucl. Phys. A **783**, 317 (2007).

166. “Formation of Gapless Phases of  $K^0$  Condensed Color-Flavor Locked Superconducting Quark Matter”, Phys. Rev. D **75**, 054028 (2007) [with X.-B. Zhang].

167. “Strongly Interacting Low Viscosity Matter Created in Heavy-Ion Collisions”, J. Phys. G **34**, S295 (2007).

168. “Accelerator Disaster Scenarios, the Unabomber, and Scientific Risks”, Physics in Perspective **10**, 163 (2008).

169. “Low Mass Dimuons Produced in Relativistic Nuclear Collisions”, Phys. Rev. Lett. **100**, 162301 (2008) [with J. Ruppert, C. Gale, T. Renk and P. Lichard].

170. “Shear Transport Coefficients from Gauge/Gravity Correspondence”, Phys.

Rev. D **78**, 066017 (2008) [with T. Springer].

171. “Critical Points in the Linear Sigma Model with Quarks”, Phys. Rev. C **79**, 015202 (2009) [with E. S. Bowman].

172. “Chiral Symmetry Breaking in Soft-Wall AdS/QCD”, Phys. Rev. D **79**, 076003 (2009) [with T. Gherghetta and T. M. Kelley].

173. “Viscous Properties of Strongly Interacting Matter at High Temperature”, Landoldt review volume on Relativistic Nuclear Collisions, ed. R. Stock (Springer) in press.

## 7 Books

*Finite Temperature Field Theory*, Cambridge University Press, 1989. The paperback version appeared in 1994. It has been reviewed by:

R. D’Auria, in *Classical and Quantum Gravity* **7**, 2175 (1990).

G. N. Afanas, in *H.K.* **7**, (1990).

B. E. Y. Svensson, in *Elementa* **73:4**, (1990).

A. Moroz, in *Acta Applicandae Mathematicae* **23**, 199 (1991).

R. Delbourgo, in *Mathematical Reviews* **1110583** (92e:81003).

J. J. M. Verbaarschot, in *Journal Phys. G: Nucl. Part. Phys.* **21**, (1995).

*Finite Temperature Field Theory*, 428 pages, co-authored with Charles Gale, Cambridge University Press, 2006. It has been reviewed by:

A. Maas, in *Mathematical Reviews* **2267560** (2008k:81347).

*Quark Gluon Plasma: Theoretical Foundations*, an annotated reprint collection, 836 pages, Elsevier, 2003 (ISBN: 0-444-51110-5) [edited with Berndt Müller and Johann Rafelski].

*Advances in Nuclear Dynamics*, World Scientific, 1991 [edited with W. Bauer].

*SQM2006 - International Conference on Strangeness in Quark Matter*, J. Phys. G **32**, No. 12 (2006) [edited with K. Barish, H. Z. Huang, G. Odyniec, J. Rafelski and C. A. Whitten].

## 8 Teaching

### **Courses taught at the University of Minnesota under the Quarter System 1982-99:**

1001 - The Physical World (spring 1994)  
1071 - Introductory Meteorology (fall 1990)  
1104 - General Physics (fall 1996, fall 1997)  
1105 - General Physics (winter 1997, winter 1998)  
1106 - General Physics (spring 1983)  
1107 - General Physics Laboratory (fall 1996, fall 1997)  
1108 - General Physics Laboratory (winter 1997, winter 1998)  
3011 - Oscillations (winter 1983)  
3501 - Modern Physics (winter 1991, fall 1991)  
5021 - Classical Mechanics (fall 1992)  
5022 - Classical Mechanics (winter 1993)  
5023 - Electric and Magnetic Fields (winter 1989, winter 1990)  
5024 - Electric and Magnetic Fields (spring 1989, spring 1990)  
5031 - Topics in Mathematical Physics (fall 1986, fall 1987)  
5032 - Topics in Mathematical Physics (winter 1987, winter 1988)  
5033 - Topics in Mathematical Physics (spring 1987, spring 1988)  
5151 - Quantum Mechanics (fall 1994, fall 1995)  
5152 - Quantum Mechanics (winter 1995, winter 1996)  
5153 - Quantum Mechanics (spring 1995, spring 1996)  
5201 - Thermal and Statistical Physics (fall 1984, fall 1985)  
5202 - Thermal and Statistical Physics (winter 1985, winter 1986)  
5553 - Topics in Physics for Biology and Medicine (spring 1991)  
8081 - General Relativity (fall 1983)  
8082 - General Relativity (winter 1984)  
8121 - Relativistic Quantum Mechanics (fall 1998)  
8216 - Many-Body Theory (spring 1984, spring 1986)  
8311 - Nuclear Physics (fall 1989)  
8312 - Nuclear Physics (winter 1999)  
8313 - Nuclear Physics (fall 1991, winter 1994)  
8321 - Advanced Topics in Nuclear Physics (fall 1982)

### **Courses taught at the University of Minnesota under the Semester System 1999-present:**

1202 - Introductory Physics for Pre-Medicine and Biology II (spring 2000, fall 2002)  
1302 - Introductory Physics for Science and Engineering II (fall 2001, fall 2003)  
2303 - Physics of Matter (fall 2004, spring 2005, fall 2005, spring 2006)

- 4101 - Quantum Mechanics (fall 1999, fall 2000)
- 4303 - Waves, Optics and Special Relativity (spring 2001, spring 2002)
- 5012 - Classical Physics II: Electrodynamics (spring 2007, spring 2008, spring 2009)
- 8001 - Advanced Quantum Mechanics (fall 2007, fall 2008)
- 8850 - Advanced Topics in Nuclear Physics (spring 2003)

I like to teach a wide variety of courses. Eventually I would like to teach as many different courses as I am able. I especially enjoyed teaching Physics 5553 and Physics 4101 because they were shown on UNITE instructional television.

## 9 Graduate Students and Postdoctoral Research Associates

### Masters Students (date of degree)

1. Sun Myong Kim (December 1985)
2. Cheryl Grant (June 1986)
3. Nae Ho Shin (July 1989)
4. Sidi Benzahara (September 1998)

### PhD Students (date of degree and current position)

1. Mahmoud Kullab (July 1985: Professor, Yarmouk University, Jordan)
2. Scott Pratt (October 1985: Professor, Michigan State University)
3. Henrike von Gersdorff (October 1989: Associate Professor, Cell and Developmental Biology Department, Oregon Health & Science University)
4. Kevin Haglin (September 1990: Professor, St. Cloud State University, Minnesota)
5. Chungsik Song (August 1993: private sector)
6. Jay Louise Nadeau (May 1996: Assistant Professor, McGill University)
7. Ramon Rodriguez (March 1998: private sector)
8. Agnes Mocsy (September 2001, Assistant Professor, Pratt Institute, Brooklyn, NY)
9. Azwinndini Muronga (November 2002, Senior Lecturer with Tenure, University of Cape Town, South Africa)
10. Ramin Daghigh (December 2002, Assistant Professor, Metropolitan State University, St. Paul, Minnesota)
11. Yang Li (August 2006, postdoc, Iowa State University)
12. Edwin Scott Bowman (current student)

13. Todd Springer (current student)
14. Tom Kelley (current student)

**Postdoctoral Research Associates mentored and supported (current position)**

1. Laszlo Csernai (Professor, University of Bergen, Norway)
2. Charles Gale (Professor, McGill University, Canada)
3. Gil Gatoff (private sector)
4. Margaret Carrington (Professor, Brandon University, Manitoba, Canada)
5. David Seibert (private sector, Raleigh, NC)
6. Raju Venugopalan (Physicist with Tenure, BNL)
7. Klaus Kinder-Geiger (deceased)
8. Axel Vischer (Senior Product Manager, Eurex, London)
9. Sangyong Jeon (Associate Professor, McGill University, Canada)
10. Mohamed Belkacem (Portfolio Manager, Abu Dhabi Investment Authority, United Arab Emirates )
11. Stephen Wong (private sector)
12. Igor Shovkovy (Assistant Professor, Arizona State University, Tempe)
13. Pasi Huovinen (Postdoctoral Research Associate, Purdue University)
14. Rainer Fries (Assistant Professor, Texas A&M University)
15. Chiho Nonaka (Assistant Professor, Nagoya University, Japan)
16. Evgeni Kolomeitsev (Scientist, GSI, Darmstadt, Germany)
17. Purnendu Chakraborty (current postdoc at Minnesota)
18. Evan Frodermann (current postdoc at Minnesota)

## **10 Seminars, Colloquia, Conferences and Schools**

### **1982**

Theoretical Seminar (60 min.) CERN: “Infrared Behavior of the Gluon Propagator at High Temperature”, February 17, 1982.

Invited seminar (60 min.) at C.E.N. Saclay: “Infrared Problems in quantum Field Theory at Finite Temperature”, February 26, 1982.

Invited talk (40 min.) at the XVII Rencontre de Moriond (Elementary Hadronic Processes and New Spectroscopy) Les Arcs, Savoie, France: “Heavy Ion Collisions in the Hydrodynamical Model”, March 23, 1982.

Invited talk (60 min.) in the plenary session at the Workshop on Quark Matter Formation and Heavy Ion Collisions (Bielefeld): “Collective Aspects of Hadrons and Quarks in Nucleus-Nucleus Collisions”, May 13, 1982. Contributed talk (30 min.) at the workshop, May 11, 1982: ”Behavior of Gluons at High Temperature”.

Invited seminar (60 min.) at the Niels Bohr Institute, Copenhagen: “Collective Aspects of Hadrons and Quarks in Nucleus-Nucleus Collisions”, June 7, 1982.

Invited seminar (60 min.) at the Institute for Theoretical Physics, University of Groningen: “Finite Temperature QCD and Deconfinement”, June 10, 1982.

Invited talk (15 min.) in the “ $4\pi$  and Central Collision Physics” session of the *VENUS 82 Workshop* at Lawrence Berkeley Laboratory, September 15-18, 1982.

Joint Nuclear-High Energy Physics Seminar (60 min.) at the University of Minnesota: “Infrared Problems in Quantum Field Theory at Positive Temperature”, October 27, 1982.

Invited seminar (60 min.) in Department of Physics - University of Wisconsin: “Infrared Problems in Quantum Field Theory at Positive Temperature”, November 8, 1982.

### **1983**

Nuclear Physics seminar (60 min.), University of Minnesota: “Hot and Supercharged Supersymmetric Matter”, January 26, 1983.

Graduate Physics Seminar (45 min.), University of Minnesota: “Superdense Matter”, February 14, 1983.

Invited seminar (60 min.) at the Cyclotron Laboratory, Texas A&M University: “Hot and Supercharged Supersymmetric Matter”, March 4, 1983.

Invited talk (30 min.) at the Annual Meeting of the American Chemical Society, Division of Nuclear Chemistry: “Entropy Production and Light Fragment Emission in Relativistic Heavy Ion Collisions”.

Invited seminar (60 min.) at TRIUMF, Vancouver: “Hot and Supercharged Supersymmetric Matter”, March 25, 1983.

School of Physics and Astronomy Colloquium (60 min.), University of Minnesota: “Looking for New Physics in Relativistic Heavy Ion Collisions”, April 6, 1983.

General Physics Seminar (45 min.) University of Minnesota: “White Dwarfs, Neutron Stars and Black Holes”, May 5, 1983.

Joint Bevalac Research Meeting and Nuclear Science Seminar (60 min.) Lawrence Berkeley Laboratory: “Deuteron and Entropy Production and the Nuclear Liquid-Gas Phase Transition”, June 20, 1983.

Invited talk (20 min.) at the III Intl. Conf. on Ultra-Relativistic Nucleus-Nucleus Collisions (Brookhaven): “Hydrodynamics of Nucleus-Nucleus Collisions”, September 26-30, 1983.

Nuclear Physics seminar (60 min.), University of Minnesota: “Liquid-Gas Phase Instabilities and Droplet Formation in Nuclear Reactions”, October 5, 1983.

Nuclear Physics seminar (60 min.), University of Minnesota: “Report on Quark Matter '83: Boom or Bust?”, October 19, 1983.

Nuclear Physics seminar (60 min.), MSU-Superconducting Cyclotron Laboratory: “Liquid-Gas Phase Instabilities and Droplet Formation in Nuclear Reactions”, November 9, 1983.

## **1984**

Nuclear Physics seminar (60 min.), Iowa State University/Ames Laboratory: “Liquid-Gas Phase Instabilities and Droplet Formation in Nuclear Reactions”, March 29, 1984.

Nuclear Physics seminar (60 min.), University of Minnesota: “Is Pion Production a Test of Nuclear Matter Properties?”, May 9, 1984.

Invited talk (30 min.) at the XV Symposium on Multiparticle Dynamics, (Lund, Sweden): “Status of the Theory of QCD Plasma”, June 11-16, 1984.

Contributed talk (15 min.) at the IV Intl. Conf. on Ultra-relativistic Nucleus-Nucleus Collisions, (Helsinki, Finland): “Birth of the QCD Plasma in a Superheated Hadron Vapor”, June 17-21, 1984.

Two invited seminars (60 minutes each) at Brookhaven National Laboratory: “Theory of QCD Plasma” and “Phenomenology of QCD Plasma”, August 3 and 7, 1984.

## 1985

Society of Physics Students seminar (45 min.), University of Minnesota: “Strange New Phenomena When Relativity and Quantum Mechanics Collide”, February 12, 1985.

Nuclear physics seminar (60 min.), University of Maryland: “How Strange are Ultrarelativistic Nucleus-Nucleus Collisions?”, May 8, 1985.

Physics Department Colloquium (60 min.), Michigan State University: “The World of High Temperature Gauge Theories: Big Bang and Big Accelerators”, May 16, 1985.

Nuclear Physics seminar (60 min.), University of Minnesota: “How Strange are Ultrarelativistic Nucleus-Nucleus Collisions?”, May 17, 1985.

Invited talk (40 min.) at the IV Int. Conf. on Recent Progress in Many-Body Theories, (San Francisco): “Infrared Problems in Quantum Field Theory at High Temperature”, August 12-17, 1985.

Invited lecture (90 min.) at the Workshop on Nuclear Chromodynamics: Quarks and Gluons in Particles and Nuclei, (Institute for Theoretical Physics, UC-Santa Barbara): “Quark-Gluon Plasma”. August 19-23, 1985.

Invited talk (30 min.) at the Annual Fall Meeting of the Division of Nuclear Physics of the American Physical Society: “How Strange are Untrarelativistic Nuclear Collisions?”, Asilomar, CA, October 28-30, 1985.

Physics Colloquium (60 min.), Argonne National Laboratory: “Colliding Nuclei in a Supercomputer”, November 22, 1985.

Nuclear physics seminar (60 min.), Cyclotron Laboratory, Michigan State University: “Pion Production as a Test of Nuclear Matter Properties”, December 19, 1985.

## 1986

Invited talk (40 min.) at the Winter Workshop on Nuclear Dynamics: “Dilepton Emission and the QCD Phase Transition in Ultrarelativistic Nuclear Collisions”, Copper Mountain, Colorado, February 25-28, 1986.

Physics Colloquium (60 min.), Iowa State University: “Ultrarelativistic Nucleus-

Nucleus Collisions and Quark-Gluon Plasma”, March 24, 1986.

Invited talk (30 min.) at the Bevalac User’s Meeting, LBL: “Dileptons at the Bevalac”, April 19, 1986.

Three invited lectures (50 min. each) at the International Summer School on Nuclear Phase Transition and Heavy Ion Reactions, Jilin University, Changchun, China: “Dynamics of Quarks and Gluons in Ultrarelativistic Nuclear Collisions”, June 23-27, 1986.

Nuclear Physics Seminar (60 min.), University of Minnesota: “Relativistic Heavy Ion Physics: An Overview”, October 22, 1986.

## **1987**

Nuclear Physics seminar (60 min.), University of Minnesota: “Dilepton Radiation from High Temperature Nuclear Matter”, January 21, 1987.

Invited talk (45 min.) at the Annual Meeting of the American Chemical Society, Division of Nuclear Chemistry: “Electron-Positron Pair Production in High Temperature Nuclear Matter”, Denver, February 9, 1987.

Invited seminar (30 min.) at Los Alamos National Laboratory: “Dilepton Radiation from High Temperature Nuclear Matter”, June 25, 1987.

Invited lectures (2 of 60 min. each) at the UK Institute for Theoretical High Energy Physicists, University of Cambridge, England: “Finite Temperature Field Theory”, August 20-21, 1987.

Invited talk (30 min.) at Quark-Matter ’87 - International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Schloss Nordkirchen, W. Germany: “Pion Transverse Momentum Distribution. Screening of the qq Potential at High Temperature”, August 24-28, 1987.

Invited talk (45 min.) at the Holifield Theory Users Group Meeting, Joint Institute for Heavy Ion Research, Oak Ridge National Laboratory: “Dilepton Radiation from High Temperature Nuclear Matter”, Sept. 25-26, 1987.

## **1988**

Invited seminar (60 min.) Physics Dept., University of Iowa: “Dilepton Radiation

from Nuclear Matter and Nuclear Collisions”, Jan. 27, 1988.

Nuclear Physics seminar (60 min.) at the University of Minnesota: “Finite Lattice-Size Effects in QCD Thermodynamics”, Feb. 3, 1988.

Invited talk (30 min.) at the Winter Workshop on Nuclear Dynamics V, Sun Valley, Idaho: “Analysis of Ultrarelativistic Nuclear Collisions in Emulsion”, Feb. 22-26, 1988.

Invited seminar (60 min.) at the Center for Theoretical Physics, MIT: “Dilepton Radiation from Nuclear Matter and Nuclear Collisions”, April 11, 1988.

Invited talk (30 min.) at the Annual Meeting of the AGS Users Group, Brookhaven National Laboratory: “RHIC Physics”, May 6, 1988.

Invited Summary talk (30 min.) at the Fifth Gull Lake International Conference on Phase Transitions in Nuclear Systems, Gull Lake, MI: “Theory Summary”, May 23-27, 1988.

Invited talk (50 min.) at the Gordon Research Conference on Nuclear Chemistry, Colby-Sawyer College, New Hampshire: “Perspectives on Quark- Gluon Plasma Formation”, June 20-24, 1988.

Invited talk (40 min.) at the Workshop on Thermal Field Theories and Their Applications, Case Western Reserve University: “Finite Lattice Size Effects on QCD Thermodynamics”. I also organized and chaired an evening session on “Instabilities in Thermal QCD?”, Oct. 3-5, 1988.

Invited talk (40 min.) at the International Workshop on Nuclear Dynamics at Medium and High Energies, Bad Honnef, W. Germany: “Dilepton Production”, Oct. 10-14, 1988.

Invited seminar (60 min.) at the Center for Theoretical Physics, MIT: “Single and Multi-Particle Analysis of Nucleus-Nucleus Collisions at 14.6, 60 and 200 GeV per Nucleon”, Nov. 15, 1988.

Nuclear Physics seminar (60 min.) at the University of Minnesota, “Single and Multi-Particle Analysis of Nucleus-Nucleus Collisions at 14.6, 60 and 200 GeV per Nucleon”, Nov. 30, 1988.

Nuclear Science Division seminar (60 min.) at Lawrence Berkeley Laboratory, “Sin-

gle and Multi-Particle Analysis of Nucleus-Nucleus Collisions at 14.6, 60 and 200 GeV per Nucleon”, Dec. 12, 1988. Also two lunchtime talks for the Nuclear Theory Group: “Finite Lattice Size Effects on QCD Thermodynamics” and ”Dilepton Production in Nucleon-Nucleon and Nucleus-Nucleus Collisions”, Dec. 14-15, 1988.

## 1989

Nuclear Physics seminar (60 min.), University of Minnesota: “Dilepton Production in Nucleon-Nucleon Collisions”, Jan. 25, 1989.

Graduate Student Research Seminar (60 min.) University of Minnesota: “Nuclear Physics Theory”, Feb. 13, 1989.

Presentation to the Bevalac Review Committee (30 min.), Lawrence Berkeley Lab: “Dilepton Physics at the Bevalac”, April 4, 1989.

Nuclear physics seminar (60 min.) at the University of Minnesota: “Fermions at High Temperature”, May 3, 1989.

Invited joint seminar in nuclear and particle physics (60 min.) McGill University: “High Temperature QCD”, June 6, 1989.

Invited Nuclear Theory seminar (60 min.) Lawrence Berkeley Laboratory: “Dilepton Production Theory”, Aug. 24, 1989.

Invited seminar (60 min.) Rutgers University, “Dilepton Production in Nucleon-Nucleon and Nucleus-Nucleus Collisions”, Dec. 5, 1989.

## 1990

Invited TPI colloquium (60 min) University of Minnesota: “High Temperature QCD”, Jan. 25, 1990.

Invited talk (30 min) Winter Workshop on Nuclear Dynamics VI, Jackson Hole, Wyoming: “Dilepton Production Theory”, Feb. 17-24, 1990.

Invited talk (30 min) HIPAGS Workshop, Brookhaven National Laboratory: “Dilepton Production Theory”, March 6, 1990.

Invited seminar (60 min) McGill University: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, June 6, 1990.

Joint Nuclear physics/TPI seminar (60 min) University of Minnesota: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, July 18, 1990.

Invited talk (40 min) International Workshop on High Density Nuclear Matter, KEK, Japan: “Mesons in High Density Matter”, Sept. 18-21, 1990.

Invited colloquium (60 min) Kent State University: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, Nov. 2, 1990.

### **1991**

Nuclear physics seminar (60 min) University of Minnesota: “Vector Dominance Model at Finite Temperature”, Jan. 16, 1991.

Invited talk (30 min) Winter Workshop on Nuclear Dynamics VII, Key West, Florida: “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Matter”, Jan. 26 - Feb. 2, 1991.

Invited colloquium (60 min) Northwestern University: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, Feb. 13, 1991.

Invited colloquium (60 min) Indiana University: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, March 6, 1991.

Invited seminar (45 min) Indiana University Cyclotron: “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Matter”, March 7, 1991.

Nuclear physics seminar (60 min) University of Minnesota: “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Matter”, March 13, 1991.

Invited colloquium (60 min) University of Minnesota: “Strangeness, Glue and Quark Matter Content of Neutron Stars”, April 24, 1991.

Invited talk (30 min) Workshop on Baryon Number Violation in Electroweak Theory, Institute for Advanced Study, Princeton: “Phase Diagram of Electroweak Theory”, May 16-18, 1991.

Invited seminar (60 min) McGill University: “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Gas”, June 4, 1991.

Five lectures (90 min each) Annual Summer School in Nuclear Physics, University of Wisconsin, Madison: “Finite Temperature Field Theory in Nuclear Physics”, June 17-21, 1991.

Invited talk (30 min) Ninth International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Gatlinburg, Tennessee: “High Energy Photons from Quark-Gluon Plasma versus Hot Hadronic Matter”, Nov. 11-15, 1991.

## **1992**

Invited Triangle Nuclear Theory Colloquium (60 min) Duke University: “Quantum Chromodynamics at High Temperature and Density”, March 3, 1992.

Invited seminar (60 min) Duke University: “Dynamics of Relativistic First-Order Phase Transitions”, March 4, 1992.

Invited colloquium (60 min) University of Rochester: “Quantum Chromodynamics at High Temperature and Density”, March 5, 1992.

Invited colloquium (60 min) Oregon State University: “Quantum Chromodynamics at High Temperature and Density”, April 13, 1992.

Invited seminar (60 min) SUNY at Stony Brook: “Dynamics of Relativistic First-Order Phase Transitions”, April 30, 1992.

Invited seminar (60 min) Brookhaven National Laboratory: “Dynamics of the QCD Phase Transition”, May 1, 1992.

Invited talk (40 min) Workshop on Thermal Field Theories and Applications, University of Bielefeld, Germany: “Dynamics of Relativistic First-Order Phase Transitions”, May 18-21, 1992. I also gave the closing comments at the workshop.

Invited seminar (60 min) McGill University: “Dynamics of the QCD Phase Transition”, June 9, 1992.

Invited talk (60 min) Condensed matter luncheon seminar, University of Minnesota: “What has been Learned from Lattice QCD at Finite Temperature?”, June 17, 1992.

Invited talk (45 min) Workshop on Perturbative Methods in Hot Gauge Theories, Winnipeg Institute for Theoretical Physics: “Screening of Static QED Electric Fields in Hot QCD”, July 21, 1992.

Invited talk (45 min) Workshop on Relativistic Heavy Ion Collisions, KFKI, Budapest, Hungary: “Screening of Static QED Electric Fields in Hot QCD”, Aug. 10-13, 1992.

Invited talk (50 min) Graduate research seminar, University of Minnesota: “High Energy Nuclear Theory”, Oct. 12, 1992.

Invited talk (50 min) Junior honors seminar, University of Minnesota: “High Energy Nuclear Theory”, Oct. 13, 1992.

Invited Colloquium (60 min) Los Alamos National Laboratory: “High Temperature QCD”, Nov. 19, 1992.

Invited seminar (60 min) T-2 Group, Los Alamos National Laboratory: “Dilepton Radiation from Cascading Partons”, Nov. 20, 1992.

Invited seminar (60 min) Theory Division, Los Alamos National Laboratory: “Dynamics of the QCD and Electroweak Phase Transitions”, Nov. 20, 1992.

Invited seminar (60 min) MIT: “Dynamics of the QCD and Electroweak Phase Transitions”, Dec. 7, 1992.

### **1993**

Invited seminar (60 min) University of Pittsburgh: “Dynamics of the QCD and Electroweak Phase Transitions”, Feb. 4, 1993.

TPI seminar (60 min) University of Minnesota: “Dynamics of the QCD and Electroweak Phase Transitions”, Feb. 12, 1993.

Invited seminar (60 min) Wayne State University: “Dynamics of the QCD and Electroweak Phase Transitions”, March 24, 1993.

Invited talk (40 min) Nordic Workshop on Relativistic Heavy Ion Reaction Theory, Bergen University, Norway: “Dynamics of the QCD and Electroweak Phase Transitions”, June 15, 1993.

Invited seminar (60 min) Lund University, Sweden: “Dynamics of the QCD and Electroweak Phase Transitions”, June 17, 1993.

Invited plenary talk (40 min) Tenth International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Borlange, Sweden: “Photons and Lepton Pairs from High Energy Nuclear Collisions”, June 20-24, 1993.

Invited talk (30 min) Conference on Strong Interactions at Finite Temperature, ITP, UC Santa Barbara: “Temperature Dependence of Electric and Magnetic Gluon Condensates”, August 16-20, 1993.

Invited seminar (60 min) ITP, UC Santa Barbara: “Weinberg-type Sum Rules at Finite Temperature”, Aug. 31, 1993.

Invited colloquium (60 min – presented jointly with E. Shuryak) ITP, UC Santa Barbara: “Quarks, Gluons and the Relativistic Heavy Ion Collider”, Sept. 15, 1993.

Invited colloquium (60 min) Physics Department, UC Santa Barbara: “Quarks, Gluons and the Relativistic Heavy Ion Collider”, Nov. 9, 1993.

## **1994**

Nuclear physics seminar (60 min) University of Minnesota: “Quarks, Gluons and the Relativistic Heavy Ion Collider”, Jan. 19, 1994.

Invited talk (30 min) Workshop on Continuous Advances in QCD, University of Minnesota: “Weinberg-type Sum Rules at Zero and Finite Temperature”, Feb. 18-20, 1994.

Invited talk (60 min) Junior honors seminar, University of Minnesota: “Relativistic Heavy Ion Collisions”, March 8, 1994.

Invited talk (40 min) NATO Advanced Research Workshop on Electroweak Physics and the Early Universe, Sintra, Portugal: “Dynamical Evolution of the Electroweak Phase Transition”, March 23-25, 1994.

Invited presentation (30 min) to the QCD Working Group of the Long Range Planning Committee for the Division of Particles and Fields of the APS, Madison: “Finite Temperature QCD”, April 10, 1994.

Invited seminar (60 min) McGill University: “Chiral Symmetry Breaking and Restoration at Finite Temperature”, June 14, 1994.

Invited talk (35 min) at the experimental collaboration meeting on Physics with

PHENIX at RHIC, Brookhaven National Laboratory: “Dynamics of the Chiral Phase Transition”, Aug. 31, 1994.

TPI seminar (60 min) University of Minnesota: “Dynamics of the Chiral Phase Transition”, Oct. 7, 1994.

Invited symposium speaker (60 min) Yale University: “Quarks, Gluons, and the Relativistic Heavy Ion Collider”, Dec. 9, 1994.

## **1995**

Invited presentation (45 min) at the Nuclear Theory Town Meeting, Argonne National Laboratory: “High Temperature QCD and Relativistic Nuclear Collisions”, Jan. 29, 1995.

Tutorial at the APS Spring Meeting in Washington, D.C. (70 min) “Quantum Chromodynamics at Finite Temperature”, April 17, 1995.

Condensed matter physics seminar (60 min) University of Minnesota: “Statistical Mechanics and Transport Theory of High-Energy Nuclear Collisions”, April 6, 1995.

Invited talk (60 min) ECT\* Workshop on QCD and Relativistic Heavy Ion Collisions, Trento, Italy: “Photon and Dilepton Production and their Experimental Signatures”, June 12-24, 1995.

Invited talk (40 min) American Chemical Society National Meeting, Nuclear Chemistry and Technology Symposium: “Theory of Very High Energy Nucleus–Nucleus Collisions”, Aug. 21-24, 1995.

Invited colloquium (60 min) High Energy Physics Division, Argonne National Laboratory: “Quarks, Gluons and the Relativistic Heavy Ion Collider”, Nov. 16, 1995.

## **1996**

Invited talk (50 min) INT/RHIC Workshop on Electromagnetic Probes of Quark Gluon Plasma, University of Washington, Seattle: “Theory Overview: Leptons and Photons from QGP”, Jan. 24-27, 1996.

Invited colloquium (60 min) Department of Physics and Astronomy, Michigan State University: “Quarks, Gluons and the Relativistic Heavy Ion Collider”, Feb. 13, 1996.

Invited talk (60 min) Graduate research seminar, University of Minnesota: “Cooking QCD”, Feb. 22, 1996.

Invited seminar (60 min) Physics Department, SUNY at Stony Brook: “Aspects of Chiral Symmetry at Finite Temperature”, Feb. 29, 1996.

Invited seminar (60 min) Physics Department, Brookhaven National Laboratory: “Aspects of Chiral Symmetry at Finite Temperature”, March 1, 1996.

Nuclear physics seminar (60 min) University of Minnesota: “Aspects of Chiral Symmetry at Finite Temperature”, March 27, 1996.

Invited seminar (60 min) Physics Department, McGill University: “Linear versus Nonlinear Sigma Model at Finite Temperature”, June 11, 1996.

Invited colloquium (60 min) Physics Division, Argonne National Laboratory: “RHIC Physics”, Nov. 8, 1996.

Invited seminar (60 min) Nuclear Science Division, Lawrence Berkeley Laboratory: “Coulomb Effects on Charged Kaon Distributions from Vlasov Dynamics”, Dec. 18, 1996.

## **1997**

Nuclear Physics seminar (60 min) University of Minnesota: “Coulomb Effects on Charged Kaon Distributions from Vlasov Dynamics”, Jan. 16, 1997.

Invited plenary talk (30 min) Third International Conference on the Physics and Astrophysics of Quark Gluon Plasma, Jaipur, India: “Linear Extrapolation of Ultrarelativistic Nucleon-Nucleon Scattering to Nucleus-Nucleus Collisions”, March 20, 1997.

Invited plenary talk (40 min) International Symposium on Trends in Subatomic Physics, Taipei, Taiwan: “Quarks, Gluons, and the Relativistic Heavy Ion Collider”, Aug. 7-12, 1997.

Nuclear physics seminar (60 min) University of Minnesota: “Coarse Grained Field Equations for Classical Many-Particle Systems”, Nov. 6, 1997.

Invited seminar (60 min) Nuclear Science Division, Lawrence Berkeley Laboratory:

“Coarse Grained Field Equations for Classical Many-Particle Systems”, Dec. 18, 1997.

## 1998

Invited seminar (60 min) Physics Department, University of Michigan: “Linear versus Nonlinear Sigma Model at Finite Temperature”, Feb. 6, 1998.

Invited seminar (60 min) RIKEN Institute, Brookhaven National Laboratory: “Coarse Grained Field Equations for Classical Many-Particle Systems”, Feb. 26, 1998.

Invited seminar (60 min) Physics Department, Columbia University: “Nucleus-Nucleus Bremsstrahlung at RHIC: Theory and Proposed Experiment”, Feb. 27, 1998.

Invited seminar (60 min) National Institute for Nuclear Theory, University of Washington, Seattle: “Linear Extrapolation of High Energy Nucleon-Nucleon Collisions to Nucleus-Nucleus Collisions”, March 24, 1998.

Invited seminar (60 min) National Institute for Nuclear Theory, University of Washington, Seattle: “Nucleus-Nucleus Bremsstrahlung at RHIC: Theory and Proposed Experiment”, April 27, 1998.

Nuclear physics seminar (60 min) University of Minnesota: “Nucleus-Nucleus Bremsstrahlung at RHIC: Theory and Proposed Experiment”, May 7, 1998.

Invited talk (60 min) Workshop on  $J/\psi$  Production, National Institute for Nuclear Theory, University of Washington, Seattle: “Can  $J/\psi$  be Suppressed without Partons?”, May 11-15, 1998.

Invited talk (30 min) Workshop on High Density Matter in AGS, SPS and RHIC Collisions, RIKEN BNL Research Center: “RHIC Bremsstrahlung - Theory”, July 11, 1998.

Invited talk (40 min) Workshop on Quarkonium Production in Relativistic Nuclear Collisions, RIKEN BNL Research Center: “Coherence Time in High Energy Proton-Nucleus Collisions”, Sept. 28, 1998.

Invited talk (20 min) Workshop on RHIC Physics and Beyond, Brookhaven National Laboratory: “Coherence Time Effects on Drell-Yan And  $J/\psi$  Production in pA Collisions: Part I”, Oct. 23, 1998.

Invited talk (60 min) Workshop on Quantum Fields In and Out of Equilibrium, RIKEN BNL Research Center: “Rho Mesons and Dilepton Emission at Finite Temperature”, Oct. 26, 1998.

## 1999

Nuclear physics seminar (60 min) University of Minnesota: “Drell-Yan and  $J/\psi$  Production in High Energy Proton-Nucleus Collisions”, Jan. 21, 1999.

Invited talk (30 min) Quark Matter 1999: International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Torino, Italy: “Coherence Time in High Energy Nuclear Collisions”, May 10-15, 1999.

Invited talk (25 min) Workshop on Heavy Ion Theory, CERN, Geneva, Switzerland: “The Rho Meson at Finite Temperature and Density”, May 17-20, 1999.

Invited seminar (60 min) CERN Heavy Ion Forum, CERN, Geneva, Switzerland: “Imaging the Space-Time Evolution of High Energy Nucleus-Nucleus Collisions with Bremsstrahlung”, June 10, 1999.

Invited seminar (60 min) Brookhaven National Laboratory: “Dynamical Evolution of the Scalar Condensate in Heavy Ion Collisions”, Oct. 8, 1999.

Nuclear physics seminar (60 min) University of Minnesota: “Dynamical Evolution of the Scalar Condensate in Heavy Ion Collisions”, Nov. 11, 1999.

## 2000

TPI seminar (60 min) University of Minnesota: “Has Quark-Gluon Plasma been Discovered at CERN?”, Feb. 25, 2000.

Invited Nuclear Science Division seminar (60 min) Lawrence Berkeley National Laboratory: “The Last Eight Minutes of a Primordial Black Hole”, April 7, 2000.

Physics Education seminar (60 min) University of Minnesota: “Web Based Problem Solving at the University of Minnesota”, April 14, 2000.

Invited seminar (60 min) Ohio State University: “The Last Eight Minutes of a Primordial Black Hole”, April 26, 2000.

Astronomy seminar (60 min) University of Minnesota: “The Last Eight Minutes of

a Primordial Black Hole”, May 5, 2000.

Invited talk (45 min) Workshop on Hard Processes and RHIC Physics, Los Alamos National Laboratory: “Status of the QCD Equation of State”, June 12-16, 2000.

Invited talk (30 min) International Conference: Strangeness 2000, Lawrence Berkeley National Laboratory: “Theoretical Predictions for RHIC: Will Strangeness Win the Prize?”, July 24, 2000.

Invited seminar (60 min) Nuclear Theory Group, Lawrence Berkeley Laboratory: “Bremsstrahlung from UrQMD”, Aug. 25, 2000.

Nuclear Physics seminar (60 min) University of Minnesota: “Interpretation of the First Data on Central Au+Au Collisions at RHIC”, Sept. 14, 2000.

Invited talk (30 min) Mini-workshop on Heavy Ion Reaction Dynamics, University of Minnesota: “Interpretation of the First Data on Particle Production at RHIC”, Nov. 6, 2000.

Invited lecture (50 min) International School of Astrophysics D. Chalonge, 8th Course, *Phase Transitions in the Early Universe: Theory and Observations*: “Primordial Black Holes and Hot Matter”, Erice, Sicily, Dec. 6-17, 2000.

Invited lecture (50 min) International School of Astrophysics D. Chalonge, 8th Course, *Phase Transitions in the Early Universe: Theory and Observations*: “Quark-Gluon Plasma in the Early Universe”, Erice, Sicily, Dec. 6-17, 2000.

## **2001**

Contributed talk (12 min) April Meeting 2001 of the American Physical Society: “Evidence for Topological Defect Production in Heavy Ion Collisions”, Washington, D.C.

Invited talk (25 min) RHIC/INT Workshop *Ultrarelativistic Heavy Ion Collisions in the RHIC Era*, Lawrence Berkeley National Laboratory: “Two-Loop Self-Energy and Multiple Scattering at Finite Temperature”, May 31-June 2, 2001.

Invited talk (60 min) Snowmass 2001 - Summer Study on the Future of Particle Physics, Snowmass, CO: “Primordial Black Holes and Hot Matter”, July 9-13, 2001.

Contributed talk (20 min) Joint Fall Meeting of the Nuclear Physics Divisions of

the American and Japanese Physical Societies: “Dilepton Production in Heavy Ion Collisions”, Maui, Hawaii, October 17-20, 2001.

## 2002

Invited talk (30 min) Eighteenth Winter Workshop on Nuclear Dynamics, Nassau, Bahamas: “Dileptons and Photons from Coarse Grained UrQMD and Hydrodynamics Confront SPS Data”, January 20-27, 2002.

Invited talk (30 min) Eighteenth Winter Workshop on Nuclear Dynamics, Nassau, Bahamas: “Explosions of Microscopic Black Holes and Hot Matter”, January 20-27, 2002.

Invited seminar (60 min) McGill University: “Explosions of Microscopic Black Holes and Hot Matter”, March 18, 2002.

Invited seminar (60 min) McGill University: “Dileptons and Photons from Coarse Grained UrQMD and Hydrodynamics Confront SPS Data”, March 19, 2002.

Invited talk (30 min) RIKEN BNL Center workshop on Baryon Dynamics at RHIC: “Skyrmions”, March 30, 2002.

Invited parallel talk (20 min) Quark Matter 2002: The XVI International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Nantes, France: “Dileptons and Photons from Coarse-Grained Microscopic Dynamics and Hydrodynamics Compared to Experimental Data”, July 18-24, 2002.

Invited seminar (60 min) Brookhaven National Laboratory: “Thermal Rates for Baryon and Anti-Baryon Production”, Oct. 18, 2002.

Nuclear Physics seminar (60 min) University of Minnesota: “Rates for Baryon and Anti-Baryon Production in Hot and Dense Matter”, Oct. 31, 2002.

Invited talk (30 min) INT/RHIC Workshop on the First Two Years of RHIC: Theory vs. Experiments, National Institute for Nuclear Theory, University of Washington, Seattle: “LEXUS Predictions”, Dec. 13, 2002.

## 2003

Invited plenary talk (20 min) Seventh International Conference on Strangeness in Quark Matter, Atlantic Beach, North Carolina: “Thermal Rates for Baryon and

Anti-Baryon Production”, March 14, 2003.

Invited talk (15 min) International Conference on Topics in Heavy Ion Collisions, McGill University, Canada: “Baryon and Anti-Baryon Production at RHIC”, June 27, 2003.

Invited seminar (60 min) University of Connecticut: “High Temperature Matter and Gamma Rays and Neutrinos from Microscopic Black Holes”, Nov. 7, 2003.

## **2004**

Invited parallel talk (20 min) Quark Matter 2004: The XVII International Conference on Ultrarelativistic Nucleus-Nucleus Collisions, Oakland, California: “Rescattering Effects on HBT Interferometry”, Jan. 11-17, 2004.

Invited talk (30 min) Twentieth Winter Workshop on Nuclear Dynamics, Trelawny Beach, Jamaica: “Rescattering Effects on HBT Interferometry”, March 15-20, 2004.

Invited seminar (60 min) Duke University: “High Temperature Matter and Gamma Rays and Neutrinos from Microscopic Black Holes”, March 30, 2004.

Invited talk (30 min) Workshop on Continuous Advances in QCD, Theoretical Physics Institute, University of Minnesota: “Baryon and Anti-Baryon Production at RHIC”, May 14, 2004.

Invited talk (30 min) McGill University: “Neutrino Superfluidity”, Dec. 4, 2004.

## **2005**

Astrophysics and Cosmology seminar (60 min) University of Minnesota: “Neutrino Superfluidity”, Jan. 24, 2005.

Contributed talk (12 min) April Meeting 2005 of the American Physical Society: “Neutrino Superfluidity”, Tampa, FL

Contributed talk (24 min) April Meeting 2005 of the American Physical Society: “Disaster Scenarios at Nuclear Accelerators”, Tampa, FL

Invited seminar (30 min) Ohio State University: “Neutrino Superfluidity”, June 2, 2005.

Invited seminar (30 min) Ohio State University: “Disaster Scenarios at Nuclear Accelerators”, June 2, 2005.

Invited parallel talk (20 min) Quark Matter 2005: 18th International Conference on Ultrarelativistic Nucleus-Nucleus Interactions, Budapest, Hungary: “Hot Matter from Exploding Black Holes”, August 3-9, 2005.

Invited after dinner talk at Quark Matter 2005: 18th International Conference on Ultrarelativistic Nucleus-Nucleus Interactions, Budapest, Hungary: “Disaster Scenarios at Nuclear Accelerators: History and Lessons”, August 3-9, 2005.

Contributed talk (15 min) 2nd Joint Meeting of the Nuclear Physics Divisions of the APS and The Physical Society of Japan: “From Hard Scattering to Classical Gluon Fields to Quark Gluon Plasma”, Maui, Hawaii, Sept. 18-22, 2005.

## **2006**

Nuclear physics seminar (60 min) University of Minnesota: “Disaster Scenarios at Nuclear Accelerators and Beyond”, Jan. 26, 2006.

Condensed seminar (60 min) University of Minnesota: “Neutrino Superfluidity”, March 2, 2006.

Invited talk (25 min) Seventh International Conference on Strong and Electroweak Matter, Brookhaven National Laboratory: “On the Strongly-Interacting Low-Viscosity Matter Created in Relativistic Nuclear Collisions”, May 10, 2006.

Colloquium (60 min) University of Washington, Seattle: “Physics at RHIC”, May 22, 2006.

Invited plenary talk (60 min) IVth International Conference on Quarks and Nuclear Physics, Madrid, Spain: “Deducing the Equation of State at RHIC”, June 10, 2006.

Invited plenary talk (30 min) Second International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions, Asilomar Conference Grounds, Pacific Grove, California: “Electromagnetic Probes of Strongly Interacting Matter”, June 14, 2006.

Invited talk (30 min) Symposium on Current Trends in Nuclear Physics, Lawrence Berkeley National Laboratory: “Strongly-Interacting Low-Viscosity Matter in Heavy Ion Collisions”, June 17, 2006.

Nuclear physics seminar (60 min) University of Minnesota: “On the Strongly-Interacting Low-Viscosity Matter Created in Relativistic Nuclear Collisions”, Sept. 21, 2006.

Invited seminar (60 min) Brookhaven National Laboratory: “Cosmological Black Hole Formation and the QCD Phase Transition”, October 20, 2006.

Colloquium (60 min) McGill University, Montreal: “Physics at RHIC”, October 27, 2006.

Invited plenary talk (25 min) Quark Matter 2006: 19th International Conference on Ultrarelativistic Nucleus-Nucleus Interactions, Shanghai, China: “Strongly Interacting Low Viscosity Matter Created in Heavy Ion Collisions”, November 14-20, 2006.

## **2007**

Invited talk (40 min) Workshop on Strongly Interacting Quark Gluon Plasma, Nagoya University, Japan: “Strongly Interacting Low Viscosity Matter Created in Heavy Ion Collisions”, February 16-18, 2007.

Summary talk (30 min) Workshop on Strongly Interacting Quark Gluon Plasma, Nagoya University, Japan, February 16-18, 2007.

Invited lecture (90 min) First Nagoya Winter School: The Origin of the Universe and Matter, MielParl Ise Shima, Japan: “Physics at RHIC”, February 19-23, 2007.

Invited lecture (90 min) First Nagoya Winter School: The Origin of the Universe and Matter, MielParl Ise Shima, Japan: “Cosmological Black Hole Formation and the QCD Phase Transition”, February 19-23, 2007.

Invited talk (40 min) Exotic States of Hot and Dense Matter and Their Dual Description, Perimeter Institute, Waterloo, Canada: “Cosmological Black Hole Formation and the QCD Phase Transition”, May 22-25, 2007.

Invited talk (30 min) Workshop on Early Time Dynamics in Heavy Ion Collisions, McGill University, Montreal: “Role of Viscosity in Relativistic Nuclear Collisions”, July 16-19, 2007.

Colloquium (60 min) Ohio University, Athens, Ohio: “Physics at RHIC”, Septem-

ber 14, 2007.

Invited talk (30 min) Fall Meeting of the APS Division of Nuclear Physics, Newport News, VA: “Bulk Properties and Collective Flow of Quark Gluon Plasma”, October 10-13, 2007.

Colloquium (60 min) Texas A&M University, College Station, Texas: “Physics at RHIC”, October 25, 2007.

Invited talk (60 min) Workshop on Electromagnetic Radiation in Nuclear Collisions, CERN, Geneva, Switzerland: “Spectral Density for Dilepton Production in Hot and Dense Hadronic Matter”, December 17-19, 2007.

## **2008**

Nuclear physics seminar (60 min) University of Minnesota: “Determination of Vector Meson Properties in Dense Matter via Relativistic Nuclear Collisions”, Feb. 7, 2008.

Physics Colloquium (60 min) Argonne National Laboratory: “Physics at RHIC”, Feb. 25, 2008.

Invited talk (30 min) Korean Physical Society Meeting, Daejun, Korea: “Heavy Ion Physics from RHIC to LHC”, April 18, 2008.

Invited talk (60 min) Heavy Ion Meeting, University of Seoul, Korea: “Heavy Ion Physics from RHIC to LHC”, April 19, 2008.

Invited seminar (60 min) Korean Institute for Advanced Study, Seoul, Korea: “Determination of Vector Meson Properties in Dense Matter via Relativistic Nuclear Collisions”, April 21, 2008.

Invited talk (30 min) Workshop on Extra Strong Quark Gluon Plasma, SUNY Stony Brook, NY: “Is RHIC-Produced Matter More Like Milk or Honey? ”, October 2-3, 2008.

Contributed talk (12 min) Fall Meeting of the Division of Nuclear Physics of the American Physical Society: “Shear Transport Coefficients from Gauge/Gravity Correspondence”, October 25, 2008.

## **2009**

Invited talk (20 min) Quark Matter 2009: 21st International Conference on Ultrarelativistic Nucleus-Nucleus Interactions, Knoxville, TN: “Critical Points in the QCD Phase Diagram with Two Flavors of Quarks”, March 30 - April 4, 2009.