Andy W.C. Lau

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Birthplace and Date: Hong Kong; December 15, 1971.

Citizenship: U.S.A.

Research Interests: Theoretical soft condensed matter physics, biophysics, and statistical mechanics.

Education

Ph.D. in Physics, October 2000, University of California, Santa Barbara.

Thesis: Fluctuation and correlation effects in electrostatics of highly-charged surfaces
Advisor: Prof. Philip A. Pincus

M.A. in Physics, March 1998, University of California, Santa Barbara.

B.S. in Physics (with Honors), June 1994, University of California, Davis.

Experience

University of Pennsylvania, Philadelphia (Sept. 2001 – Present)

Postdoctoral Fellow: Research position in the UPenn Soft Condensed Matter group. Research on depletion interaction mediated by semiflexible rods, phase behavior of nematic gels, microrheology of living cells, and correlation effects and dynamics in charged systems.

College de France, Paris, France (Nov. 2000 – Aug. 2001)

Postdoctoral Fellow: Research position in the group headed by Prof. P.-G de Gennes. Research on spreading behavior of an elastic latex particle on a high-energy surface, and continued to work on problems in correlation effects in electrostatics.

University of California, Santa Barbara (Sept. 1994 – Oct. 2000)

Research Assistant: Conducted active, independent research projects in theoretical soft condensed matter physics (advisor: Prof. P.A. Pincus), Superconductivity in SNS junctions (advisor: Prof. Herbert Kroemer).

Teaching Assistant: Taught discussion and laboratory classes in undergraduate physics. Graded and prepared solutions for graduate quantum mechanics and statistical mechanics.

Los Alamos National Laboratory (Summer, 1995)

Research Assistant: Research on non-linear spatially extended systems. Performed analytical work and numerical simulations on stochastic systems which exhibit chaotic dynamics. Advisor: Dr. Niels Grønbech-Jensen, T-11.

University of California, Davis (1993–1994)

Teaching Assistant: Graded and prepared solutions for undergraduate freshman engineering physics courses.

Los Alamos National Laboratory (Spring, 1993)

Research Assistant: A selected participant of Science and Engineering Research Semester (SER) Program. Research on non-neutral plasma physics and generalizations of the Penning Trap. Advisor: Dr. Leaf Turner, T-15.

Awards and Honors

John Cardy Award: For excellent academic performance and evidence of future promise in physics, University of California, Santa Barbara (1995).

Saxon-Patten Prize in Physics: For achieving an excellent academic record and showing interest and promise in continued work in physics and/or related physical sciences, University of California, Davis (1994).

Department Citation: For excellence in the major program and outstanding GPA in courses given by the department major program, University of California, Davis (1994).

Publications

- B.D. Hoffman, G. Massiera, A.W.C. Lau, and J.C. Crocker, "The quaking cell: Cytoskeletal mechanics determined by molecular motor Assembly", to be submitted (2003).
- Z. Dogic, J. Zhang, A.W.C. Lau, H. Aranda-Espinoza, P. Dalhaimer, D.E. Discher, P.A. Janmey, T.C. Lubensky and A.G. Yodh, "Elongation and fluctuations of semi-flexible polymers in a nematic solvent," submitted to Phys. Rev. Lett. (2003).
- C.D. Santangelo and A.W.C. Lau, " Effects of counterion fluctuations in a polyelelctrolyte brush," Euro. Phys. J. E, in press (2003).
- A.W.C. Lau, B.D. Hoffman, A. Davis, J.C. Crocker, and T.C. Lubensky, "Microrheology, stress fluctuations and active behavior of living cells", Phys. Rev. Lett **91**, 198101 (2003).
- A.W.C. Lau, M. Portigliatti, E. Raphaël, and L. Léger, "Spreading of Latex Particles on a Substrate", Europhys. Lett. **60**, 717 (2002).
- A.W.C. Lau, P. Pincus, "Counterion Condensation and Fluctuation-Induced Attraction", Phys. Rev. E **66**, 041501 (2002).
- D. Lacoste, A.W.C. Lau, T.C. Lubensky, "Phase Transitions in Lyotropic Nematic Gels", Eur. Phys. J. E **8**, 403 (2002).
- A.W.C. Lau, Keng-Hui Lin, and A.G. Yodh, "Entropic interactions in suspensions of semiflexible rods: Short-range effects of flexibility", Phys. Rev. E **66**, 020401(R) (2002).
- D.B. Lukatsky, S.A. Safran, A.W.C. Lau, P. Pincus, "Enhanced Counterion Localization Induced by Surface charge Modulation", Europhys Lett. **58**, 785 (2002).
- A.W.C. Lau, D.B. Lukatsky, P. Pincus, and S.A. Safran, "Charge Fluctuations and Counterion Condensation", Phys. Rev. E. **65**, 051502 (2002).
- A.W.C. Lau, P. Pincus, Dov Levine, and H.A. Fertig, "Electrostatic Attraction of Coupled Wigner Crystals: Finite Temperature Effects", Phys. Rev. E **63**, 051604 (2001).
- A.W.C. Lau, Dov Levine, and P. Pincus, "Novel Electrostatic Attraction from Plasmon Fluctuations", Phys. Rev. Lett. **84**, 4116 (2000).

- A.W.C. Lau and P. Pincus, "Binding of Oppositely Charged Membranes and Membrane Reorganization", Eur. Phys. J. B **10**, 175-180 (1999).
- A.W.C. Lau and P. Pincus, "Charged-Fluctuation-Induced Nonanalytic Bending Rigidity", Phys. Rev. Lett. **81**, 1338 (1998).
- Niels Grønbech-Jensen, David Cai, A.R. Bishop, A.W.C. Lau, and Peter S. Lomdahl, "Bunched Fluxons in Coupled Josephson Junctions", Phy. Rev. B **50**, 6352 (1994).
- L. Turner, T.N. Tiouririne, A.W.C. Lau, "Compressional Oscillation Frequency of an Anharmonic Oscillator – the Spherical Non-neutral Plasma", J. Math. Phys. **35**, 2349 (1994).
- T.N. Tiouririne, L. Turner, A.W.C. Lau, "Multipole Traps for Non-neutral Plasmas", Phys. Rev. Lett. **72**, 1204 (1994).

Presentations and Seminars

- A.W.C. Lau, "Microrheology and Stress Fluctuations in Living cells", Seminar, Universit Paris-sud XI, ORSAY, France (Jul., 2003).
- A.W.C. Lau, "Microrheology and Stress Fluctuations in Living cells", Seminar, ESPCI, Paris, France (Jul., 2003).
- A.W.C. Lau, "Microrheology and Stress Fluctuations in Living cells", Seminar, Kent State University, Kent, OH (Apr., 2003).
- C.D. Santangelo and A.W.C. Lau, "Effect of Counterion Fluctuations in a Polyelectrolyte Brush", contributed talk at the **APS March Meeting** (Session X17), Austin, TX (Mar. 2003).
- K.-H. Lin, A.W.C. Lau, A.G. Yodh, "Depletion interactions mediated by semiflexible rods", contributed talk at the **APS March Meeting** (Session N13), Austin, TX (Mar. 2003).
- A.W.C. Lau, B.D. Hoffman, J.C. Crocker, T.C. Lubensky, "Microrheology and Stress Fluctuations in Living cells", contributed talk at the **APS March Meeting** (Session G18), Austin, TX (Mar. 2003).
- A.W.C. Lau, "Microrheology and Stress Fluctuations in Living cells", Seminar, Brown University, Providence, RI (Feb., 2002).
- A.W.C. Lau, "Phase Transitions in Lyotropic Nematic Gels", Soft Materials chalk talk, University of Pennsylvania, Philadelphia, PA (Jun., 2002).
- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Seminar, NEC Research Institute, Princeton, NJ (May, 2002).
- D. Lacoste, A.W.C. Lau, and T.C. Lubensky "Collapse of nematic gels driven by isotropic-nematic transition", contributed talk at the **APS March Meeting** (Session L9), Indianapolis, Indiana (Mar. 2002).
- A.W.C. Lau, D.B. Lukasky, P. Pincus, and S.A. Safran "Charge fluctuations and Counterion condensation", contributed talk at the **APS March Meeting** (Session A10), Indianapolis, Indiana (Mar. 2002).
- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Applied Math Lab Seminar, Courant Institute, New York University, NY (Feb., 2002).

- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Condensed Matter Seminar, University of Pennsylvania, Philadelphia, PA (Oct., 2001).
- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Seminar, Institute Charles Sadron, Strosbourg, France (Mar., 2001).
- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Invited Talk, Internal Seminar, College de France, Paris, France (Dec., 2000).
- A.W.C. Lau, "Electrostatics of Highly Charged Surfaces: Fluctuation and Correlation Effects", Invited Talk, Applied Mathematics Seminar, University of North Carolina, Chapel Hill, NC (Oct., 2000).
- A.W.C. Lau, Dov Levine, and P. Pincus, "Plasmon Fluctuations and Long-range Electrostatic Attraction", contributed talk at the **APS Centennial Meeting** (Session XC14), Atlanta, GA (1999).
- A.W.C. Lau and P. Pincus, "Charged-Fluctuation-Induced Nonanalytic Bending Rigidity", seminar and poster session at the International Centre for Theoretical Physics, Triste, Italy (May 1998).
- A.W.C. Lau and P. Pincus, "Charged-Fluctuation-Induced Nonanalytic Bending Rigidity", contributed talk at the **APS March Meeting** (Session Y24), Los Angeles, CA (1998).

Conferences and Schools Attended

- **Boulder School for Condensed Matter and Materials Physics**, Boulder, Colorado (2002).
- **Electrostatic Effects in Complex Fluids and Biophysics**, Institute of Theoretical Physics, University of California, Santa Barbara, CA (August, 1998 – December 1998).
- **Spring College on Statistical Mechanics and Dynamics of Soft Condensed Matter**, International Centre for Theoretical Physics, Triste, Italy (May 4–June 5, 1998).
- **Biomolecular Science Summer School**, Institute of Theoretical Physics and Material Research Laboratory, University of California, Santa Barbara, CA (June, 1997).

References

- **Prof. Philip A. Pincus**
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