

Jian Qin

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- Education** **2004-2009:** Ph.D., Materials Science, University of Minnesota
• Dissertation Topic: “Analysis of Phase Behavior and Correlations in Block Copolymer Melts by Self-Consistent Field and Fluctuating Field Theories”
• Advisors: Prof. David C. Morse and Prof. Frank S. Bates
2002-2004: M.S., Materials Physics, Tsinghua University, China; Advisor: Prof. Dan Wei
1998-2002: B.S., Materials Science, Tsinghua University, China; Advisor: Prof. Dan Wei
- Employment** **Oct. 2012-:** Postdoc, University of Chicago; Advisor: Prof. Juan de Pablo
2009-2012: Postdoc, Pennsylvania State University; Advisor: Prof. Scott T. Milner
- Honors** **Kadanoff-Rice Postdoctoral Fellowship**, University of Chicago, 2013-
Doctor Dissertation Fellowship, University of Minnesota, 2007-2008
- Research Topics** Polyelectrolyte complexation; Self-assembly of salt-doped copolymers; Coarse-grained simulation of charged polymers; Polymer entanglements and tube dynamics; Applied knot theory; Fluctuation effects in polymer blends and block copolymer melts; Monte-Carlo simulation of dense polymeric liquids; SCFT study of ABC triblock copolymer phase behavior.
- In preparation** [32] **Jian Qin**, Karl F. Freed, Juan J. de Pablo, “Coulomb energy of dielectric spheres as a model system for polarizable ions”
[31] **Jian Qin**, Weiwei Chu, Juan J. de Pablo, “Ion distribution in medium with periodic dielectric permittivity”
[31] **Jian Qin**, Scott T. Milner, “Watching rings reptating through entangled networks”
- Submitted** [29] **Jian Qin**, Juan J. de Pablo, “Ordering transition in salt-doped diblock copolymers”, *in revision*
[28] Jonathan K. Whitmer, Aaron M. Fluit, Lucas Antony, **Jian Qin**, Michael McGovern, Juan J. de Pablo “Sculpting bespoke mountains: determining free energies with basis expansions”, *in revision*
[27] Sarah L. Perry, Lorraine Leon, Kyle. Q. Hoffmann, Matthew J. Kade, Dimitrios Priftis, Katie A. Black, Derek Wong, Ryan A. Klein, Charles F. Pierce, Khatcher O. Margossian, Jonathan K. Whitmer, **Jian Qin**, Juan J. de Pablo, Matthew Tirrell, “Chirality selected phase behavior in ionic polypeptide complexes”, *in revision*
[26] Jing Cao, **Jian Qin**, Scott T. Milner, “Finding entanglement points in simulated polymer melts”, *in revision*
- Published** [25] **Jian Qin**, Scott T. Milner, “Tubes, topology, and polymer entanglement”, *Macromolecules*, **47**:6047, 2014
[24] Gurdaman S. Khaira, **Jian Qin**, Shisheng Xiong, Grant P. Garner, Lei Wan, Ricardo

- Ruiz, Heinrich M. Jaeger, Paul F. Nealey, Juan J. de Pablo, “Evolutionary optimization of directed self-assembly of triblock copolymers on patterned substrates”, *ACS Macro Letters*, **3**:747, 2014
- [23] **Jian Qin**, Dimitrios Priftis, Robert Farina, Sarah L. Perry, Lorraine Leon, Jonathan Whitmer, Kyle Hoffmann, Matthew Tirrell, Juan J. de Pablo, “Interfacial tension of polyelectrolyte complex coacervate phases”, *ACS Macro Letters*, **3**:565, 2014
- [22] Dimitrios Priftis, Xiaoxing Xia, Khatcher O. Margossian, Sarah L. Perry, Lorraine Leon, **Jian Qin**, Juan J. de Pablo, Matthew Tirrell, “Ternary, tunable polyelectrolyte complexes driven by complex coacervation”, *Macromolecules*, **47**:3076, 2014
- [21] Jing Cao, **Jian Qin**, Scott T. Milner, “Simulating constraint release by watching a ring cross itself”, *Macromolecules*, **47**:2479, 2014
- [20] Jens Glaser, **Jian Qin**, Pavani Medapuram, David C. Morse, “Collective and single-chain correlations in disordered melts of symmetric diblock copolymers: Quantitative comparison of simulations and theory”, *Macromolecules*, **47**:851, 2014
- [19] **Jian Qin**, Gurdaman S. Khaira, Yongrui Su, Grant P. Garner, Marc Miskin, Heinrich M. Jaeger, Juan J. de Pablo, “Evolutionary pattern design for copolymer directed self-assembly”, *Soft Matter (inside front cover)*, **9**:11467, 2013, arXiv:1308.0622 [cond-mat.soft]
- [18] **Jian Qin**, Scott T. Milner, “Tube diameter of oriented and stretched polymer melts”, *Macromolecules*, **46**:1659-1672, 2013
- [17] **Jian Qin**, Jungseob So, Scott T. Milner, “Tube diameter of stretched and compressed polymers”, *Macromolecules*, **45**:9816-9822, 2012
- [16] Jens Glaser, **Jian Qin**, Pavani Medapuram, Marcus Müller, David C. Morse, “Test of a scaling hypothesis for the structure factor of disordered diblock copolymer melts”, *Soft Matter*, **8**:11310-11317, 2012, arXiv:1207.1322v1 [cond-mat.soft]
- [15] **Jian Qin**, David C. Morse, “Fluctuations in symmetric diblock copolymers: Testing theories old and new”, *Phys. Rev. Lett.*, **108**:238301, 2012, arXiv:1106.1610 [cond-mat.soft]
- [14] **Jian Qin**, Scott T. Milner, Pavlos S. Stephanou, Vlasis G. Mavrantzas, “Effects of tube persistence length on dynamics of mildly entangled polymers”, *Journal of Rheology*, **56**:702-723, 2012
- [13] **Jian Qin**, Scott T. Milner, “Counting polymer knots to find the entanglement length”, *Soft Matter*, **7**:10676-10693, 2011
- [12] Windsor Bisbee, **Jian Qin**, Scott T. Milner, “Finding the tube with isoconfigurational averaging”, *Macromolecules*, **44**:8972-8980, 2011
- [11] **Jian Qin**, Piotr Grzywacz, David C. Morse, “Renormalized one-loop theory of correlations in disordered diblock copolymers”, *J. Chem. Phys.*, **135**:084902, 2011
- [10] David C. Morse, **Jian Qin**, “Relationships among coarse-grained theories of fluctuations in polymer liquids”, *J. Chem. Phys.*, **134**:084902, 2011
- [9] **Jian Qin**, Frank S. Bates, David C. Morse, “Phase behavior of nonfrustrated ABC triblock copolymers: Weak and intermediate segregation”, *Macromolecules*, **43**:5024, 2010
- [8] **Jian Qin**, David C. Morse, “Renormalized one-loop theory of correlations in polymer blends”, *J. Chem. Phys.*, **130**:224902, 2009
- [7] Adam J. Meuler, Christopher J. Ellison, **Jian Qin**, Marc A. Hillmyer, Frank S. Bates, “Polydispersity effects in poly(isoprene-b-styrene-b-ethylene oxide) triblock terpolymers”, *J. Chem. Phys.*, **130**:234903, 2009
- [6] Christopher J. Ellison, Adam J. Meuler, **Jian Qin**, Christopher M. Evans, Lynn M.

Wolf, Frank S. Bates, “Bicontinuous polymeric microemulsions from polydisperse diblock copolymers”, *J. Phys. Chem. B*, **113**:3726-3737, 2009 (**Pierre G. de Gennes Memorial** special issue)

[5] Amit Ranjan, **Jian Qin**, David C. Morse, “Linear response and stability of ordered Phases of block copolymer melts”, *Macromolecules*, **41**:942-954, 2008

[4] Piotr Grzywacz, **Jian Qin**, David C. Morse, “Renormalization of the one-loop theory of fluctuations in polymer blends and diblock copolymer melts”, *Phys. Rev. E*, **76**:061802, 2007

[3] Christopher A. Tyler, **Jian Qin**, Frank S. Bates, David C. Morse, “SCFT study of non-frustrated ABC triblock copolymer melts”, *Macromolecules*, **40**:4654-4668, 2007

[2] Dan Wei, Kun Piao, **Jian Qin**, Zhong Dong, “Calculation of resistivity of the insulating layer in tunneling-magneto-resistive head by fast Green function method”, *Chinese Physics Letters*, **22**:2063-2065, 2005

[1] **Jian Qin**, Dan Wei, “Thermodynamic behavior of a nano-sized magnetic grain near the superparamagnetic limit”, *IEICE Trans. Elec.*, **E86-C**:1825-1829, 2003

Invited Talks

[5] Invited session on polymer entanglement, 2015, APS march meeting

[4] Department Colloquia, 2013, Physics Department, Virginia Polytechnic Institute and State University, “Molecular that tangle: polymer entanglement and melt structure”

[3] Polymer Physics Seminar, 2011, Department of Materials Science and Engineering, Penn State University, “Entanglements in ring polymers: visualization and topological analysis”

[2] Pritchard Lab Seminar, 2010, Department of Mathematics, Penn State University, “Studying polymer melts with knot theory”

[1] Polymer Physics Seminar, 2009, Department of Materials Science and Engineering, Penn State University, “Correlation in homogeneous diblock copolymer melts: Theory & Monte Carlo simulation”

Professional Experience

APS March Meeting 2014, talk, “Surface tension of polyelectrolyte coacervates”

APS March Meeting 2013, talk, “Tube diameter of oriented polymer melts”

AIChE Annual Meeting 2012, talk, “Tube Diameter of Oriented and Stretched Chains Studied with Isoconfigurational Averaging”

APS March Meeting 2012, talk, “Tube Dynamics of Mildly Entangled Polymers: Semiflexibility Effects”

APS March Meeting 2012, poster, “Tube Visualization and Properties from Isoconfigurational Averaging”

APS March Meeting 2011, talk, “Tying polymer knots to find the entanglement length”

APS March Meeting 2011, poster, “Identifying entanglement states of ring polymers using knot polynomials”

104th Statistical Mechanics Conference, 2010, Rutgers, short talk, “Entanglement length from polymer knotting statistics”

Gordon Research Conference on Polymer Physics, 2010, attendee

APS March Meeting 2010, talk, “How universal are correlations in disordered diblock copolymers: A comparison of three simulation models”

IPRIME Annual Meeting 2009, poster, “Fluctuations in diblock copolymers: simulation and theory”

APS March Meeting 2009, talk, "Simulation of fluctuations in diblock copolymer melts: Testing an alternative to the Fredrickson-Helfand theory"

Gordon Research Conference on Polymer Physics, 2008, poster, "Renormalized fluctuation theory for polymer blends and diblocks"

IPRIME Annual Meeting 2008, poster, "Fluctuation theory for binary homopolymer blends"

APS March Meeting 2008, poster, "UV-convergent one-loop theory of homogeneous diblock copolymer melts"

APS March Meeting 2008, talk, "UV-convergent one-loop theory of binary homopolymer blends"

IPRIME Annual Meeting 2007, talk, "SCFT simulation of ABC triblocks"

IPRIME Annual Meeting 2006, poster, "Numerical methods for self-consistent field theory"

ASIST Annual Meeting 2003, Korea, talk, "Superparamagnetic properties of a nano-sized magnetic particle"

Visiting COSDAF (Center of Super-Diamond and Advanced Thin Films) at the City University of Hong Kong for two months, 2001

**Teaching
Experience**

Served as teaching assistant to two graduate courses:

"Electronic Properties of Materials"

"Thermodynamics of Materials"

and one undergraduate course:

"Electro-magnetic Properties of Materials"

**Computational
Skills**

Fluent in C++, C, Fortran (77 & 90), python, Mathematica, and MPI parallelization.

Heavily involved with the development of following simulation packages: 1) Polymer Self-Consistent Field Theory (PSCFT); 2) Simulation Package for Polymer and Molecular Liquids (Simpatico); 3) Renormalized One-loop Theory in Polymer/Copolymer Mixture. (ref: <http://gemini.cems.umn.edu/research/morse/soft.php>)

Research experiences with various advanced Monte Carlo simulation techniques, such as configuration bias moves, molecular rebridging moves and replica exchange, and with algorithm development for solving stochastic differential equations.