PUBLICATIONS of PAUL M. GOLDBART (as of August 2017)

Thermal fluctuations and allosteric regulation: A simple elastic continuum picture.  

[160] Rafael Hipolito, Benjamin Loewe, Paul M. Goldbart.  
Suppression of the Schwinger pair-production process: Transitionless driving in a many-body setting.  

[159] Benjamin Loewe, Rafael Hipolito, Paul M. Goldbart.  
Transitionless quantum driving: Explicitness and locality.  

Large deflections of a hydrogel rod caused by internal phase separation.  

The non-local interfacial model for short-ranged forces revisited.  

[156] Benjamin Loewe, Anton Souslov, Paul M. Goldbart  
Flocking from a quantum analogy: Spin-orbit coupling in an active fluid.  

Phase separation leads to buckling in polymer-gel tori.  
2017 (submitted).

Defect transitions in nematics liquid crystal capillary bridges.  
2017 (submitted).

[153] Rafael Hipolito, Paul M. Goldbart.  
Control of noisy quantum systems: Field-theory approach to error mitigation.  
Physical Review A 93, 042319 (2016) [24 pages].

[152] Anton Souslov, Benjamin Loewe, Paul M. Goldbart.  
Emergent tilt order in Dirac polymer liquids.  

Beads on a string: structure of bound aggregates of globular particles and long polymer chains.  

Impact of single-particle compressibility on the fluid-solid phase transition for ionic microgel suspensions.  

[149] Xiangjun Xing, Bing-Sui Lu, Fangfu Ye, Paul M. Goldbart.


[137] Sarang Gopalakrishnan, Austen Lamacraft, Paul M. Goldbart. 
*Universal phase structure of dilute Bose gases with Rashba spin-orbit coupling.* 
Physical Review A **84**, 061604(R) (2011) [5 pages].

*Frustration and glassiness in spin models with cavity-mediated interactions.* 

[135] Matthew W. Brenner, Sarang Gopalakrishnan, Jaseung Ku, Timothy J. Mc Ardle, James N. Eckstein, 
Nayana Shah, Paul M. Goldbart, Alexey Bezryadin. 
*Craded Lorentzian response of driven microwave superconducting nanowire-bridged resonators: oscillatory and magnetic-field induced stochastic states.* 
Physical Review B **83**, 184503 (2011) [18 pages].

*Penetration of nonintegral magnetic flux through domain-wall bends in time-reversal symmetry broken superconductors.* 
Physical Review B **84**, 014523 (2011) [18 pages].

[133] David Pekker, Gil Refael, Paul M. Goldbart. 
*Weber blockade theory of magneto-resistance oscillations in superconducting strips.* 

*Global geometric entanglement in transverse-field XY spin chains: finite and infinite systems.* 

*Probing the mechanical properties of graphene using a corrugated elastic substrate.* 

*Transport through Andreev bound states in a graphene quantum dot.* 

*Observation of half-height magnetization steps in Sr2RuO4.* 

*Atom-light crystallization of BECs in multimode cavities: Nonequilibrium classical and quantum phase transitions, emergent lattices, supersolidity and frustration.* 

*An anomalously elastic, intermediate phase in randomly layered superfluids, superconductors, and planar magnets.* 

[126] Siddhartha Lal, Sarang Gopalakrishnan, Paul M. Goldbart.
Approaching multichannel Kondo physics using correlated bosons: Quantum phases and how to realize them.


[125] Alexey Bezryadin, Paul M. Goldbart.

*Superconducting nanowires fabricated using DNA and nanotubes as molecular templates.*


[124] Tzu-Chieh Wei, Paul M. Goldbart.

*Critical velocity of a clean one-dimensional superconductor.*


[123] Paul M. Goldbart.

*Heterogeneous solids and the micro/macro connection: Structure and elasticity in architecturally complex media as emergent collective phenomena.*

Conference paper prepared in connection with a keynote address at the International Congress on Thermal Stresses (Urbana, Illinois, June 2009).


[122] Sarang Gopalakrishnan, Benjamin L. Lev, Paul M. Goldbart.

*Emergent crystallinity and frustration with Bose-Einstein condensates in multimode cavities.*


[121] David Pekker, Nayana Shah, Mitrabhanu Sahu, Alexey Bezryadin, Paul M. Goldbart.

*Stochastic dynamics of phase-slip trains and superconductive-resistive switching in current-biased nanowires.*


[120] Xiaoming Mao, Paul M. Goldbart, Xiangjun Xin, Annette Zippelius.

*Soft random solids and their heterogeneous elasticity.*


*Individual topological tunnelling events of a quantum field probed via their macroscopic consequences.*


[117] Paul M. Goldbart and Florin Bora.

*Quantized vortices and superflow in arbitrary dimensions: Structure, energetics and dynamics.*

*Journal of Physics A: Mathematical and Theoretical* **422** (2009), 185001 [30 pages].

[116] Paul M. Goldbart.

*David Sherrington as a mentor of young scientists.*

Talk delivered at *Viewing the World Through Spin Glasses*, a conference in honour of David Sherrington (Oxford, August 31-September 1, 2007).

[115] Tzu-Chieh Wei, Paul M. Goldbart.  
Emergence of h/e-period oscillations in the critical temperature of small superconducting rings threaded by magnetic flux.  

[114] Nayana Shah, David Pekker, Paul M. Goldbart  
Inherent stochasticity of superconductive-resistive switching in nanowires.  

[113] Xiangjun Xing, Stephan Pfahl, Swagatam Mukhopadhyay, Paul M. Goldbart, Annette Zippelius.  
Nematic elastomers: From a microscopic model to macroscopic elasticity theory.  

Phase-slip avalanches in the superflow of helium-four through arrays of nanosize apertures.  

Elasticity of highly cross-linked random networks.  

[110] Xiaoming Mao, Paul M. Goldbart, Xiangjun Xing, Annette Zippelius.  
Elastic heterogeneity of soft random solids.  
Europhysics Letters 80, 26004 (2007) [5 pages].

[109] Xiangjun Xing, Paul M. Goldbart, Leo Radzihovsky.  
Thermal fluctuations and rubber elasticity.  
Physical Review Letters 98, 075502 (2007) [4 pages]; see also the Physical Review Focus article Rubber Theory Fits without a Stretch (February 20, 2007).

Local superfluid densities probed via current-induced superconducting phase gradients.  

Magnetic field enhancement of superconductivity in ultra-narrow wires.  

Enhancing superconductivity: Magnetic impurities and their quenching by magnetic fields.  

Universal point contact resistance between thin-film superconductors.  

Squeezing superfluid from a stone: Coupling superfluidity and elasticity in a supersolid.  


[97] Xiangjun Xing, Swagatam Mukhopadhyay, Paul M. Goldbart, Annette Zippelius. *From vulcanization to isotropic and nematic rubber elasticity.* cond-mat/0411660 [7 pages].


[92] Xiangjun Xing, Swagatam Mukhopadhyay, Paul M. Goldbart.
Scaling of entropic shear rigidity.

[91] Tzu-Chieh Wei, Marie Ericsson, Paul M. Goldbart, William J. Munro.
*Connections between relative entropy of entanglement and geometric measure of entanglement.*

[90] Paul M. Goldbart, Swagatam Mukhopadhyay, Annette Zippelius.
*Goldstone-type fluctuations and their implications for the random solid state.*

[89] Paul M. Goldbart, Nigel Goldenfeld.
*Sam Edwards and the statistical mechanics of rubber.*
In reference [88].

[88] Paul M. Goldbart, Nigel Goldenfeld, David Sherrington (editors).
*Stealing the Gold: A Celebration of the Pioneering Physics of Sam Edwards.*
A volume of selected reprints with commentaries by various authors.

[87] Ulas C. Coskun, Tzu-Chieh Wei, Smitha Vishveshwara, Paul M. Goldbart, Alexey Bezryadin.
*h/e magnetic flux modulation of the energy gap in nanotube quantum dots.*

*Measures of entanglement in multipartite bound entangled states*

[85] Swagatam Mukhopadhyay, Paul M. Goldbart, Annette Zippelius.
*Goldstone fluctuations in the amorphous solid.*

[84] Tzu-Chieh Wei, Paul M. Goldbart.
*Geometric measure of entanglement and applications to bipartite and multipartite quantum states.*

*Instantaneous liability rule auctions: The continuous extension of higher-order liability rules.*

[82] ˙Inanc Adagideli, Daniel E. Sheehy, Paul M. Goldbart.
*Density of states in d-wave superconductors disordered by extended impurities.*

[79] ˙Inanc Adagideli, Paul M. Goldbart.
Quantal Andreev billiards: Semiclassical approach to mesoscale oscillations in the density of states.

Probing d-wave pairing correlations in the pseudogap regime of the cuprate superconductors via low-energy states near impurities.

Connecting the vulcanization transition to percolation.

Charge transport in manganites: Hopping conduction, the anomalous Hall effect and universal scaling.

[75] Ian Ayres, Paul M. Goldbart.
Optimal delegation and decoupling in the design of liability rules.

[74] Ian Ayres and Paul M. Goldbart.
Correlated values in the theory of property and liability rules.
32 Journal of Legal Studies, 121-151.

[73] İnanç Adagideli, Paul M. Goldbart.
Quantal Andreev billiards: Density of states oscillations and the spectrum-geometry relationship.

Density-correlator signatures of the vulcanization transition.

Andreev interferometry as a probe of superconducting phase correlations in the pseudogap regime of the cuprates.

[70] Paul M. Goldbart, Weiqun Peng.
Vulcanization and the random solid state it yields: A statistical mechanical perspective.
Proceedings of the King’s College (London) Conference (July 10-14, 2000).
P. Sollich, A. C. C. Coolen, L. P. Hughston (editors).

[69] Paul M. Goldbart.
Random solids and random solidification: What can be learned by exploring systems obeying permanent random constraints?
Presented at a workshop entitled Unifying Concepts in Glass Physics (ICTP, Trieste, September 15-18, 1999).

Semi-microscopic theory of elasticity near the vulcanization transition.
Mesoscopic phenomena in Bose-Einstein systems: Persistent currents, population oscillations and quantal phases.  

Topological defects and the short-distance behavior of the structure factor in nematic liquid crystals.  

Renormalization-group approach to the vulcanization transition.  

Low-energy quasiparticle states near extended scatterers in d-wave superconductors and their connection with SUSY quantum mechanics.  

Early stages of homopolymer collapse.  

Magnetotransport in manganites and the role of quantal phases: Theory and experiment.  

[61] Horacio E. Castillo, Paul M. Goldbart, Annette Zippelius.  
The amorphous solid state: a locally stable thermodynamic phase of randomly constrained systems.  

Resonant states and order-parameter suppression near point-like impurities in d-wave superconductors.  

Statistical mechanics of permanent random atomic and molecular networks: Structure and heterogeneity of the amorphous solid state.  

[58] Daniel Loss, Herbert Schoeller, Paul M. Goldbart.  
Observing the Berry phase in diffusive conductors: Necessary conditions for adiabaticity.  

[57] Paul M. Goldbart.  
Rigidity as an emergent property of random networks: a statistical mechanical view.  
An invited paper appearing in Rigidity: Theory and Applications (Plenum, 1999), proceedings of a workshop held at Traverse City, Michigan (June 15-17, 1998).  
M. F. Thorpe and P. M. Duxbury (editors).

Conductivity of mesoscopic ferromagnets.  

Elasticity near the vulcanization transition.

*Intrinsic dissipation and the SO(5) theory of high-temperature superconductivity.*

[53] Paul M. Goldbart, Daniel E. Sheehy.
*Antiferromagnetic hedgehogs with superconducting cores.*

[52] Dmitrii L. Maslov, Paul M. Goldbart.
*Quasi-Andreev reflection in inhomogeneous Luttinger liquids.*

[51] Paul M. Goldbart, Daniel E. Sheehy.
*Antiferromagnetic hedgehogs with superconducting cores.*

*Universality and its origins at the amorphous solidification transition.*

*Dynamical signatures of the vulcanization transition.*

*Exact calculation of multifractal exponents of the critical wave function of Dirac fermions in a random magnetic field.*

*Vulcanised matter: A model glass?*
An invited chapter written for the book *Spin Glasses and Random Fields.*

*Continuous random alloy networks: Glass transition and elasticity.*

*Random networks of crosslinked manifolds.*

*Induction of non–d-wave order-parameter components by currents in d-wave superconductors.*

*Universality of gelation: Endlinking versus crosslinking, stiff rods versus flexible chains.*

Randomly crosslinked macromolecular systems: vulcanization transition to and properties of the amorphous solid state.

Quantization of superflow circulation and magnetic flux with a tunable offset.

[40] Daniel Loss, Paul M. Goldbart.
Experimental consequences of persistent currents due to the Berry phase.

Probing the superconducting proximity effect in NbSe_2 by scanning tunneling microscopy.

[38] Dmitrii L. Maslov, Michael Stone, Paul M. Goldbart, Daniel Loss.
Josephson current and proximity effect in Luttinger liquids.

[37] Ioan Kosztin, Dmitrii L. Maslov, Paul M. Goldbart.
Chaos in Andreev billiards.

Kinetics of phase-ordering in uniaxial and biaxial nematic films.

Distribution of localisation lengths in crosslinked macromolecular networks.

[34] Paul M. Goldbart, Annette Zippelius.
Issues of replica symmetry breaking for the amorphous solid state of vulcanised macromolecules.

[33] Paul M. Goldbart, Annette Zippelius.
Statistical mechanics of continuous random networks: a model glass transition.

Quantum interference effects in inhomogeneous magnetic fields.

Intrinsic dissipative fluctuation rate in mesoscopic superconducting rings.

Josephson tunneling as a probe of the vortex-glass state.

[29] Paul M. Goldbart, Annette Zippelius.
The amorphous solid state of vulcanized macromolecules: A variational approach.

Weak localization effects and conductance fluctuations: implications of inhomogeneous magnetic fields.

[27] Annette Zippelius, Paul M. Goldbart, Nigel Goldenfeld.
Statistical mechanics of vulcanisation and the spontaneous emergence of static density fluctuations.

Josephson interference phenomena above $T_c$.

Nematic fluids in shear flow: a laboratory for nonequilibrium physics.
In: Complex Fluids: Proceedings of the XII Sitges Conference, Sitges, Barcelona, Spain, (June 1-5, 1992), L. Garrido (editor).

Isotropic-nematic transition in shear flow: state selection, coexistence, phase transitions and critical behavior.

Persistent currents from Berry’s phase in mesoscopic systems.

[22] Peter D. Olmsted, Paul M. Goldbart.
Light scattering near the shear-induced critical point in nematic liquid crystals.
Symposium held December 2-6, 1991 (Boston, MA).

Dynamic scaling and spontaneous symmetry breaking at the gel-point.

Period- and amplitude-halving in mesoscopic rings with spin.

Equilibrium distribution of shapes for linear and star macromolecules.

Persistent currents from geometric phases in mesoscopic rings.
In: Granular Nanoelectronics, Proceedings of the NATO Advanced Study Institute, Il Ciocco, Italy (July 1990), D. K. Ferry, J. R. Barker, C. Jacoboni (editors).

[17] Paul M. Goldbart, Ping Ao.
Intrinsic torsional viscosity in a narrow tube of nematic liquid crystal.
In: Proceedings of the Thirteenth International Conference on Liquid Crystals,
Vancouver, British Columbia, Canada (July 1990).

Non-equilibrium phase transitions for nematic liquid crystals in shear flow.
In: Proceedings of the Thirteenth International Conference on Liquid Crystals,
Vancouver, British Columbia, Canada (July 1990).

Berry’s phase and persistent charge and spin currents in textured mesoscopic rings.

Elastic singularities at the Peierls transition.

Theory of the non-equilibrium phase transition for nematic liquid crystals under shear flow.

Intrinsic torsional viscosity of nematic liquid crystals.

Microscopic theory for cross-linked macromolecules: I. Broken symmetry, rigidity, and topology.

Microscopic theory for cross-linked macromolecules: II. Replica theory of the transition to the solid state.

Vulcanization: How randomly cross-linked macromolecules form equilibrium amorphous solids.
In: Synergetics 43: Cooperative Dynamics in Complex Physical Systems (Proceedings of the Second

Solid state of randomly cross-linked macromolecules: Basic concepts.

Rigidity and ergodicity of randomly cross-linked macromolecules.

Replica symmetry breaking in Ising and quadrupolar glasses.
In: Les Houches XLIII Random systems, gauge theories, critical phenomena.
Gauge invariant spin glasses. 

Novel ordering in the x-y spin glass. 

The failure of the Parisi scheme for spin glass models without inversion symmetry. 

[2] Paul M. Goldbart, 
The Dzyaloshinskii-Moriya spin glass with uniaxial anisotropy. 

Replica theory of the uniaxial quadrupolar glass. 