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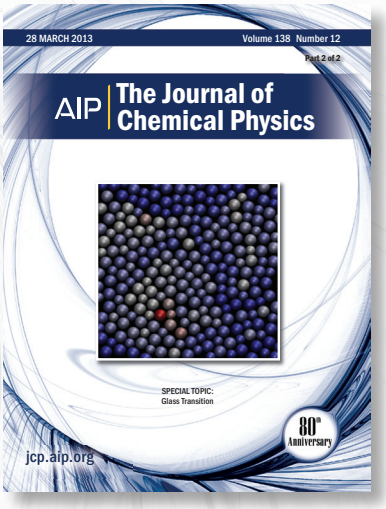
Special Topic on the Glass Transition



This Special Topic presents a timely discussion of modern developments in our understanding of the behavior of supercooled liquids and amorphous materials. In spite of decades of intense theoretical and experimental study, the fundamental causes of vitrification are still debated. Further, a deeper understanding of the behavior of supercooled liquids and glasses will have implications in diverse fields ranging from biology (e.g., the passive transport of cellular cargo which occurs in a dense, disordered environment) to materials science (e.g., the design of amorphous materials with unique mechanical properties). We thus believe that the Special Topic on the Glass Transition will be instrumental in focusing attention on this important problem.

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Perspective: The glass transition
Giulio Biroli and Juan P. Garrahan
J. Chem. Phys. **138**, 12A301 (2013);
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Are the dynamics of a glass embedded in its elastic properties?
Marcel Potuzak, Xiaoju Guo, Morten M. Smedskjaer, and John C. Mauro
J. Chem. Phys. **138**, 12A501 (2013);
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Are polar liquids less simple?
D. Fragiadakis and C. M. Roland
J. Chem. Phys. **138,** 12A502 (2013);
DOI: 10.1063/1.4769262

Glass transition of poly(ethylmethacrylate) admixed and bound to nanoparticles
Cornelius Friedrichs, Sebastian Emmerling, Gunnar Kircher, Robert Graf, and Hans Wolfgang Spiess
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Modeling the relaxation of polymer glasses under shear and elongational loads
S. M. Fielding, R. L. Moorcroft, R. G. Larson, and M. E. Cates
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Higher-order correlation functions and nonlinear response functions in a Gaussian trap model
Gregor Diezemann
J. Chem. Phys. **138**, 12A505 (2013);
DOI: 10.1063/1.4769254

Multiple length and time scales of dynamic heterogeneities in model glass-forming liquids: A systematic analysis of multi-point and multi-time correlations
Kang Kim and Shinji Saito
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DOI: 10.1063/1.4769256

Dynamic criticality at the jamming transition
Atsushi Ikeda, Ludovic Berthier, and Giulio Biroli
J. Chem. Phys. **138**, 12A507 (2013);
DOI: 10.1063/1.4769251

Nonequilibrium static growing length scales in supercooled liquids on approaching the glass transition
Étienne Marcotte, Frank H. Stillinger, and Salvatore Torquato
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Static correlations functions and domain walls in glass-forming liquids: The case of a sandwich geometry
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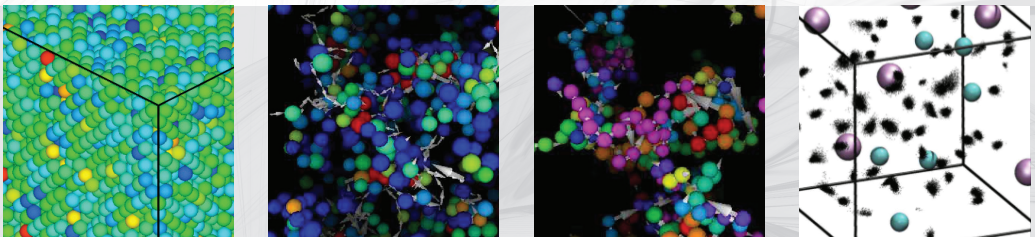

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Dynamics of thermal vibrational motions and stringlike jump motions in three-dimensional glass-forming liquids
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Geometrical frustration and static correlations in hard-sphere glass formers
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Microrheology of supercooled liquids in terms of a continuous time random walk
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Dynamics of glass-forming liquids. XVI. Observation of ultrastable glass transformation via dielectric spectroscopy
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Local elastic response measured near the colloidal glass transition
D. Anderson, D. Schaar, H. G. E. Hentschel, J. Hay, Piotr Habdas, and Eric R. Weeks
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Microscopic theory of the glassy dynamics of passive and active network materials
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Statistics of modifier distributions in mixed network glasses
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Dynamic heterogeneities above and below the mode-coupling temperature: Evidence of a dynamic crossover
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Single molecule probe reports of dynamic heterogeneity in supercooled *ortho*-terphenyl
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Relationship between neighbor number and vibrational spectra in disordered colloidal clusters with attractive interactions
Peter J. Yunker, Zexin Zhang, Matthew Gratale, Ke Chen, and A. G. Yodh
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Relaxation processes in liquids: Variations on a theme by Stokes and Einstein
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Are rare, long waiting times between rearrangement events responsible for the slowdown of the dynamics at the glass transition?
Ji Won Ahn, Bryn Falahee, Chiara Del Piccolo, Michael Vogel, and Dieter Bingemann
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Evolution of collective motion in a model glass-forming liquid during physical aging
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The first jamming crossover: Geometric and mechanical features
Massimo Pica Ciamarra and Peter Sollich
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Evaluation of heterogeneity measures and their relation to the glass transition
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Space-time phase transitions in the East model with a softened kinetic constraint
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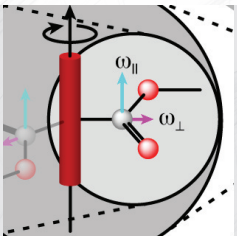

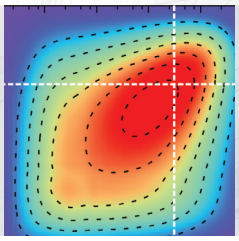
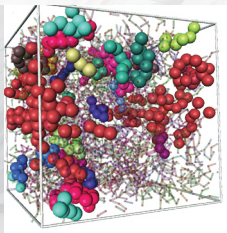
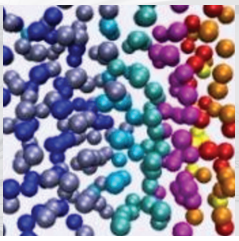

Scaling between relaxation, transport and caged dynamics in a binary mixture on a per-component basis
F. Puosi, C. De Michele, and D. Leporini
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Shear modulus of simulated glass-forming model systems: Effects of boundary condition, temperature, and sampling time
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J. Chem. Phys. **138**, 12A533 (2013);
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Microscopic calculation of the free energy cost for activated transport in glass-forming liquids
Pyotr Rabochiy and Vassiliy Lubchenko
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Identification of long-lived clusters and their link to slow dynamics in a model glass former
Alex Malins, Jens Eggers, C. Patrick Royall, Stephen R. Williams, and Hajime Tanaka
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Importance of many-body correlations in glass transition: An example from polydisperse hard spheres
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A small subset of normal modes mimics the properties of dynamical heterogeneity in a model supercooled liquid
Glen M. Hocky and David R. Reichman
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String-like cooperative motion in homogeneous melting
Hao Zhang, Mohammad Khalkhali, Qingxia Liu, and Jack F. Douglas
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Static triplet correlations in glass-forming liquids: A molecular dynamics study
Daniele Coslovich
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Static replica approach to critical correlations in glassy systems
Silvio Franz, Hugo Jacquin, Giorgio Parisi, Pierfrancesco Urbani, and Francesco Zamponi
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The relationship of dynamical heterogeneity to the Adam-Gibbs and random first-order transition theories of glass formation
Francis W. Starr, Jack F. Douglas, and Srikanth Sastry
J. Chem. Phys. **138**, 12A541 (2013);
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Systematic expansion in the order parameter for replica theory of the dynamical glass transition
Hugo Jacquin and Francesco Zamponi
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Mechanical spectra of glass-forming liquids. I. Low-frequency bulk and shear moduli of DC704 and 5-PPE measured by piezoceramic transducers
Tina Hecksher, Niels Boye Olsen, Keith A. Nelson, Jeppe C. Dyre, and Tage Christensen
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Mechanical spectra of glass-forming liquids. II. Gigahertz-frequency longitudinal and shear acoustic dynamics in glycerol and DC704 studied by time-domain Brillouin scattering
Christoph Klieber, Tina Hecksher, Thomas Pezeril, Darius H. Torchinsky, Jeppe C. Dyre, and Keith A. Nelson
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Temporal disconnectivity of the energy landscape in glassy systems
Nikolaos Lempesis, Georgios C. Boulougouris, and Doros N. Theodorou
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Theoretical reconstruction of realistic dynamics of highly coarse-grained *cis*-1,4-polybutadiene melts
I. Y. Lyubimov and M. G. Guenza
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Chiara Cammarota and Giulio Biroli
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Breakdown of the Stokes-Einstein relation in two, three, and four dimensions
Shiladitya Sengupta, Smarajit Karmakar, Chandan Dasgupta, and Srikanth Sastry
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"Ideal glassformers" vs "ideal glasses": Studies of crystal-free routes to the glassy state by "potential tuning" molecular dynamics, and laboratory calorimetry
Vitaliy Kapko, Zuofeng Zhao, Dmitry V. Matyushov, and C. Austen Angell
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