

Publications of Silvio Franz

Edited Volumes

- [A1] S. Franz, J. Lebowitz, E. Marinari, M. Mezard, and N. Sourlas. *Special Issue of Journal of Statistical Physics dedicated to E. Brézin and G. Parisi*, *J. Stat. Phys.* 135. 2009.
- [A2] M. Evans, S. Franz, C. Godreche, and D. Mukamel. *Focus issue of JSTAT Dynamics of Non-Equilibrium Systems* <http://www.iop.org/EJ/journal/-page=extra.focus4/jstat>. 2007.
- [A3] S. Franz and S. Sastry. *Lecture notes of the school “Unifying concepts in glass physics III”, Bangalore 26 Juin - 1 Juillet 2004.. Focus Issue of J. Stat. Mech.: Teor. Exp.* 2004.
- [A4] S. Franz, S. Glotzer, and S. Sastry. *Proceedings of the conference “Unifying concepts in glass physics”, Trieste, 5 - 18 Septembre 1999. Special issue J. Phys. Condens. Matter* 12. 2000.

Articles on Refereed Journals

- [B1] S. Franz, H. Jacquin, G. Parisi, P. Urbani, and F. Zamponi. Quantitative field theory of the glass transition. *Proceedings of the National Academy of Sciences (PNAS)*, 109, 2012.
- [B2] S. Franz, H. Jacquin, G. Parisi, P. Urbani, and F. Zamponi. Static replica approach to critical correlations in glassy systems. *arXiv preprint arXiv:1210.7304*, *J. Chem. Phys. accepted*, 2012.
- [B3] S. Franz and F. R.-T. Parisi, G. Glassy critical points and random field ising model. *arXiv preprint arXiv:1203.4849*, *JSTAT accepted*, 2012.
- [B4] S. Franz and G. Parisi. Quasi-equilibrium in glassy dynamics: an algebraic view. *arXiv preprint arXiv:1206.4067*, *JSTAT accepted*, 2012.
- [B5] S. Franz, G. Parisi, F. Ricci-Tersenghi, T. Rizzo, and P. Urbani. A note on weakly discontinuous dynamical transitions. *arXiv preprint arXiv:1211.1616*, *J. Chem. Phys. accepted*, 2012.
- [B6] S. Franz and M. Sellitto. Finite-size critical fluctuations in microscopic models of mode-coupling theory. *arXiv preprint arXiv:1210.5952*, *JSTAT accepted*, 2012.
- [B7] G. Bianconi, D. Fichera, S. Franz, and L. Peliti. Modeling microevolution in a changing environment: the evolving quasispecies and the diluted champion process. *Journal of Statistical Mechanics: Theory and Experiment*, 2011(08):P08022, 2011.

- [B8] C. Borile, M. Labarre, S. Franz, C. Sola, and G. Refrégier. Using affinity propagation for identifying subspecies among clonal organisms: lessons from m. tuberculosis. *BMC bioinformatics*, 12(1):224, 2011.
- [B9] S. Franz, G. Parisi, F. Ricci-Tersenghi, and T. Rizzo. Field theory of fluctuations in glasses. *The European Physical Journal E: Soft Matter and Biological Physics*, 34(9):1–17, 2011.
- [B10] E. Brézin, S. Franz, and G. Parisi. Critical interface: Twisting spin glasses at t_c . *Physical Review B*, 82(14):144427, 2010.
- [B11] M. Castellana, A. Decelle, S. Franz, M. Mézard, and G. Parisi. Hierarchical random energy model of a spin glass. *Physical review letters*, 104(12):127206, 2010.
- [B12] S. Franz, M. Marsili, and P. Pin. Observed choices and underlying opportunities. *Science and Culture*, 76:471, 2010.
- [B13] E. Zarinelli and S. Franz. Surface tension in kac glass models. *Journal of Statistical Mechanics: Theory and Experiment*, 2010(04):P04008, 2010.
- [B14] G. Bianconi, L. Ferretti, and S. Franz. Non-neutral theory of biodiversity. *EPL (Europhysics Letters)*, 87(2):28001, 2009.
- [B15] L. De Sanctis and S. Franz. Self-averaging identities for random spin systems. *Progress in Probability*, 62:123–142, 2009.
- [B16] S. Franz, T. Jörg, and G. Parisi. Overlap interfaces in hierarchical spin-glass models. *Journal of Statistical Mechanics: Theory and Experiment*, 2009(02):P02002, 2009.
- [B17] F. Caccioli, S. Franz, and M. Marsili. Ising model with memory: coarsening and persistence properties. *Journal of Statistical Mechanics: Theory and Experiment*, 2008(07):P07006, 2008.
- [B18] S. Franz. Spin glass models with kac interactions. *The European Physical Journal B-Condensed Matter and Complex Systems*, 64(3):557–561, 2008.
- [B19] S. Franz, G. Parisi, and F. Ricci-Tersenghi. Mosaic length and finite interaction-range effects in a one-dimensional random energy model. *Journal of Physics A: Mathematical and Theoretical*, 41(32):324011, 2008.
- [B20] S. Franz. On the dynamics of kac p-spin glasses. *Journal of Statistical Physics*, 126(4):765–780, 2007.
- [B21] S. Franz and A. Montanari. Analytic determination of dynamical and mosaic length scales in a kac glass model. *Journal of Physics A: Mathematical and Theoretical*, 40(11):F251, 2007.

- [B22] S. Franz. Metastable states, relaxation times and free-energy barriers in finite-dimensional glassy systems. *EPL (Europhysics Letters)*, 73(4):492, 2006.
- [B23] S. Franz and G. Parisi. Local spin glass order in 1d. *EPL (Europhysics Letters)*, 75(3):385, 2006.
- [B24] S. Franz and F. Tria. A note on the guerra and talagrand theorems for mean field spin glasses: the simple case of spherical models. *Journal of statistical physics*, 122(2):313–332, 2006.
- [B25] S. Franz. First steps of a nucleation theory in disordered systems. *Journal of Statistical Mechanics: Theory and Experiment*, 2005(04):P04001, 2005.
- [B26] S. Franz and F. Toninelli. A field-theoretical approach to the spin glass transition: models with long but finite interaction range. *Journal of Statistical Mechanics: Theory and Experiment*, 2005(01):P01008, 2005.
- [B27] F. Tria, M. Laessig, L. Peliti, and S. Franz. A minimal stochastic model for influenza evolution. *Journal of Statistical Mechanics: Theory and Experiment*, 2005(07):P07008, 2005.
- [B28] H. Bauke, S. Franz, and S. Mertens. Number partitioning as a random energy model. *Journal of Statistical Mechanics: Theory and Experiment*, 2004(04):P04003, 2004.
- [B29] S. Franz and F. Toninelli. Finite-range spin glasses in the kac limit: free energy and local observables. *Journal of Physics A: Mathematical and General*, 37(30):7433, 2004.
- [B30] S. Franz and F. Toninelli. Kac limit for finite-range spin glasses. *Physical review letters*, 92(3):30602, 2004.
- [B31] K. Dawson, S. Franz, and M. Sellitto. Dynamical arrest in a geometric model for the glass transition. *EPL (Europhysics Letters)*, 64(3):302, 2003.
- [B32] S. Franz, V. Lecomte, and R. Mulet. Quasiequilibrium during aging of the two-dimensional edwards-anderson model. *Physical Review E*, 68(6):066128, 2003.
- [B33] S. Franz and M. Leone. Replica bounds for optimization problems and diluted spin systems. *Journal of Statistical Physics*, 111(3):535–564, 2003.
- [B34] S. Franz, M. Leone, and F. Toninelli. Replica bounds for diluted non-poissonian spin systems. *Journal of Physics A: Mathematical and General*, 36(43):10967, 2003.
- [B35] J. Berg, S. Franz, and M. Sellitto. Testing the edwards hypothesis in spin systems under tapping dynamics. *The European Physical Journal B-Condensed Matter and Complex Systems*, 26(3):349–356, 2002.

- [B36] A. Billoire, S. Franz, and E. Marinari. On the tail of the overlap probability distribution in the sherrington–kirkpatrick model. *Journal of Physics A: Mathematical and General*, 36(1):15, 2002.
- [B37] S. Franz, R. Mulet, and G. Parisi. Kob-andersen model: A nonstandard mechanism for the glassy transition. *Physical Review E*, 65(2):021506, 2002.
- [B38] M. Franz S, Leone, A. Montanari, and F. Ricci-Tersenghi. Dynamic phase transition for decoding algorithms. *Physical Review E*, 66(4):046120, 2002.
- [B39] S. Franz, M. Leone, F. Ricci-Tersenghi, and R. Zecchina. Exact solutions for diluted spin glasses and optimization problems. *Physical review letters*, 87(12):127209, 2001.
- [B40] S. Franz, M. Mézard, F. Ricci-Tersenghi, M. Weigt, and R. Zecchina. A ferromagnet with a glass transition. *EPL (Europhysics Letters)*, 55(4):465, 2001.
- [B41] Z. Konkoli, J. Hertz, and S. Franz. Random heteropolymer dynamics. *Physical Review E*, 64(5):051910, 2001.
- [B42] S. Sastry, N. Deo, and S. Franz. Spectral statistics of instantaneous normal modes in liquids and random matrices. *Physical Review E*, 64(1):016305, 2001.
- [B43] S. Franz and G. Parisi. Non trivial overlap distributions at zero temperature. *The European Physical Journal B-Condensed Matter and Complex Systems*, 18(3):485–491, 2000.
- [B44] S. Franz and G. Parisi. On non-linear susceptibility in supercooled liquids. *Journal of Physics: Condensed Matter*, 12(29):6335, 2000.
- [B45] S. Franz and F. Ricci-Tersenghi. Ultrametricity in three-dimensional edwards-anderson spin glasses. *Physical Review E*, 61(2):1121, 2000.
- [B46] S. Franz and M. Virasoro. Quasi-equilibrium interpretation of ageing dynamics. *Journal of Physics A: Mathematical and General*, 33(5):891, 2000.
- [B47] A. Barrat and S. Franz. Basins of attraction of metastable states of the spherical p-spin model. *Journal of Physics A: Mathematical and General*, 31(6):L119, 1999.
- [B48] A. Barrat, S. Franz, and G. Parisi. Temperature evolution and bifurcations of metastable states in mean-field spin glasses, with connections with structural glasses. *Journal of Physics A: Mathematical and General*, 30(16):5593, 1999.

- [B49] M. Cardenas, S. Franz, and G. Parisi. Constrained boltzmann-gibbs measures and effective potential for glasses in hypernetted chain approximation and numerical simulations. *Journal of Chemical Physics*, 110:1726–1734, 1999.
- [B50] S. Franz, T. Garel, and H. Orland. Overlap properties and adsorption transition of two hamiltonian paths. *The European Physical Journal B-Condensed Matter and Complex Systems*, 11(3):463–468, 1999.
- [B51] S. Franz, M. Mezard, G. Parisi, and L. Peliti. The response of glassy systems to random perturbations: A bridge between equilibrium and off-equilibrium. *Journal of statistical physics*, 97(3):459–488, 1999.
- [B52] S. Franz and G. Parisi. Critical properties of a three-dimensional p-spin model. *The European Physical Journal B-Condensed Matter and Complex Systems*, 8(3):417–422, 1999.
- [B53] M. Campellone, S. Franz, and G. Parisi. Crossover behavior of a one-dimensional random energy model. *Physical Review E*, 58(5):5455, 1998.
- [B54] M. Cardenas, S. Franz, and G. Parisi. Glass transition and effective potential in the hypernetted chain approximation. *Journal of Physics A: Mathematical and Geneneral*, 31:L163–L169, 1998.
- [B55] S. Franz, M. Mézard, G. Parisi, and L. Peliti. Measuring equilibrium properties in aging systems. *Physical review letters*, 81(9):1758–1761, 1998.
- [B56] S. Franz and G. Parisi. Effective potential in glassy systems: theory and simulations. *Physica A: Statistical Mechanics and its Applications*, 261(3):317–339, 1998.
- [B57] S. Franz and G. Parisi. Phase diagram of coupled glassy systems: A mean-field study. *Physical review letters*, 79(13):2486–2489, 1997.
- [B58] S. Franz and L. Peliti. Error threshold in simple landscapes. *Journal of Physics A: Mathematical and General*, 30(13):4481, 1997.
- [B59] S. Franz and F. Ritort. Relaxation processes and entropic traps in the backgammon model. *Journal of Physics A: Mathematical and General*, 30(11):L359, 1997.
- [B60] D. Alvarez, S. Franz, and F. Ritort. Fragile-glass behavior of a short-range p-spin model. *Physical Review B*, 54(14):9756, 1996.
- [B61] S. Franz and F. Ritort. Glassy mean-field dynamics of the backgammon model. *Journal of statistical physics*, 85(1):131–150, 1996.
- [B62] S. Franz and J. Hertz. Glassy transition and aging in a model without disorder. *Physical review letters*, 74(11):2114–2117, 1995.

- [B63] S. Franz, E. Marinari, and G. Parisi. Series expansion of the off-equilibrium mode coupling equations. *Journal of Physics A: Mathematical and General*, 28(19):5437, 1995.
- [B64] S. Franz and M. Ney-Nifle. On chaos in mean-field spin glasses. *Journal of Physics A: Mathematical and General*, 28(9):2499, 1995.
- [B65] S. Franz and G. Parisi. Recipes for metastable states in spin glasses. *Journal de Physique I*, 5(11):1401–1415, 1995.
- [B66] S. Franz and H. Rieger. Fluctuation-dissipation ratio in three-dimensional spin glasses. *Journal of statistical physics*, 79(3):749–758, 1995.
- [B67] S. Franz and F. Ritort. Dynamical solution of a model without energy barriers. *EPL (Europhysics Letters)*, 31(9):507, 1995.
- [B68] A. Coolen and S. Franz. Closure of macroscopic laws in disordered spin systems: a toy model. *Journal of Physics A: Mathematical and General*, 27(21):6947, 1994.
- [B69] V. Dotsenko, S. Franz, and M. Mezard. Partial annealing and overfrustration in disordered systems. *Journal of Physics A: Mathematical and General*, 27(7):2351, 1994.
- [B70] S. Franz and M. Mézard. Off-equilibrium glassy dynamics: a simple case. *EPL (Europhysics Letters)*, 26(3):209, 1994.
- [B71] S. Franz and M. Mézard. On mean field glassy dynamics out of equilibrium. *Physica A: Statistical Mechanics and its Applications*, 210(1):48–72, 1994.
- [B72] S. Franz, G. Parisi, and M. Virasoro. Interfaces and lower critical dimension in a spin glass model. *Journal de Physique I*, 4(11):1657–1667, 1994.
- [B73] S. Franz, G. Parisi, and M. Virasoro. Free-energy cost for ultrametricity violations in spin glasses. *EPL (Europhysics Letters)*, 22(6):405, 1993.
- [B74] S. Franz, L. Peliti, and M. Sellitto. An evolutionary version of the random energy model. *Journal of Physics A: Mathematical and General*, 26(23):L1195, 1993.
- [B75] V. Dotsenko, S. Franz, and M. Mezard. Memorizing polymers’ shapes and permutations. *Journal of Physics A: Mathematical and General*, 25(24):6631, 1992.
- [B76] S. Franz and J. Kurchan. On the computation of static expectation values from dynamics in spin glasses. *EPL (Europhysics Letters)*, 20(3):197–203, 1992.

- [B77] S. Franz, G. Parisi, and M. Virasoro. The replica method on and off equilibrium. *Journal de Physique I*, 2(10):1869–1880, 1992.
- [B78] S. Franz, G. Parisi, and M. Virasoro. Ultrametricity in an inhomogeneous simplest spin glass model. *EPL (Europhysics Letters)*, 17(1):5–9, 1992.
- [B79] S. Franz, D. Amit, and M. Virasoro. Prosopagnosia in high capacity neural networks storing uncorrelated classes. *Journal de Physique*, 51(5):387–408, 1990.
- [B80] P. Del Giudice, S. Franz, and M. Virasoro. Perceptron beyond the limit of capacity. *Journal de Physique*, 50(2):121–134, 1989.

Articles in Encyclopedias and Book Chapters

- [C1] S. Franz and G. Semerjian. *Analytical approaches to time and length scales in models of glasses* in L. Berthier, G. Biroli, J.-P. Bouchaud, L. Cipelletti, W. van Saarloos (eds.). *Dynamical heterogeneities in glasses, colloids and granular materials*. Oxford University Press, 2011.
- [C2] S. Franz. Fenomeni di non-equilibrio nei sistemi vetrosi, (non-equilibrium phenomena in glassy systems); in vol. h-w, enciclopedia del '900, supplemento iii, istituto dell'enciclopedia italiana, treccani ed. pag. 443-450., 2004.
- [C3] S. Franz. Glassy disordered systems: Dynamical evolution; in encyclopedia of mathematical physics, eds. j.-p. francoise, g.l. naber and tsou s.t. oxford: Elsevier, 2006 (isbn 978-0-1251-2666-3), volume 2 page 553., 2004.

Refereed Conference Proceedings

- [D1] S. Franz and F. Toninelli. The kac limit for diluted spin glasses. In *Proceeding of the conference "Perspectives on Quantum Field Theory, Statistical Mechanics and Stochastics" in honour of the 60th birthday of Francesco Guerra.*, volume 18, pages 675–679. World Scientific Publishing Company, 2004.
- [D2] F. T. S. Franz. The kac limit for diluted spin glasses. In *Proceeding of the conference "Perspectives on Quantum Field Theory, Statistical Mechanics and Stochastics" in honour of the 60th birthday of Francesco Guerra.*, volume 18, pages 675–679. 2004.
- [D3] V. L. S. Franz and R. Mulet. On pre-asymptotic aging in finite dimensional spin glasses. In *Proceeding of the conference "Unifying Concepts in Granular Media and Glasses" June 25 - 28, 2003 Villa Orlandi, Anacapri Capri, A. Coniglio, A. Fierro H.J. Herrmann and M. Nicodemi eds.* Elsevier, 2004.

- [D4] S. Franz. How glasses explore configuration space. In *Proceedings of the "3rd workshop on non-equilibrium phenomena in supercooled fluids, glasses and amorphous materials" Pisa 22-27 September 2002.*, volume 15, page S881. IOP Publishing, 2003.
- [D5] C. Donati, S. Franz, S. Glotzer, and G. Parisi. Theory of non-linear susceptibility and correlation length in glasses and liquids. In *Proc. of the 4th International Discussion Meeting on Relaxations in Complex Systems*, volume 307, pages 215–224. Elsevier, 2002.
- [D6] S. Franz, C. Donati, G. Parisi, and S. Glotzer. On dynamical correlations in supercooled liquids. In *proceedings of the International workshop on disordered systems, Andalo, March 1999.*, volume 79, pages 1827–1831. Taylor & Francis, 1999.
- [D7] A. Barrat, A. Cavagna, S. Franz, I. Giardina, and G. Parisi. Exploring the configuration space of glassy models. In *Proceedings of the conference in honour of G. Paladin, Disordered and Chaos Rome 22-24 Sept. 1997.*, volume 8. 1998.
- [D8] S. Franz and G. Parisi. Effective potentials in glassy systems. In *Proceedings of the International workshop on disordered systems Andalo, 3 - 6 March, 1997*, volume 77, pages 239–243. Taylor & Francis, 1998.
- [D9] S. Franz. Entropy crisis in a short range spin glass. In *proceedings of the XIV Sitges conference Complex behaviour of glassy systems 10-14 June 1996, p 226-231. Springer 1997*, pages 226–231. Springer, 1997.
- [D10] S. Franz and G. Parisi. Off equilibrium generalization of mode coupling theory. In *Proceedings of the workshop Nonequilibrium Phenomena in Supercooled Fluids, Glasses and Amorphous Materials, Pisa, 25-29 September 1995. p.134-139 Eds. M.Giordano, D. Leporini, M.P.Tosi World Scientific, Singapore 1996.*, volume 12, pages 134–142. WORLD SCIENTIFIC PUBLISHING, 1996.
- [D11] M. S. S. Franz, L. Peliti. Molecular quasispecies and spin glasses. In *Proceedings of the "Summer school on Recent Advances in Statistical Physics" Istanbul 1993*, volume 18. 1994.
- [D12] S. Franz, M. Mézard, and G. Parisi. On the mean field theory of random heteropolymers. In *proceedings of the 1992 Elba Conference on Neural Networks, From Biology to High Energy Physics*, volume 3 (supp01), pages 195–200. World Scientific Publishing Company, 1992.

Unpublished Preprints

- [E1] S. Franz, G. Parisi, and P. Urbani. Quasi-equilibrium in glassy dynamics: a liquid theory approach. *arXiv preprint arXiv:1212.4291*, 2012.

- [E2] S. Franz, G. Parisi, F. Ricci-Tersenghi, and T. Rizzo. Replica field theory of the dynamical transition in glassy systems. *arXiv preprint arXiv:1105.5230*, 2011.
- [E3] A. Barra, S. Franz, and T. Sabetta. Some thoughts on the ontogenesis in b-cell immune networks. *arXiv preprint arXiv:1012.2025*, 2010.
- [E4] S. Franz, G. Parisi, F. Ricci-Tersenghi, and T. Rizzo. Critical behaviour of large scale dynamical heterogeneities in glasses: a complete theory. *arXiv preprint arXiv:1008.0996*, 2010.
- [E5] S. Franz, G. Parisi, F. Ricci-Tersenghi, and T. Rizzo. Properties of the perturbative expansion around the mode-coupling dynamical transition in glasses. *arXiv preprint arXiv:1001.1746*, 2010.
- [E6] P. Pin, S. Franz, and M. Marsili. Opportunity and choice in social networks. 2008.
- [E7] S. Franz and G. Parisi. Comment on “dynamical heterogeneities in a supercooled lennard-jones liquid”. *arXiv:cond-mat/9804084*, 1998.