Group Meeting Reading List Suggestions

Alexander Group

(Dated: Friday 11th July, 2014)

This is a list of suggestions for papers to discuss at our weekly group meeting, reflecting my eclectic tastes. Many areas are under-represented, particularly economics, game theory, astrophysics and experiment. Feel free to add anything that interests you.

This list contains suggestions only; we do not have to stick to it. Indeed, I encourage you to choose your own papers to talk about. In addition, I also encourage discussions based on papers that have appeared on the arXiv in the past week, or short expository articles such as the "What is ... ?" series of the Notices of the AMS [see also here]. Requests for themes to run over two or three weeks are also welcome. And if you can't think of anything, pick any paper of GI's and I will be happy.

Soft Matter

1. E. Efrati and W.T.M. Irvine, Orientation-Dependent Handedness and Chiral Design. Phys. Rev. X **4**, 011003 (2014).

2. L. Giomi and L. Mahadevan, Minimal Surfaces Bounded by Elastic Lines. Proc. R. Soc. A **468**, 1851-1864 (2012).

3. D.P. Holmes, M. Roché, T. Sinha, and H.A. Stone, Bending and Twisting of Soft Materials by Non-homogeneous Swelling. Soft Matter **7**, 5188-5193 (2011).

4. C.R. Iacovella, A.S. Keys, and S.C. Glotzer, Self-assembly of Soft-matter Quasicrystals and their Approximants. Proc. Natl. Acad. Sci. USA **108**, 20935-20940 (2011).

5. C.L. Kane and T.C. Lubensky, Topological Boundary Modes in Isostatic Lattices. Nature Phys. **10**, 39-45 (2013).
   20th June 2014 – Tom Machon

5. H. Kusumaatmaja and R. Lipowsky, Droplet-induced Budding Transition of Membranes. Soft Matter **7** 6914-6919 (2011).

6. D. Lovine and P.J. Steinhardt, Quasicrystals: A New Class of Ordered Structures. Phys. Rev. Lett. **53**, 2477-2480 (1984).

7. T.C. Lubensky, Reflections on Graduate Education in Soft Matter. Soft Matter **9**, 4948-4950 (2013).

8. K. Sun, A. Souslov, X. Mao, and T.C. Lubensky, Surface Phonons, Elastic Response, and Conformal Invariance in Twisted Kagome Lattices. Proc. Natl. Acad. Sci. USA **109**, 12369-12374 (2012).

9. F.G. Woodhouse and R.E. Goldstein, Cytoplasmic Streaming in Plant Cells Emerges Naturally by Microfilament Self-organization. Proc. Natl. Acad. Sci. USA **110**, 14132-14137 (2013).

10. M. Wyart, S.R. Nagel, and T.A. Witten, Geometric Origin of Excess Low-frequency Vibrational Modes in Weakly Connected Amorphous Solids. EPL (Europhys. Lett.) **72**, 486-492 (2005).

Fluids

1. J.W.M. Bush, J.M. Aristoff, and A.E. Hosoi, An Experimental Investigation of the Stability of the Circular Hydraulic Jump. J. Fluid Mech. **558**, 33-52 (2006).

2. R.D. Deegan, O. Bakajin, T.F. Dupont, G. Huber, S.R. Nagel, and T.A. Witten, Capillary Flow as the Cause of Ring Stains from Dried Liquid Drops. Nature **389**, 827-829 (1997).
P.J. Yunker, T. Still, M.A. Lohr, and A.G. Yodh, Suppression of the Coffee-ring Effect by Shape-dependent Capillary Interactions. Nature **476**, 308-311 (2011).
11th July 2014 – Dario Papavassiliou

2. S. Duhr and D. Braun, Why Molecules Move along a Temperature Gradient. Proc. Natl. Acad. Sci. USA **103**, 19678-19682 (2006).

3. J.M. Kolinski, S.M. Rubinstein, S. Mandre, M.P. Brenner, D.A. Weitz, and L. Mahadevan, Skating on a Film of Air: Drops Impacting on a Surface. Phys. Rev. Lett. **108**, 074503 (2012).

4. M.J. Lighthill, On Sound Generated Aerodynamically. I. General Theory. Proc. R. Soc. Lond. A **211**, 564-587 (1952).

5. M.J. Lighthill, Physical Interpretation of the Mathematical Theory of Wave Generation by Wind. J. Fluid Mech. **14**, 385-398 (1962).

6. É. Reyssat, F. Chevy, A.L. Biance, L. Petitjean, and D. Quéré, Shape and Instability of Free-Falling Liquid Globules. EPL (Europhys. Lett.) **80**, 34005 (2007).

7. P.G. Saffman, Brownian Motion in Thin Sheets of Viscous Fluid. J. Fluid Mech. **73**, 593-602 (1976).

   Y.A. Domanov, S. Aimon, G.E.S. Toombes, M. Renner, F. Quemeneur, A. Triller, M.S. Turner, and P. Bassereau, Mobility in Geometrically Confined Membranes. Proc. Natl. Acad. Sci. USA **108**, 12605-12610 (2011).

8. P.G. Saffman and G.I. Taylor, The Penetration of a Fluid into a Porous Medium or Hele-Shaw Cell Containing a more Viscous Liquid. Proc. R. Soc. Lond. A **245**, 312-329 (1958).

9. G.I. Taylor, Dispersion of Soluble Matter in Solvent Flowing Slowly through a Tube. Proc. R. Soc. Lond. A **219**, 186-203 (1953).

10. G.B. Whitham, A General Approach to Linear and Non-linear Dispersive Waves using a Lagrangian. J. Fluid Mech. **22**, 273-283 (1965).

Hard Condensed Matter

1. A.A. Belavin, A.M. Polyakov, and A.B. Zamalodchikov, Infinite Conformal Symmetry in Two-Dimensional Quantum Field Theory. Nucl. Phys. B **241**, 333-380 (1984).

2. P. Calabrese and J.L. Cardy, Entanglement Entropy and Quantum Field Theory. J. Stat. Mech.: Theor. Exp., P06002 (2004).

3. F.D.M. Haldane, Fractional Quantization of the Hall Effect: A Hierarchy of Incompressible Quantum Fluid States. Phys. Rev. Lett. **51**, 605-608 (1983).

4. C. Jarzynski, Equalities and Inequalities: Irreversibility and the Second Law of Thermodynamics at the Nanoscale. Annu. Rev. Condens. Matter Phys. **2**, 329-351 (2011).

   4th July 2014 – Diana Khoromskaia

4. M. Schellekens, R. Hoppeler, A. Perrin, J. Viana Gomes, D. Boiron, A. Aspect, and C.I. Westbrook, Hanbury Brown Twiss Effect for Ultracold Atom Gases. Science **310**, 648-659 (2005).

5. D. Sherrington and S. Kirkpatrick, Solvable Model of a Spin-Glass. Phys. Rev. Lett. **35**, 1792-1796 (1975).

Classical Physics

1. M.V. Berry, Stokes' Phenomenon; Smoothing a Victorian Discontinuity. Publ. Math. de l'IHES **68**, 211-221 (1989).

2. M.V. Berry, Natural Focusing. The Artful Eye, 311-323 (1995).

3. M.V. Berry, R. Bhandari, and S. Klein, Black Plastic Sandwiches Demonstrating Biaxial Optical Anisotropy. Eur. J. Phys. **20**, 1-14 (1999).

4. M.V. Berry, M.R. Dennis, and R.L. Lee, Polarization Singularities in the Clear Sky. New J. Phys. **6**, 162 (2004).

5. E.H. Lieb, The Stability of Matter. Rev. Mod. Phys. **48**, 553-569 (1976).

High Energy

1. F. Englert and R. Brout, Broken Symmetry and the Mass of Gauge Vector Mesons. Phys. Rev. Lett. **13**, 321-323 (1964).
   P.W. Higgs, Broken Symmetries and the Masses of Gauge Bosons. Phys. Rev. Lett. **13**, 508-509 (1964).
   G.S. Guralnik, C.R. Hagen, T.W.B. Kibble, Global Conservation Laws and Massless Particles. Phys. Rev. Lett. **13**, 585-587 (1964).

2. D.J. Gross and F. Wilczek, Ultraviolet Behavior of Non-Abelian Gauge Theories. Phys. Rev. Lett. **30**, 1343-1346 (1973).

3. S.W. Hawking, Particle Creation by Black Holes. Commun. Math. Phys. **43**, 199-220 (1975).

4. J.M. Leinaas and J. Myrheim, On the Theory of Identical Particles. Il Nuovo Cimento **37**, 1-23 (1977).
   F. Wilczek, Quantum Mechanics of Fractional-Spin Particles. Phys. Rev. Lett. **49**, 957-959 (1982).

5. E. Witten, Global Aspects of Current Algebra. Nucl. Phys. B **223**, 422-432 (1983).

Mathematics

1. M.F. Atiyah, Topological Quantum Field Theories. Publ. Math. de l'IHES **68**, 175-186 (1988).

2. Y. Baryshnikov and R. Ghrist, Target Enumeration via Euler Characteristic Integrals. SIAM J. Appl. Math. **70**, 825-844 (2009).

3. M.A. Berger, Third-order Braid Invariants. J. Phys. A: Math. Gen. **24**, 4027-4036 (1991).

4. R. Bott, Lectures on Morse Theory, Old and New. Bull. Am. Math. Soc. **7**, 331-358 (1982).

5. S.S. Chern, On the Curvatura Integra in a Riemannian Manifold. Ann. Math. **46**, 674-684 (1945).

6. M. Gromov, Pseudo Holomorphic Curves in Symplectic Manifolds. Invent Math. **82**, 307-347 (1985).

7. P.D. Lax, Integrals of Nonlinear Equations of Evolution and Solitary Waves. Commun. Pure Appl. Math. **21**, 467-490 (1968).

8. R.S. MacKay, Complicated Dynamics from Simple Topological Hypotheses, Phil. Trans. R. Soc. A **359**, 1479-1496 (2001).

9. R. Penrose, A Generalized Inverse for Matrices. Math. Proc. Camb. Phil. Soc. **51**, 406-413 (1955).

10. W.P. Thurston and H.E. Winkelnkemper, On the Existence of Contact Forms. Proc. Am. Math. Soc. **52**, 345-347 (1975).