# PUBLICATIONS of OLIVER PENROSE
### (November 2005 edition)

## Refereed Articles

1.[1]   On the quantum mechanics of helium II, Phil. Mag. **42**, 1373-1377 (1951).

2.   The quantum mechanics of fluids, Thesis, Cambridge University, 1953.

3.   The quantization of sound waves, Phil. Mag. **45**, 80 (1954).

4.   Oscillations of liquid helium in a U-tube (by R J Donnelly and O Penrose) Phys. Rev. **103**, 1137 (1956).

5.[1, 2]   Bose-Einstein condensation and liquid helium (by O Penrose and L Onsager) Phys. Rev. **104**, 576-584 (1956).

6.   Bose-Einstein condensation in liquid helium, Nuov. Cim. Supp. 2 (10), **256** (1958).

7.   Electrostatic instabilities of a uniform non-Maxwellian plasma, Phys. Fluids, **3**, 258 (1960).

8.   A variational method for the ground state of a Bose fluid, Proc. Roy. Soc. A **256**, 106 (1960).

9.   The direction of time (by O Penrose and I C Percival), Proc. Phys. Soc. **79**, 605 (1962).

10.   Convergence of fugacity expansions for fluids and lattice gases, J. Math. Phys. **4**, 1312 (1963).

11.   The remainder in Mayer's fugacity series, J. Math. Phys. **4** 1488 (1963).

12.   Convergence of virial expansions (by J L Lebowitz and O Penrose) J. Math. Phys. **5**, 841 (1964).

13.   Two inequalities for classical and quantum systems with hard cores, Phys. Letters **11**, 224-226 (1964).

14.[3]   Rigorous treatment of the van der Waals - Maxwell theory of the liquid-vapour transition (by J L Lebowitz and O Penrose), J Math. Phys. **7**, 98-113 (1966).

15.   The Yang-Lee distribution of zeros for a classical one-dimensional fluid (short version by J S N Elvey and O Penrose) Physics Letters **26A**, 456 (1968); (full version by O Penrose and J S N Elvey) Proc. Phys. Soc. (J. Phys. A) **1**, 661-674 (1968).

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[1]Papers 1 and 5 in the above list were reprinted in the volume "Basic Notions of Condensed Matter Physics" by P W Anderson (Benjamin, 1984).

[2]This paper was reprinted in the volume "Quantum Fluids" in a series "Selected Papers on Physics" published by the Physical Society of Japan.

[3]Papers 12 and 14 were reprinted in the volume "The Equilibrium Theory of Classical Fluids" by H L Frisch & J L Lebowitz (Benjamin 1964).

17. The van der Waals limit for classical systems I. a variational principle. Commun. Math. Phys. **15** 255-276 (1969) (by D J Gates and O Penrose).

18. The van der Waals limit for classical systems II. Existence and continuity of the canonical pressure. Ibid. **16**, 231-217 (1970) (by D J Gates and O Penrose).

19. The van der Waals limit for classical systems III. Deviation from the vander Waals-Maxwell Theory. Ibid. **17**, 194-209 (1970) (by D J Gates and O Penrose).

20. One-dimensional random lattice systems including DNA (by S Cohen and O Penrose), J. Chem. Phys. **52**, 5018-5021 (1970).

21. Rigorous treatment of metastable states in the van der Waals-Maxwell Theory. J. Stat. Phys. **3**, 211-241 (1971) (by O Penrose and J L Lebowitz).

22. Bounds on the thermodynamic behaviour of systems with generalized Coulomb interaction. Phys. Rev. **A4**, 1567-1569 (1971) (by G Stell and O Penrose).

23. A functional equation in the theory of fluids (by O Penrose and J L Lebowitz, J. Math. Phys. **13**, 604-607 (1972).

24. Thermodynamic limit for classical systems with Coulomb interactions (by O Penrose and E R Smith), Commun. Math. Phys. **26**, 53-77 (1972).

25. Modern ergodic theory (by J L Lebowitz and O Penrose), Physics Today, Feb. 1973, pages 23-29. Czech translation : československy časopis pro fyziku (sekce A) **25** 219-234 (1975).

26. Decay of correlations (by J L Lebowitz and O Penrose), Phys. Rev. Letters. **31**, 549-552 (1973).

27. On the exponential decay of correlation functions (by O Penrose and J L Lebowitz): expanded version of No.30, Commun. Math. Phys. **39**, 165-184 (1974).

28. An upper bound on the free energy for classical systems with Coulomb interactions in a varying external field (by E R Smith and O Penrose), Commun. Math. Phys. **40**, 197-213 (1975).

29. Divergent susceptibility of isotropic ferromagnets (by J L Lebowitz and O Penrose),Phys. Rev. Letters. **54**, 549-552 (1975).

30. Constant fugacity perturbation theory for fluids (by B Kumar and O Penrose), Molec. Phys. **30**, 849-856 (1975).

31. Cluster and percolation inequalities for lattice systems with interactions (by J L Lebowitz and O Penrose), J. Stat. Phys. **16**, 321-327 (1977).

32. Clusters, metastability and nucleation: kinetics of first-order phase transitions (by M Kalos, J L Lebowitz, O Penrose and A Sur), J. Stat. Phys. **18**, 39-52, (1978).

33. Continuity of the temperature and derivation of the Gibbs canonical distribution in classical statistical mechanics (by R Rechtman and O Penrose), J. Stat. Phys. **19**, 359-366 (1978).

34. Growth of clusters in a first-order phase transition (by O Penrose, J L Lebowitz, J Marro, M Kalos and A Sur), J. Stat. Phys. **19**, 243-267 (1978).

35. Towards a rigorous molecular theory of metastability (by O Penrose and J L Lebowitz), pages 293-340 of Fluctuation Phenomena (Studies in Statistical Mechanics, vol. VII) edited by E W Montroll and J L Lebowitz (1979).

36.      Foundations of statistical mechanics, Rep. Prog. Phys. **42**, 1937-2006 (1979).

37.      Kinetics of an order-disorder transition (by M Phani, J L Lebowitz, M Kalos and O Penrose), Phys. Rev. Letters **45**, 366-369 (1980).

38.      A non-equilibrium entropy for dynamical systems (by S Goldstein and O Penrose), J. Stat. Phys. **24**, 325-343 (1981).

39.      Entropy and irreversibility, Annals of the New York Academy of Sciences, **373**, 211-219 (1981).

40.      Kinetics of nucleation in lattice gas models: microscopic theory and simulation compared (by O Penrose and A Buhagiar), J. Stat. Phys. **30**, 219-241 (1983).

41.      First-order thermodynamic perturbation theory is exact in the two-dimensional close-packing limit (by G Stell and O Penrose), Phys. Rev. Letters **51** (16), 1397-1400 and **52** (1), 85 (1983).

42.      Kinetics of a first-order phase transition: Computer simulations and theory (by O Penrose, J L Lebowitz, J Marro, M Kalos and J Tobochnik), J. Stat. Phys. 34, 399-426 (1984).

43.      The Becker-Dring cluster equations: basic properties and asymptotic behaviour of solutions (by J M Ball, J Carr and O Penrose), Comm. Math. Phys. **104**, 657-692 (1986).

44.      Phase transitions on fractal lattices with long-range interactions, J. Stat. Phys. **45**, 69-88 (1986), corrigendum **48** 1947-950 (1987).

45.      Statistical mechanics and the kinetics of phase separation, pages 373-394 of Material Instabilities in Continuum Mechanics (editor J M Ball) Oxford University Press (1988).

46.      Analyticity properties of the surface free energy of the Ising model, (by C E Pfister and O Penrose) Comm. Math. Phys. **115**, 691-699 (1988).

47.      Metastable states for the Becker-Döring cluster equations, Comm. Math. Phys. 121 527-540 (1989).

48.      Thermodynamically consistent models of phase-field type for the kinetics of phase transitions, (by O Penrose and P C Fife) Physica D **43** 44-62 (1990).

49.      Bose-Einstein condensation in an exactly soluble system of interacting particles. J. Stat. Phys. **63** 761-781 (1991).

50.      A mean-field equation of motion for the dynamic Ising model, J. Stat. Phys **63** 975-986 (1991).

51.      Scaling functions, self-similarity, and the morphology of phase-separating systems, (by P Fratzl, J L Lebowitz, O Penrose and J Amar) Phys. Rev. B **44** (1991).

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53.      On the validity of the Brussels formalism in statistical mechanics (by P V Coveney and O Penrose) J. Phys. A: Math. Gen. **25** 4947-4966 (1992). Comment, Ibid **26** 3905 - 7 (1993).

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55. Proof of dynamical scaling in Smoluchowski's coagulation equation with constant kernel. (by M Kreer and O Penrose) J Stat Phys. **75** 389-407 (1994).

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57. The second virial coefficient for quantum-mechanical sticky spheres (by M D Penrose and O Penrose) pp. 381-384 of 'Micro, Meso and Macroscopic approaches in physics'. Edited by A Verbeure, M Fannes and C Maes (Plenum Press 1994).

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59. Is there a 'canonical' non-equilibrium ensemble? (by O Penrose and P V Coveney) Proc R Soc Lond A (1994) **447**, 631-646.

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67. Competing mechanisms for precipitate coarsening in phase separation with vacancy dynamics (by P. Fratzl and O. Penrose), Phys. Rev. **B 55** R6101-R6104 (1997)

68. A Phase-field model for diffusion-induced grain boundary motion (by J.W. Cahn, P.C. Fife and O. Penrose), Acta Mater. **45** 4397-4413 (1997).

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73. Close to close packing (by O. Penrose and G. Stell), J. Stat. Phys. **100**, 89-95 (2000).

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76. A mathematical model for diffusion-induced grain boundary motion (by O Penrose and J W Cahn), International Series of Numerical Mathematics **147**, (proceedings of the June 2002 conference on free boundary problems, Trento, Italy), 237-254. Birkhauser, Basel 2003

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## Book

Foundations of Statistical Mechanics (Pergamon, 1969) 260 + ix pages. Reprinted by Dover Publications 2005

## Unrefereed Articles

1. The direction of time and the microcanonical ensemble (by O Penrose and A Lawrence) pages 303-309 of Modern Developments in Thermodynamics, edited by B Gal-Or (Wiley, 1974).

2. Kinetics of phase transitions (Lectures given at the Sitges International school, 1978). Springer Lecture Notes in Physics **84**, 210-234 (1978).

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1. Low-energy stationary states in $He^3$ and $He^4$ , Proc. Symposium on Liquid and Solid $He^3$ (Ohio State University 1957) p.85. A report of this work appears in the book Liquid Helium by K R Atkins.

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3. Inequalities for the ground state of liquid He , Low Temperature Physics LT9, ed. J G Daunt et al. (Plenum Press 1965) p.91.

4. Convergence of fugacity expansions for classical systems,Statistical Mechanics: Foundations and Application (Proc. I.U.P.A.P. conference, Copenhagen, 1966) ed. T Bak (Benjamin 1967) p.101.

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## Book Reviews

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