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6. Ordering and Antiferromagnetism in Ferrites <i>Phys. Rev.</i> 102, 1008–1013 (1956)	71
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10. Theory of Dirty Superconductors <i>J. Phys. Chem. Solids</i> 11, 26–30 (1959)	113
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18. Exchange in Magnetic Insulators in <i>Transition Metal Compounds</i> , ed. E.R. Schatz, Buhl Int. Conference on Materials, Pittsburgh (Gordon and Breach, New York), 1964, pp. 17–28	189

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23. Infrared Catastrophe in Fermi Gases with Local Scattering Potentials <i>Phys. Rev. Lett.</i> 18, 1049–1051 (1967)	293
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Comments on Solid State Physics 2, 193–198 (1970)
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 in *Proc. of 12th Int. Conf. on Low Temperature Physics*, ed. E. Kanda
 (Academic Press, 1971), pp. 657–660
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Philos. Mag. 25, 1–9 (1972)
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AIP. Conf. Proc., 1971, pp. 17–27
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Phys. Rev. B. 8, 4429–4432 (1973)
31. Resonating Valence Bonds: A New Kind of Insulator? 393
Materials Research Bulletin 8, 153–160 (1973)
32. Anisotropic Superfluidity in ^3He : A Possible Interpretation of
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 (with W.F. Brinkman)
Phys. Rev. Lett. 30, 1108–1111 (1973)
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 in *Collective Properties of Physical Systems*, eds. B. Lundqvist and
 S. Lundqvist, Proc. of Nobel Symposium, Goteborg, Sweden,
 13 June 1973 (Academic Press, 1974), pp. 266–271
34. Asymptotically Exact Methods in the Kondo Problem 417
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 in *Magnetism, vol. V*, ed. H. Suhl (Academic Press, 1973), pp. 217–236

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(Plenum, 1974), pp. 1–29
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Solid State Communications 14, 703–709 (1974)
37. Uses of Solid State Analogies in Elementary Particle Theory 477
in *Proc. of Conf. on Gauge Theories and Modern Field Theory*,
eds. R. Arnowitt and P. Nath (MIT Press, 1976), pp. 311–335
38. Possible Consequences of Negative U Centers in Amorphous Materials 503
J. de Physique Colloque, No. 4, 339–342 (1976)
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(with S.F. Edwards)
J. Phys. F. 5, 965–974 (1975)
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Philos. Mag. 35, 593–601 (1977)
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Phys. Rev. Lett. 18, 508–511 (1977)
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Phys. Rev. Lett. 42, 673–676 (1979)
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in *Symmetries and Broken Symmetries in Condensed Matter Physics*,
ed. N. Boccara (IDSET, Paris, 1981), pp. 11–20

44. The Rheology of Neutron Stars: Vortex Line Pinning in the Crust Superfluid 555
 (with M.A. Alpar, D. Pines and J. Shaham)
Philos. Mag. A45, 227–238 (1982)
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Physica 117B & 118B, 30–35 (1983)
46. New Method for Scaling Theory of Localization. II: Multi-Channel Theory of a “Wire” and Possible Extension to Higher Dimensionality 577
Phys. Rev. B. 23, 4828–4836 (1981)
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Phys. Rev. B. 24, 1151–1154 (1981)
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Proc. Natl. Acad. Sci. (USA) 80, 3386–3390 (1983)
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Phys. Reports 110, Nos. 5&6, 311–319 (1984)
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 in *Emerging Syntheses in Science*, ed. D. Pines
 (Addison-Wesley, 1987), pp. 17–20
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Physics Today 41#1, 9 (1988)

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57. Gutzwiller-Hubbard Lattice-Gas Model with Variable Density: Application to Normal Liquid ^3He (with D. Vollhardt and P. Wölfle) <i>Phys. Rev. B.</i> 35, 6703–6715 (1987)	683
58. Some Ideas on the Aesthetics of Science Lecture given at the 50 th Anniversary Seminar of the Faculty of Science and Technology, Keio University, Japan, May 1989	697

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Nishima Memorial Lecture, Department of Physics, Keio University,
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in *Frontiers and Borderlines in Many-Particle Physics*,
Proceedings of the Enrico International School of Physics,
Varenna, July 1987 (North-Holland, 1987), pp. 1–40
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Anisotropic Materials
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Phys. Rev. Lett. 73, 1007–1010 (1994)
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Proc. Natl. Acad. Sci. (USA) 92, 6653–6654 (1995)
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Stud. Hist. Phil. Mod. Phys. 32, 487–494 (2001)
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in *The Universality of Physics, A Festschrift in Honor of*
Deng Feng Wang, ed. Khuri et al. (Kluwer/Plenum, 2001), pp. 3–8

69. Physics of the Pseudogap Phase of High T_c Cuprates, or,
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Ann. Henri Poincaré 4, S1–S6 (2003)
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J. Phys. Condens. Matter 16, R755–R769 (2004)