

4. DIFFUSE SCATTERING AND RELATED TOPICS

4.3 (cont.)

- Uyeda, R. & Nonoyama, M. (1968). *The observation of thick specimens by high voltage electron microscopy*. *Jpn. J. Appl. Phys.* **1**, 200–208.
- Van Hove, L. (1954). *Correlations in space and time and Born approximation scattering in systems of interacting particles*. *Phys. Rev.* **95**, 249–262.
- Wang, Z. L. (1995). *Elastic and inelastic scattering in electron diffraction and imaging*. New York: Plenum Press.
- Whelan, M. (1965). *Inelastic scattering of fast electrons by crystals. I. Interband excitations*. *J. Appl. Phys.* **36**, 2099–2110.
- Yoshioka, H. (1957). *Effect of inelastic waves on electron diffraction*. *J. Phys. Soc. Jpn.* **12**, 618–628.

4.4

- Aeppli, G. & Bruinsma, R. (1984). *Hexatic order and liquid crystal density fluctuations*. *Phys. Rev. Lett.* **53**, 2133–2136.
- Aeppli, G., Litster, J. D., Birgeneau, R. J. & Pershan, P. S. (1981). *High resolution X-ray study of the smectic A–smectic B phase transition and the smectic B phase in butyloxybenzylidene octylaniline*. *Mol. Cryst. Liq. Cryst.* **67**, 205–214.
- Aharony, A., Birgeneau, R. J., Brock, J. D. & Litster, J. D. (1986). *Multicriticality in hexatic liquid crystals*. *Phys. Rev. Lett.* **57**, 1012–1015.
- Alben, R. (1973). *Phase transitions in a fluid of biaxial particles*. *Phys. Rev. Lett.* **30**, 778–781.
- Als-Nielsen, J., Christensen, F. & Pershan, P. S. (1982). *Smectic-A order at the surface of a nematic liquid crystal: synchrotron X-ray diffraction*. *Phys. Rev. Lett.* **48**, 1107–1110.
- Als-Nielsen, J., Litster, J. D., Birgeneau, R. J., Kaplan, M., Safinya, C. R., Lindegaard, A. & Mathiesen, S. (1980). *Observation of algebraic decay of positional order in a smectic liquid crystal*. *Phys. Rev. B*, **22**, 312–320.
- Bak, P., Mukamel, D., Villain, J. & Wentowska, K. (1979). *Commensurate–incommensurate transitions in rare-gas monolayers adsorbed on graphite and in layered charge-density-wave systems*. *Phys. Rev. B*, **19**, 1610–1613.
- Barois, P., Prost, J. & Lubensky, T. C. (1985). *New critical points in frustrated smectics*. *J. Phys. (Paris)*, **46**, 391–399.
- Beaglehole, D. (1982). *Pretransition order on the surface of a nematic liquid crystal*. *Mol. Cryst. Liq. Cryst.* **89**, 319–325.
- Benattar, J. J., Doucet, J., Lambert, M. & Levelut, A. M. (1979). *Nature of the smectic F phase*. *Phys. Rev. A*, **20**, 2505–2509.
- Benattar, J. J., Levelut, A. M. & Strzelecki, L. (1978). *Etude de l'influence de la longueur moléculaire les caractéristiques des phases smectique ordonnées*. *J. Phys. (Paris)*, **39**, 1233–1240.
- Benattar, J. J., Moussa, F. & Lambert, M. (1980). *Two-dimensional order in the smectic F phase*. *J. Phys. (Paris)*, **40**, 1371–1374.
- Benattar, J. J., Moussa, F. & Lambert, M. (1983). *Two dimensional ordering in liquid crystals: the SmF and SmI phases*. *J. Chim. Phys.* **80**, 99–107.
- Benattar, J. J., Moussa, F., Lambert, M. & Germian, C. (1981). *Two kinds of two-dimensional order: the SmF and SmI phases*. *J. Phys. (Paris) Lett.* **42**, L67–L70.
- Benguigui, L. (1979). *A Landau theory of the NAC point*. *J. Phys. (Paris) Colloq.* **40**, C3-419–C3-421.
- Bensimon, D., Domany, E. & Shtrikman, S. (1983). *Optical activity of cholesteric liquid crystals in the pretransitional regime and in the blue phase*. *Phys. Rev. A*, **28**, 427–433.
- Billard, J., Dubois, J. C., Vaucher, C. & Levelut, A. M. (1981). *Structures of the two discophases of rufigallol hexa-n-octanoate*. *Mol. Cryst. Liq. Cryst.* **66**, 115–122.
- Birgeneau, R. J., Garland, C. W., Kasting, G. B. & Ocko, B. M. (1981). *Critical behavior near the nematic–smectic-A transition in butyloxybenzylidene octylaniline (4O.8)*. *Phys. Rev. A*, **24**, 2624–2634.
- Birgeneau, R. J. & Litster, J. D. (1978). *Bond orientational order model for smectic B liquid crystals*. *J. Phys. (Paris) Lett.* **39**, L399–L402.
- Blinic, R. & Levanyuk, A. P. (1986). Editors. *Modern problems in condensed matter sciences, incommensurate phases in dielectrics, 2. Materials*. Amsterdam: North-Holland.
- Brisbin, D., De Hoff, R., Lockhart, T. E. & Johnson, D. L. (1979). *Specific heat near the nematic–smectic-A tricritical point*. *Phys. Rev. Lett.* **43**, 1171–1174.
- Brock, J. D., Aharony, A., Birgeneau, R. J., Evans-Lutterodt, K. W., Litster, J. D., Horn, P. M., Stephenson, G. B. & Tajbakhsh, A. R. (1986). *Orientalional and positional order in a tilted hexatic liquid crystal phase*. *Phys. Rev. Lett.* **57**, 98–101.
- Brooks, J. D. & Taylor, G. H. (1968). In *Chemistry and physics of carbon*, Vol. 3, edited by P. L. Walker Jr, pp. 243–286. New York: Marcel Dekker.
- Bruinsma, R. & Nelson, D. R. (1981). *Bond orientational order in smectic liquid crystals*. *Phys. Rev. B*, **23**, 402–410.
- Caillé, A. (1972). *Remarques sur la diffusion des rayons X dans les smectiques*. *A. C. R. Acad. Sci. Sér. B*, **274**, 891–893.
- Carlson, J. M. & Sethna, J. P. (1987). *Theory of the ripple phase in hydrated phospholipid bilayers*. *Phys. Rev. A*, **36**, 3359–3363.
- Chan, K. K., Deutsch, M., Ocko, B. M., Pershan, P. S. & Sorensen, L. B. (1985). *Integrated X-ray scattering intensity measurement of the order parameter at the nematic to smectic-A phase transition*. *Phys. Rev. Lett.* **54**, 920–923.
- Chan, K. K., Pershan, P. S., Sorensen, L. B. & Hardouin, F. (1985). *X-ray scattering study of the smectic-A1 to smectic-A2 transition*. *Phys. Rev. Lett.* **54**, 1694–1697.
- Chan, K. K., Pershan, P. S., Sorensen, L. B. & Hardouin, F. (1986). *X-ray studies of transitions between nematic, smectic-A1, -A2, and -Ad phases*. *Phys. Rev. A*, **34**, 1420–1433.
- Chandrasekhar, S. (1982). In *Advances in liquid crystals*, Vol. 5, edited by G. H. Brown, pp. 47–78. London/New York: Academic Press.
- Chandrasekhar, S. (1983). *Liquid crystals of disk-like molecules*. *Philos. Trans. R. Soc. London Ser. A*, **309**, 93–103.
- Chandrasekhar, S., Sadashiva, B. K. & Suresh, K. A. (1977). *Liquid crystals of disk like molecules*. *Pramana*, **9**, 471–480.
- Chapman, D., Williams, R. M. & Ladbroke, B. D. (1967). *Physical studies of phospholipids. VI. Thermotropic and lyotropic mesomorphism of some 1,2-diacylphosphatidylcholines (lecithins)*. *Chem. Phys. Lipids*, **1**, 445–475.
- Chen, J. H. & Lubensky, T. C. (1976). *Landau–Ginzberg mean-field theory for the nematic to smectic-C and nematic to smectic-A phase transitions*. *Phys. Rev. A*, **14**, 1202–1207.
- Chu, K. C. & McMillan, W. L. (1977). *Unified Landau theory for the nematic, smectic A and smectic C phases of liquid crystals*. *Phys. Rev. A*, **15**, 1181–1187.
- Coates, D. & Gray, G. W. (1975). *A correlation of optical features of amorphous liquid–cholesteric liquid crystal transitions*. *Phys. Lett. A*, **51**, 335–336.
- Collett, J. (1983). PhD thesis, Harvard University, USA. Unpublished.
- Collett, J., Pershan, P. S., Sirota, E. B. & Sorensen, L. B. (1984). *Synchrotron X-ray study of the thickness dependence of the phase diagram of thin liquid-crystal films*. *Phys. Rev. Lett.* **52**, 356–359.
- Collett, J., Sorensen, L. B., Pershan, P. S. & Als-Nielsen, J. (1985). *X-ray scattering study of restacking transitions in the crystalline-B phases of heptyloxybenzylidene heptylaniline 7O.7*. *Phys. Rev. A*, **32**, 1036–1043.
- Collett, J., Sorensen, L. B., Pershan, P. S., Litster, J., Birgeneau, R. J. & Als-Nielsen, J. (1982). *Synchrotron X-ray study of novel crystalline-B phases in 7O.7*. *Phys. Rev. Lett.* **49**, 553–556.
- Crooker, P. P. (1983). *The cholesteric blue phase: a progress report*. *Mol. Cryst. Liq. Cryst.* **98**, 31–45.
- Davey, S. C., Budai, J., Goodby, J. W., Pindak, R. & Moncton, D. E. (1984). *X-ray study of the hexatic-B to smectic-A phase transition in liquid crystal films*. *Phys. Rev. Lett.* **53**, 2129–2132.
- Davidov, D., Safinya, C. R., Kaplan, M., Dana, S. S., Schaetzing, R., Birgeneau, R. J. & Litster, J. D. (1979). *High-resolution X-ray and light-scattering study of critical behavior associated with the nematic–smectic-A transition in 4-cyano-4'-octylbiphenyl*. *Phys. Rev. B*, **19**, 1657–1663.

REFERENCES

4.4 (cont.)

- De Gennes, P. G. (1969a). *Conjectures sur l'état smectique*. *J. Phys. (Paris) Colloq.* **30**, C4-65–C4-71.
- De Gennes, P. G. (1969b). *Phenomenology of short-range-order effects in the isotropic phase of nematic materials*. *Phys. Lett. A*, **30**, 454–455.
- De Gennes, P. G. (1971). *Short range order effects in the isotropic phase of nematics and cholesterics*. *Mol. Cryst. Liq. Cryst.* **12**, 193–214.
- De Gennes, P. G. (1972). *An analogy between superconductors and smectics A*. *Solid State Commun.* **10**, 753–756.
- De Gennes, P. G. (1973). *Some remarks on the polymorphism of smectics*. *Mol. Cryst. Liq. Cryst.* **21**, 49–76.
- De Gennes, P. G. (1974). *The physics of liquid crystals*. Oxford: Clarendon Press.
- Demus, D., Diele, S., Klapperstück, M., Link, V. & Zschke, H. (1971). *Investigation of a smectic tetramorphous substance*. *Mol. Cryst. Liq. Cryst.* **15**, 161–169.
- Destrade, C., Gasparoux, H., Foucher, P., Tinh, N. H., Malthête, J. & Jacques, J. (1983). *Molécules discoïdes et polymorphisme mésomorphe*. *J. Chim. Phys.* **80**, 137–148.
- De Vries, H. L. (1951). *Rotary power and other optical properties of liquid crystals*. *Acta Cryst.* **4**, 219–226.
- Diele, S., Brand, P. & Sackmann, H. (1972). *X-ray diffraction and polymorphism of smectic liquid crystals. II. D and E modifications*. *Mol. Cryst. Liq. Cryst.* **17**, 163–169.
- Djurek, D., Baturic-Rubicic, J. & Franulovic, K. (1974). *Specific-heat critical exponents near the nematic–smectic-A phase transition*. *Phys. Rev. Lett.* **33**, 1126–1129.
- Doucet, J. (1979). In *Molecular physics of liquid crystals*, edited by G. W. Gray & G. R. Luckhurst, pp. 317–341. London/New York: Academic Press.
- Doucet, J. & Levelut, A. M. (1977). *X-ray study of the ordered smectic phases in some benzylideneanilines*. *J. Phys. (Paris)*, **38**, 1163–1170.
- Doucet, J., Levelut, A. M., Lambert, M., Lievert, L. & Strzelecki, L. (1975). *Nature de la phase smectique*. *J. Phys. (Paris) Colloq.* **36**, C1-13–C1-19.
- Etherington, G., Leadbetter, A. J., Wang, X. J., Gray, G. W. & Tajbakhsh, A. (1986). *Structure of the smectic D phase*. *Liq. Cryst.* **1**, 209–214.
- Faetti, S., Gatti, M., Palleschi, V. & Sluckin, T. J. (1985). *Almost critical behavior of the anchoring energy at the interface between a nematic liquid crystal and a substrate*. *Phys. Rev. Lett.* **55**, 1681–1684.
- Faetti, S. & Palleschi, V. (1984). *Nematic isotropic interface of some members of the homologous series of the 4-cyano-4'-(n-alkyl)bi-phenyl liquid crystals*. *Phys. Rev. A*, **30**, 3241–3251.
- Fan, C. P. & Stephen, M. J. (1970). *Isotropic–nematic phase transition in liquid crystals*. *Phys. Rev. Lett.* **25**, 500–503.
- Farber, A. S. (1985). PhD thesis, Brandeis University, USA. Unpublished.
- Fleming, R. M., Moncton, D. E., McWhan, D. B. & DiSalvo, F. J. (1980). In *Ordering in two dimensions. Proceedings of an International Conference held at Lake Geneva, Wisconsin*, edited by S. K. Sinha, pp. 131–134. New York: North-Holland.
- Fontell, K. (1974). In *Liquid crystals and plastic crystals*, Vol. II, edited by G. W. Gray & P. A. Winsor, pp. 80–109. Chichester, England: Ellis Horwood.
- Fontes, E., Heiney, P. A., Haseltine, J. H. & Smith, A. B. III (1986). *High resolution X-ray scattering study of the multiply reentrant polar mesogen DB9ONO₂*. *J. Phys. (Paris)*, **47**, 1533–1539.
- Frank, F. C. & van der Merwe, J. H. (1949). *One-dimensional dislocations. I. Static theory*. *Proc. R. Soc. London Ser. A*, **198**, 205–216.
- Freiser, M. J. (1971). *Successive transitions in a nematic liquid*. *Mol. Cryst. Liq. Cryst.* **14**, 165–182.
- Friedel, G. (1922). *Les états mésomorphes de la matière*. *Ann. Phys. (Paris)*, **18**, 273–274.
- Gane, P. A. C. & Leadbetter, A. J. (1981). *The crystal and molecular structure of N-(4-n-octyloxybenzylidene)-4'-butylaniline (8O.4) and the crystal–smectic G transition*. *Mol. Cryst. Liq. Cryst.* **78**, 183–200.
- Gane, P. A. C. & Leadbetter, A. J. (1983). *Modulated crystal B phases and the B- to G-phase transition in two types of liquid crystalline compounds*. *J. Phys. C*, **16**, 2059–2067.
- Gane, P. A. C., Leadbetter, A. J., Wrighton, P. G., Goodby, J. W., Gray, G. W. & Tajbakhsh, A. R. (1983). *The phase behavior of bis-(4'-n-heptyloxybenzylidene)-1,4-phenylenediamine HEP-TOBPD, crystal J and K phases*. *Mol. Cryst. Liq. Cryst.* **100**, 67–74.
- Gannon, M. G. J. & Faber, T. E. (1978). *The surface tension of nematic liquid crystals*. *Philos. Mag.* **A37**, 117–135.
- Garland, C. W., Meichle, M., Ocko, B. M., Kortan, A. R., Safinya, C. R., Yu, L. J., Litster, J. D. & Birgeneau, R. J. (1983). *Critical behavior at the nematic–smectic-A transition in butyloxybenzylidene heptylaniline (4O.7)*. *Phys. Rev. A*, **27**, 3234–3240.
- Gransbergen, E. F., De Jeu, W. H. & Als-Nielsen, J. (1986). *Antiferroelectric surface layers in a liquid crystal as observed by synchrotron X-ray scattering*. *J. Phys. (Paris)*, **47**, 711–718.
- Gray, G. W. & Goodby, J. W. (1984). *Smectic liquid crystals: textures and structures*. Glasgow: Leonard Hill.
- Gray, G. W., Jones, B. & Marson, F. (1957). *Mesomorphism and chemical constitution. Part VIII. The effect of 3'-substituents on the mesomorphism of the 4'-n-alkoxydiphenyl-4-carboxylic acids and their alkyl esters*. *J. Chem. Soc.* **1**, 393–401.
- Grinstein, G. & Toner, J. (1983). *Dislocation-loop theory of the nematic–smectic A–smectic C multicritical point*. *Phys. Rev. Lett.* **51**, 2386–2389.
- Guillon, D. & Skoulios, A. (1987). *Molecular model for the R smectic DS mesophase*. *Europhys. Lett.* **3**, 79–85.
- Guillon, D., Skoulios, A. & Benattar, J. J. (1986). *Volume and X-ray diffraction study of terephthal-bis-4-n-decylaniline (TBDA)*. *J. Phys. (Paris)*, **47**, 133–138.
- Gunther, L., Imry, Y. & Lajzerowicz, J. (1980). *X-ray scattering in smectic-A liquid crystals*. *Phys. Rev. A*, **22**, 1733–1740.
- Guyot-Sionnest, P., Hsiung, H. & Shen, Y. R. (1986). *Surface polar ordering in a liquid crystal observed by optical second-harmonic generation*. *Phys. Rev. Lett.* **57**, 2963–2966.
- Halperin, B. I. & Nelson, D. R. (1978). *Theory of two-dimensional melting*. *Phys. Rev. Lett.* **41**, 121–124, 519(E).
- Hardouin, F., Levelut, A. M., Achard, M. F. & Sigaud, G. (1983). *Polymorphisme des substances mésogènes à molécules polaires. I. Physico-chimie et structure*. *J. Chim. Phys.* **80**, 53–64.
- Hardouin, F., Levelut, A. M., Benattar, J. J. & Sigaud, G. (1980). *X-ray investigations of the smectic A1–smectic A2 transition*. *Solid State Commun.* **33**, 337–340.
- Hardouin, F., Sigaud, G., Tinh, N. H. & Achard, M. F. (1981). *A fluid smectic A antiphase in a pure nitro rod-like compound*. *J. Phys. (Paris) Lett.* **42**, L63–L66.
- Hardouin, F., Tinh, N. H., Achard, M. F. & Levelut, A. M. (1982). *A new thermotropic smectic phase made of ribbons*. *J. Phys. (Paris) Lett.* **43**, L327–L331.
- Helfrich, W. (1979). *Structure of liquid crystals especially order in two dimensions*. *J. Phys. (Paris) Colloq.* **40**, C3-105–C3-114.
- Hendriks, Y., Charvolin, J. & Rawiso, M. (1986). *Uniaxial–biaxial transition in lyotropic nematic solutions: local biaxiality in the uniaxial phase*. *Phys. Rev. B*, **33**, 3534–3537.
- Hirth, J. P., Pershan, P. S., Collett, J., Sirota, E. & Sorensen, L. B. (1984). *Dislocation model for restacking phase transitions in crystalline-B liquid crystals*. *Phys. Rev. Lett.* **53**, 473–476.
- Hornreich, R. M., Luban, M. & Shtrikman, S. (1975). *Critical behavior at the onset of k-space instability on the lambda line*. *Phys. Rev. Lett.* **35**, 1678–1681.
- Hornreich, R. M. & Shtrikman, S. (1983). *Theory of light scattering in cholesteric blue phases*. *Phys. Rev. A*, **28**, 1791–1807.
- Huang, C. C. & Lien, S. C. (1981). *Nature of a nematic–smectic-A–smectic-C multicritical point*. *Phys. Rev. Lett.* **47**, 1917–1920.

4. DIFFUSE SCATTERING AND RELATED TOPICS

4.4 (cont.)

- Huang, C. C., Lien, S. C., Dumrongrattana, S. & Chiang, L. Y. (1984). *Calorimetric studies near the smectic-A1–smectic-A phase transition of a liquid crystal compound*. *Phys. Rev. A*, **30**, 965–967.
- Huse, D. A. (1985). *Fisher renormalization at the smectic-A1 to smectic-A2 transition in a mixture*. *Phys. Rev. Lett.* **55**, 2228.
- Kasting, G. B., Lushington, K. J. & Garland, C. W. (1980). *Critical heat capacity near the nematic–smectic-A transition in octyloxy-cyanobiphenyl in the range 1–2000 bar*. *Phys. Rev. B*, **22**, 321–331.
- Kittel, C. (1963). *Quantum theory of solids*. New York: John Wiley.
- Kosterlitz, J. M. & Thouless, D. G. (1973). *Ordering, metastability and phase transitions in two-dimensions*. *J. Phys. C*, **6**, 1181–1203.
- Landau, L. D. (1965). In *Collected papers of L. D. Landau*, edited by D. ter Haar, pp. 193–216. New York: Gordon and Breach.
- Landau, L. D. & Lifshitz, E. M. (1958). *Statistical physics*. London: Pergamon Press.
- Lawson, K. D. & Flautt, T. J. (1967). *Magnetically oriented lyotropic liquid crystalline phases*. *J. Am. Chem. Soc.* **89**, 5489–5491.
- Leadbetter, A. J., Durrant, J. L. A. & Rugman, M. (1977). *The density of 4-n-octyl-4'-cyano-biphenyl (8CB)*. *Mol. Cryst. Liq. Cryst.* **34**, 231–235.
- Leadbetter, A. J., Frost, J. C., Gaughan, J. P., Gray, G. W. & Mosley, A. (1979). *The structure of smectic A phases of compounds with cyano end groups*. *J. Phys. (Paris) Colloq.* **40**, C3-375–C3-380.
- Leadbetter, A. J., Frost, J. C., Gaughan, J. P. & Mazid, M. A. (1979). *The structure of the crystal, smectic E and smectic B forms of IBPAC*. *J. Phys. (Paris) Colloq.* **40**, C3-185–C3-192.
- Leadbetter, A. J., Frost, J. C. & Mazid, M. A. (1979). *Interlayer correlations in smectic B phases*. *J. Phys. (Paris) Lett.* **40**, L325–L329.
- Leadbetter, A. J., Gaughan, J. P., Kelley, B., Gray, G. W. & Goodby, J. J. (1979). *Characterisation and structure of some new smectic F phases*. *J. Phys. (Paris) Colloq.* **40**, C3-178–C3-184.
- Leadbetter, A. J., Mazid, M. A. & Kelly, B. A. (1979). *Structure of the smectic-B phase and the nature of the smectic-B to H transition in the N-(4-n-alkoxybenzylidene)-4'-alkylanilines*. *Phys. Rev. Lett.* **43**, 630–633.
- Leadbetter, A. J., Mazid, M. A. & Malik, K. M. A. (1980). *The crystal and molecular structure of isobutyl 4-(4'-phenylbenzylideneamino) cinnamate (IBPBAC) – and the crystal smectic E transition*. *Mol. Cryst. Liq. Cryst.* **61**, 39–60.
- Leadbetter, A. J., Mazid, M. A. & Richardson, R. M. (1980). In *Liquid crystals*, edited by S. Chandrasekhar, pp. 65–79. London: Heyden.
- Leadbetter, A. J., Richardson, R. M. & Carlile, C. J. (1976). *The nature of the smectic E phase*. *J. Phys. (Paris) Colloq.* **37**, C3-65–C3-68.
- Lee, S. D. & Meyer, R. B. (1986). *Computations of the phase equilibrium, elastic constants, and viscosities of a hard-rod nematic liquid crystal*. *J. Chem. Phys.* **84**, 3443–3448.
- Levelut, A. M. (1976). *Etude de l'ordre local lié à la rotation des molécules dans la phase smectique B*. *J. Phys. (Paris) Colloq.* **37**, C3-51–C3-54.
- Levelut, A. M. (1983). *Structures des phases mésomorphes formée de molécules discoïdes*. *J. Chim. Phys.* **80**, 149–161.
- Levelut, A. M., Doucet, J. & Lambert, M. (1974). *Etude par diffusion de rayons X de la nature des phases smectiques B et de la transition de phase solide–smectique B*. *J. Phys. (Paris)*, **35**, 773–779.
- Levelut, A. M. & Lambert, M. (1971). *Structure des cristaux liquides smectic B*. *C. R. Acad. Sci. Sér. B*, **272**, 1018–1021.
- Levelut, A. M., Tarento, R. J., Hardouin, F., Achard, M. F. & Sigaud, G. (1981). *Number of SA phases*. *Phys. Rev. A*, **24**, 2180–2186.
- Liebert, L. E. (1978). Editor. *Liquid crystals*. In *Solid state physics: advances in research and applications*, edited by H. Ehrenreich, F. Seitz & D. Turnbull, Suppl. 14. New York: Academic Press.
- Litster, J. D., Als-Nielsen, J., Birgeneau, R. J., Dana, S. S., Davidov, D., Garcia-Golding, F., Kaplan, M., Safinya, C. R. & Schaezting, R. (1979). *High resolution X-ray and light scattering studies of bilayer smectic A compounds*. *J. Phys. (Paris) Colloq.* **40**, C3-339–C3-344.
- Lubensky, T. C. (1983). *The nematic to smectic A transition: a theoretical overview*. *J. Chim. Phys.* **80**, 31–43.
- Lubensky, T. C. (1987). *Mean field theory for the biaxial nematic phase and the NNUAC critical point*. *Mol. Cryst. Liq. Cryst.* **146**, 55–69.
- Lubensky, T. C. & Ingersent, K. (1986). *Patterns in systems with competing incommensurate lengths*. Preprint.
- Luzzati, V. & Reiss-Husson, F. (1966). *Structure of the cubic phase of lipid–water systems*. *Nature (London)*, **210**, 1351–1352.
- Ma, S. K. (1976). *Modern theory of critical phenomena*. Reading, MA: Benjamin.
- McMillan, W. L. (1972). *X-ray scattering from liquid crystals. I. Cholesteryl nonanoate and myristate*. *Phys. Rev. A*, **6**, 936–947.
- McMillan, W. L. (1973a) *Measurement of smectic-A-phase order-parameter fluctuations near a second-order smectic-A–nematic-phase transition*. *Phys. Rev. A*, **7**, 1419–1422.
- McMillan, W. L. (1973b) *Measurement of smectic-A-phase order-parameter fluctuations in the nematic phase of p-n-octyloxybenzylidene-p'-toluidine*. *Phys. Rev. A*, **7**, 1673–1678.
- McMillan, W. L. (1973c) *Measurement of smectic-phase order-parameter fluctuations in the nematic phase of heptyloxybenzene*. *Phys. Rev. A*, **8**, 328–331.
- Mada, H. & Kobayashi, S. (1981). *Surface order parameter of 4-n-heptyl-4'-cyanobiphenyl*. *Mol. Cryst. Liq. Cryst.* **66**, 57–60.
- Maier, W. & Saupe, A. (1958). *Eine einfache molekulare Theorie des nematischen kristallinüssigen Zustandes*. *Z. Naturforsch. Teil A*, **13**, 564–566.
- Maier, W. & Saupe, A. (1959). *Eine einfache molekulare statistische Theorie der nematischen kristallinüssigen phase. Teil I*. *Z. Naturforsch. Teil A*, **14**, 882–889.
- Malthête, J., Liebert, L., Levelut, A. M. & Galerne, Y. (1986). *Nematic biaxe thermotrope*. *C. R. Acad. Sci.* **303**, 1073–1076.
- Martin, P. C., Parodi, O. & Pershan, P. S. (1972). *Unified hydrodynamic theory for crystals, liquid crystals, and normal fluids*. *Phys. Rev. A*, **6**, 2401–2420.
- Martinez-Miranda, L. J., Kortan, A. R. & Birgeneau, R. J. (1986). *X-ray study of fluctuations near the nematic–smectic-A–smectic-C multicritical point*. *Phys. Rev. Lett.* **56**, 2264–2267.
- Meiboom, S., Sethna, J. P., Anderson, P. W. & Brinkman, W. F. (1981). *Theory of the blue phase of cholesteric liquid crystals*. *Phys. Rev. Lett.* **46**, 1216–1219.
- Miyano, K. (1979). *Wall-induced pretransitional birefringence: a new tool to study boundary aligning forces in liquid crystals*. *Phys. Rev. Lett.* **43**, 51–54.
- Moncton, D. E. & Pindak, R. (1979). *Long-range order in two- and three-dimensional smectic-B liquid crystal films*. *Phys. Rev. Lett.* **43**, 701–704.
- Moncton, D. E., Pindak, R., Davey, S. C. & Brown, G. S. (1982). *Melting of variable thickness liquid crystal thin films: a synchrotron X-ray study*. *Phys. Rev. Lett.* **49**, 1865–1868.
- Moncton, D. E., Stephens, P. W., Birgeneau, R. J., Horn, P. M. & Brown, G. S. (1981). *Synchrotron X-ray study of the commensurate–incommensurate transition of monolayer krypton on graphite*. *Phys. Rev. Lett.* **46**, 1533–1536.
- Nelson, D. R. & Halperin, B. I. (1979). *Dislocation-mediated melting in two dimensions*. *Phys. Rev. B*, **19**, 2457–2484.
- Nelson, D. R. & Halperin, B. I. (1980). *Solid and fluid phases in smectic layers with tilted molecules*. *Phys. Rev. B*, **21**, 5312–5329.
- Nelson, D. R. & Toner, J. (1981). *Bond-orientational order, dislocation loops and melting of solids and smectic-A liquid crystals*. *Phys. Rev. B*, **24**, 363–387.
- Neto, A. M. F., Galerne, Y., Levelut, A. M. & Liebert, L. (1985). *Pseudo lamellar ordering in uniaxial and biaxial lyotropic nematics: a synchrotron X-ray diffraction experiment*. *J. Phys. (Paris) Lett.* **46**, L499–L505.
- Ocko, B. M., Birgeneau, R. J. & Litster, J. D. (1986). *Crossover to tricritical behavior at the nematic to smectic A transition: an X-ray scattering study*. *Z. Phys. B*, **62**, 487–497.

REFERENCES

4.4 (cont.)

- Ocko, B. M., Birgeneau, R. J., Litster, J. D. & Neubert, M. E. (1984). *Critical and tricritical behavior at the nematic to smectic-A transition*. *Phys. Rev. Lett.* **52**, 208–211.
- Ocko, B. M., Braslau, A., Pershan, P. S., Als-Nielsen, J. & Deutsch, M. (1986). *Quantized layer growth at liquid crystal surfaces*. *Phys. Rev. Lett.* **57**, 94–97.
- Ocko, B. M., Pershan, P. S., Safinya, C. R. & Chiang, L. Y. (1987). *Incommensurate smectic order at the free surface in the nematic phase of DB7NO₂*. *Phys. Rev. A*, **35**, 1868–1872.
- Onsager, L. (1949). *The effects of shapes on the interaction of colloidal particles*. *Ann. NY Acad. Sci.* **51**, 627–659.
- Peierls, R. E. (1934). *Transformation temperatures*. *Helv. Phys. Acta Suppl.* **2**, 81–83.
- Pershan, P. S. (1974). *Dislocation effects in smectic-A liquid crystals*. *J. Appl. Phys.* **45**, 1590–1604.
- Pershan, P. S. (1979). *Amphiphilic molecules and liquid crystals*. *J. Phys. (Paris) Colloq.* **40**, C3-423–C3-432.
- Pershan, P. S. & Als-Nielsen, J. (1984). *X-ray reflectivity from the surface of a liquid crystal: surface structure and absolute value of critical fluctuations*. *Phys. Rev. Lett.* **52**, 759–762.
- Pershan, P. S., Braslau, A., Weiss, A. H. & Als-Nielsen, J. (1987). *Smectic layering at the free surface of liquid crystals in the nematic phase: X-ray reflectivity*. *Phys. Rev. A*, **35**, 4800–4813.
- Pershan, P. S. & Prost, J. (1975). *Dislocation and impurity effects in smectic-A liquid crystals*. *J. Appl. Phys.* **46**, 2343–2353.
- Pindak, R., Moncton, D. E., Davey, S. C. & Goodby, J. W. (1981). *X-ray observation of a stacked hexatic liquid-crystal B phase*. *Phys. Rev. Lett.* **46**, 1135–1138.
- Pokrovsky, V. L. & Talapov, A. L. (1979). *Ground state, spectrum, and phase diagram of two-dimensional incommensurate crystals*. *Phys. Rev. Lett.* **42**, 65–67.
- Prost, J. (1979). *Smectic A to smectic A phase transition*. *J. Phys. (Paris)*, **40**, 581–587.
- Prost, J. (1984). *The smectic state*. *Adv. Phys.* **33**, 1–46.
- Prost, J. & Barois, P. (1983). *Polymorphism in polar mesogens. II. Theoretical aspects*. *J. Chim. Phys.* **80**, 65–81.
- Ratna, B. R., Nagabhushana, C., Raja, V. N., Shashidhar, R. & Chandrasekhar, S. (1986). *Density, dielectric and X-ray studies of smectic A–smectic A transitions*. *Mol. Cryst. Liq. Cryst.* **138**, 245–257.
- Ratna, B. R., Shashidhar, R. & Raja, V. N. (1985). *Smectic-A phase with two collinear incommensurate density modulations*. *Phys. Rev. Lett.* **55**, 1476–1478.
- Richardson, R. M., Leadbetter, A. J. & Frost, J. C. (1978). *The structure and dynamics of the smectic B phase*. *Ann. Phys.* **3**, 177–186.
- Sadoc, J. F. & Charvolin, J. (1986). *Frustration in bilayers and topologies of liquid crystals of amphiphilic molecules*. *J. Phys. (Paris)*, **47**, 683–691.
- Safinya, C. R., Clark, N. A., Liang, K. S., Varady, W. A. & Chiang, L. Y. (1985). *Synchrotron X-ray scattering study of freely suspended discotic strands*. *Mol. Cryst. Liq. Cryst.* **123**, 205–216.
- Safinya, C. R., Liang, K. S., Varady, W. A., Clark, N. A. & Andersson, G. (1984). *Synchrotron X-ray study of the orientational ordering D₂–D₁ structural phase transition of freely suspended discotic strands in triphenylene hexa-*n*-dodecanoate*. *Phys. Rev. Lett.* **53**, 1172–1175.
- Safinya, C. R., Roux, D., Smith, G. S., Sinha, S. K., Dimon, P., Clark, N. A. & Bellocq, A. M. (1986). *Steric interactions in a model multimembrane system: a synchrotron X-ray study*. *Phys. Rev. Lett.* **57**, 2718–2721.
- Safinya, C. R., Varady, W. A., Chiang, L. Y. & Dimon, P. (1986). *X-ray study of the nematic phase and smectic-A1 to smectic- \bar{A} phase transition in heptylphenyl nitrobenzoyloxybenzoate (DB7NO₂)*. *Phys. Rev. Lett.* **57**, 432–435.
- Safran, S. A. & Clark, N. A. (1987). *Editors. Physics of complex and supermolecular fluids*. New York: John Wiley.
- Shiple, C. G., Hitchcock, P. B., Mason, R. & Thomas, K. M. (1974). *Structural chemistry of 1,2-diauroyl-DL-phosphatidylethanolamine: molecular conformation and intermolecular packing of phospholipids*. *Proc. Natl Acad. Sci. USA*, **71**, 3036–3040.
- Sigaud, G., Hardouin, F., Achard, M. F. & Gasparoux, H. (1979). *Anomalous transitional behaviour in mixtures of liquid crystals: a new transition of SA–SA type?* *J. Phys. (Paris) Colloq.* **40**, C3-356–C3-359.
- Sirota, E. B., Pershan, P. S. & Deutsch, M. (1987). *Modulated crystalline-B phases in liquid crystals*. *Phys. Rev. A*, **36**, 2902–2913.
- Sirota, E. B., Pershan, P. S., Sorensen, L. B. & Collett, J. (1985). *X-ray studies of tilted hexatic phases in thin liquid-crystal films*. *Phys. Rev. Lett.* **55**, 2039–2042.
- Sirota, E. B., Pershan, P. S., Sorensen, L. B. & Collett, J. (1987). *X-ray and optical studies of the thickness dependence of the phase diagram of liquid crystal films*. *Phys. Rev. A*, **36**, 2890–2901.
- Small, D. (1967). *Phase equilibria and structure of dry and hydrated egg lecithin*. *J. Lipid Res.* **8**, 551–557.
- Smith, G. W. & Garland, Z. G. (1973). *Liquid crystalline phases in a doubly homologous series of benzylideneanilines – textures and scanning calorimetry*. *J. Chem. Phys.* **59**, 3214–3228.
- Smith, G. W., Garland, Z. G. & Curtis, R. J. (1973). *Phase transitions in mesomorphic benzylideneanilines*. *Mol. Cryst. Liq. Cryst.* **19**, 327–330.
- Solomon, L. & Litster, J. D. (1986). *Light scattering measurements in the 7S5-8OCB nematic–smectic-A–smectic-C liquid-crystal system*. *Phys. Rev. Lett.* **56**, 2268–2271.
- Sorensen, L. B. (1987). Private communication.
- Sorensen, L. B., Amador, S., Sirota, E. B., Stragler, H. & Pershan, P. S. (1987). Unpublished.
- Springer, T. (1977). In *Current physics, Vol. 3. Dynamics of solids and liquids by neutron scattering*, edited by S. W. Lovesey & T. Springer, pp. 255–300 (see p. 281). Berlin: Springer-Verlag.
- Sprokel, G. E. (1980). *The physics and chemistry of liquid crystal devices*. New York: Plenum.
- Stegemeyer, H. & Bergmann, K. (1981). In *Liquid crystals of one- and two-dimensional order*. *Springer Series in Chemical Physics* 11, edited by W. Helfrich & G. Heppke, pp. 161–175. Berlin/Heidelberg/New York: Springer-Verlag.
- Tardieu, A. & Billard, J. (1976). *On the structure of the 'smectic D modification'*. *J. Phys. (Paris) Colloq.* **37**, C3-79–C3-81.
- Tardieu, A. & Luzzati, V. (1970). *Polymorphism of lipids: a novel cubic phase – a cage-like network of rods with enclosed spherical micelles*. *Biochim. Biophys. Acta*, **219**, 11–17.
- Thoen, J., Marynissen, H. & Van Dael, W. (1982). *Temperature dependence of the enthalpy and the heat capacity of the liquid-crystal octylcyanobiphenyl (8CB)*. *Phys. Rev. A*, **26**, 2886–2905.
- Thoen, J., Marynissen, H. & Van Dael, W. (1984). *Nematic–smectic-A tricritical point in alkylcyanobiphenyl liquid crystals*. *Phys. Rev. Lett.* **5**, 204–207.
- Villain, J. (1980). In *Order in strongly fluctuating condensed matter system*, edited by T. Riste, pp. 221–260. New York: Plenum.
- Wang, J. & Lubensky, T. C. (1984). *Theory of the SA1–SA2 phase transition in liquid crystal*. *Phys. Rev. A*, **29**, 2210–2217.
- Warren, B. E. (1968). *X-ray diffraction*. Reading, MA: Addison-Wesley.
- Winkor, M. J. & Clarke, R. (1986). *Long-period stacking transitions in intercalated graphite*. *Phys. Rev. Lett.* **56**, 2072–2075.
- Young, A. P. (1979). *Melting and the vector Coulomb gas in two dimensions*. *Phys. Rev. B*, **19**, 1855–1866.
- Young, C. Y., Pindak, R., Clark, N. A. & Meyer, R. B. (1978). *Light-scattering study of two-dimensional molecular-orientation fluctuations in a freely suspended ferroelectric liquid crystal film*. *Phys. Rev. Lett.* **40**, 773–776.
- Yu, L. J. & Saupe, A. (1980). *Observation of a biaxial nematic phase in potassium laurate–1-decanol–water mixtures*. *Phys. Rev. Lett.* **45**, 1000–1003.