

loun function. The parameter ξ associated with the generated function $g(T/T_c)$ is not known completely here—only the ratio ξ/ξ_0 is known—but

since one is generally interested in logarithmic pressure (or volume) derivatives, this ratio is all that is required.

*Work supported in part by the U. S. Atomic Energy Commission under Contract No. AT (11-1)-1198.

[†]Present address: Department of Physiology and Biophysics, University of the Pacific, San Francisco, Calif. 94115 and Cardiovascular Research Institute, School of Medicine, University of California, San Francisco, Calif. 94122.

- ¹F. W. Constant, Phys. Rev. **36**, 1654 (1930).
- ²D. Gerstenberg, Ann. Phys. (Leipz.) **2**, 236 (1958).
- ³R. M. Bozorth, P. A. Wolff, D. D. Davis, V. B. Compton, and J. H. Wernick, Phys. Rev. **122**, 1157 (1961).
- ⁴J. Crangle, Philos. Mag. **5**, 335 (1960).
- ⁵J. W. Cable, E. O. Wollan, and W. C. Koehler, Phys. Rev. **138**, A755 (1965).
- ⁶G. G. Low and T. M. Holden, Proc. Phys. Soc. Lond. **89**, 119 (1966).
- ⁷T. J. Hicks, T. M. Holden, and G. G. Low, J. Phys. C **1**, 528 (1968).
- ⁸G. G. Low, Adv. Phys. **18**, 371 (1969).
- ⁹B. Giovannini, M. Peter, and J. R. Schrieffer, Phys. Rev. Lett. **12**, 736 (1964).
- ¹⁰A. M. Clogston, Phys. Rev. Lett. **19**, 583 (1967).
- ¹¹D. J. Kim and B. B. Schwartz, J. Appl. Phys. **40**, 1208 (1969).
- ¹²T. Moriya, Prog. Theor. Phys. **34**, 329 (1965).
- ¹³T. Takahashi and M. Shimizu, J. Phys. Soc. Jap. **20**, 26 (1965).
- ¹⁴D. J. Kim, Phys. Rev. **149**, 434 (1966).
- ¹⁵D. J. Kim, Phys. Rev. B **1**, 3725 (1970).
- ¹⁶D. E. Nagle, P. P. Craig, P. Barrett, D. R. F. Cochran, C. E. Olsen, and R. D. Taylor, Phys. Rev. **125**, 490 (1962).
- ¹⁷P. P. Craig, D. E. Nagle, W. A. Steyert, and R. D. Taylor, Phys. Rev. Lett. **9**, 12 (1962).
- ¹⁸P. P. Craig, B. Mozer, and R. Segnan, Phys. Rev. Lett. **14**, 895 (1965).
- ¹⁹T. A. Kitchens, W. A. Steyert, and R. D. Taylor, Phys. Rev. **138**, A467 (1965).
- ²⁰P. P. Craig, R. C. Perisho, R. Segnan, and W. A. Steyert, Phys. Rev. **138**, A1460 (1965).
- ²¹F. W. D. Woodhams, R. E. Meads, and J. S. Carlow, Phys. Lett. **23**, 419 (1966).
- ²²T. A. Kitchens and P. P. Craig, J. Appl. Phys. **37**, 1187 (1966).
- ²³W. L. Trousdale, G. Longworth, and T. A. Kitchens, J. Appl. Phys. **38**, 922 (1967).
- ²⁴M. P. Maley, R. D. Taylor, and J. L. Thompson, J. Appl. Phys. **38**, 1249 (1967).
- ²⁵B. D. Dunlap and J. G. Dash, Phys. Rev. **155**, 460 (1967).
- ²⁶N. A. Blum and R. B. Frankel, J. Appl. Phys. **39**, 959 (1968).
- ²⁷G. Longworth, Phys. Rev. **172**, 572 (1968).
- ²⁸T. A. Kitchens and W. L. Trousdale, Phys. Rev. **174**, 606 (1968).
- ²⁹W. A. Ferrando, R. Segnan, and A. I. Schindler, J. Appl. Phys. **41**, 1236 (1970); Phys. Rev. B **5**, 4657 (1972).
- ³⁰M. Rubenstein, Solid State Commun. **8**, 919 (1970).
- ³¹U. Erich, J. Göring, S. Hüfner, and E. Kankeleit, Phys. Lett. A **31**, 492 (1970).
- ³²F. E. Obenshain, W. A. Glaeser, G. Czyzek, and J. E. Tansil, J. Phys. (Paris) Suppl. **32**, 783 (1971).
- ³³E. Fawcett, D. B. McWhan, R. C. Sherwood, and M. P. Sarachik, Solid State Commun. **6**, 509 (1968).
- ³⁴E. Fawcett, E. Bucher, W. F. Brinkman, and J. P. Maita, Phys. Rev. Lett. **21**, 1183 (1968).
- ³⁵E. Fawcett and R. C. Sherwood, Phys. Rev. B **1**, 4361 (1970).
- ³⁶E. Fawcett, Phys. Rev. B **3**, 3023 (1971).

³⁷M. Matsumoto, T. Goto, and T. Kaneko, J. Phys. (Paris) Suppl. **32**, 419 (1971).

³⁸E. Tatsumoto, T. Okamoto, S. Ishida, and J. Ishida, J. Phys. Soc. Jap. **24**, 950 (1968).

³⁹J. Ishida and S. Ishida, J. Sci. Hiroshima Univ. **33**, 257 (1969).

⁴⁰E. Tatsumoto, H. Fujiwara, T. Okamoto, and H. Fujii, J. Phys. Soc. Jap. **25**, 1734 (1968).

⁴¹H. Fujiwara, N. Tsukiji, N. Yamate, and E. Tatsumoto, J. Phys. Soc. Jap. **23**, 1176 (1967).

⁴²H. Fujiwara, J. Sci. Hiroshima Univ. **31**, 177 (1967).

⁴³J. A. Cohen, thesis (University of Illinois, 1968) (unpublished).

⁴⁴W. B. Holzapfel, J. A. Cohen, and H. G. Drickamer, Phys. Rev. **187**, 657 (1969).

⁴⁵H. S. Möller and H. G. Drickamer, J. Phys. Chem. Solids **32**, 745 (1971).

⁴⁶*Constitution of Binary Alloys*, 2nd ed., edited by M. Hansen (McGraw-Hill, New York, 1958), p. 491.

⁴⁷W. H. Southwell, D. L. Decker, and H. B. Vanfleet, Phys. Rev. **171**, 354 (1968).

⁴⁸P. Debrunner, R. W. Vaughan, A. R. Champion, J. A. Cohen, J. A. Moyzis, and H. G. Drickamer, Rev. Sci. Instrum. **37**, 1310 (1966).

⁴⁹D. N. Pipkorn, C. K. Edge, P. Debrunner, G. DePasquali, H. G. Drickamer, and H. Frauenfelder, Phys. Rev. **135**, A1604 (1964).

⁵⁰E. A. Perez-Albuern, K. F. Forsgren, and H. G. Drickamer, Rev. Sci. Instrum. **35**, 29 (1964).

⁵¹B. L. Chrisman and T. A. Tumolillo, Comput. Phys. Commun. **2**, 322 (1971).

⁵²R. S. Preston, S. S. Hanna, and J. Heberle, Phys. Rev. **128**, 2207 (1962).

⁵³C. E. Violet and D. N. Pipkorn, J. Appl. Phys. **42**, 4339 (1971).

⁵⁴M. H. Rice, R. G. McQueen, and J. M. Walsh, in *Solid State Physics*, edited by F. Seitz and D. Turnbull (Academic, New York, 1958), Vol. 6, p. 1.

⁵⁵The compressibility is expected to have an anomaly around $T = T_c$, since it is a second derivative of the thermodynamic potential and should thus be discontinuous at a second-order phase-transition critical point [K. P. Belov, *Magnetic Transitions* (Consultants Bureau, New York, 1961), pp. 1 and 2]. From the data of Ref. 38 on the alloy $\text{Pd}_{0.795}\text{Ni}_{0.205}$ it appears that the difference in volume compressibilities of the paramagnetic and ferromagnetic phases is of order $\Delta\kappa \sim 0.3 \times 10^{-4}/\text{kbar}$, the paramagnetic phase being the more compressible. If applied to the present alloys, this figure implies a difference in V/V_0 of $\sim 0.6\%$ at 200 kbar between an alloy which is ferromagnetic and one which is not. Since the over-all volume changes here are of order 10% at 200 kbar, the above effect is negligible.

⁵⁶D. H. Martin, *Magnetism in Solids* (MIT, Cambridge, Mass., 1967).

⁵⁷J. S. Smart, *Effective Field Theories of Magnetism* (Saunders, Philadelphia, Pa., 1966).

⁵⁸D. H. Anderson, Solid State Commun. **4**, 189 (1966).

⁵⁹K. J. Duff and T. P. Das, Phys. Rev. B **3**, 2294 (1971).

⁶⁰V. Jaccarino, L. R. Walker, and G. K. Wertheim, Phys. Rev. Lett. **13**, 752 (1964).

⁶¹H. Callen, D. Hone, and A. J. Heeger, Phys. Lett. **17**, 233 (1965).

⁶²D. Hone, H. Callen, and L. R. Walker, Phys. Rev. **144**, 283 (1966).

⁶³J. G. Dash, B. D. Dunlap, and D. G. Howard, Phys. Rev. **141**, 376 (1966).

⁶⁴T. A. Campbell, J. Phys. C **3**, 2151 (1970).

- ⁶⁵This point has been demonstrated experimentally for Fe^{57} in PdFe in Ref. 23.
- ⁶⁶D. L. Raimondi and G. Jura, *J. Appl. Phys.* **38**, 2133 (1967).
- ⁶⁷D. H. Martin, in Ref. 56, p.10.
- ⁶⁸J. M. Leger, C. Susse, and B. Vodar, *Solid State Commun.* **5**, 755 (1967).
- ⁶⁹J. D. Litster and G. B. Benedek, *J. Appl. Phys.* **34**, 688 (1963).
- ⁷⁰R. E. Watson and A. J. Freeman, *Phys. Rev.* **123**, 2027 (1961); Fig. 2.
- ⁷¹T. Moriya, in *Theory of Magnetism in Transition Metals*, edited by W. Marshall (Academic, New York, 1967), p. 206.
- ⁷²M. F. Collins and J. B. Forsyth, *Philos. Mag.* **8**, 401 (1963).
- ⁷³L. R. Walker, G. K. Wertheim, and V. Jaccarino, *Phys. Rev. Lett.* **6**, 98 (1961).
- ⁷⁴*Mössbauer Effect Data Index, 1958-1965*, edited by A. H. Muir, Jr., K. J. Ando, and H. M. Coogan (Interscience, New York, 1966), p. 26.
- ⁷⁵J. A. Cohen (unpublished).
- ⁷⁶H. G. Drickamer, R. L. Ingalls, and C. J. Coston, in *Physics of Solids at High Pressures*, edited by C. T. Tomizuka and R. M. Emrick (Academic, New York, 1965), p. 313.
- ⁷⁷A. D. C. Grassie, G. A. Swallow, G. Williams, and J. W. Loram, *Phys. Rev. B* **3**, 4154 (1971).
- ⁷⁸Reference 46, pp. 491 and 697.
- ⁷⁹Reference 46, pp. 486 and 678.
- ⁸⁰A. Kussmann and K. Jessen, *J. Phys. Soc. Jap. Suppl.* **17**, 136 (1963).
- ⁸¹H. Fujimori and H. Saito, *J. Phys. Soc. Jap.* **20**, 293 (1965).
- ⁸²S. K. Sidorov and A. V. Doroshenko, *Phys. Status Solidi* **16**, 737 (1966).
- ⁸³The anomalous behavior of $T_c(x)$ for PdFe could be associated with the existence of an ordered phase Pd_3Fe at $x = 0.25$. It is not clear at present whether a similarly ordered phase Pd_3Co exists in PdCo [Y. Matsuo and F. Hayashi, *J. Phys. Soc. Jap.* **28**, 1375 (1970)]. Whatever the reason for the unusual curvature of $T_c(x)$ in PdFe , the conclusion remains that the *nondilute* PdFe and PdCo alloys indeed have different magnetic properties.
- ⁸⁴E. I. Kondorsky and V. L. Sedov, *J. Appl. Phys. Suppl.* **31**, 331 (1960).
- ⁸⁵D. R. Rhiger and R. Ingalls, *Phys. Rev. Lett.* **28**, 749 (1972).
- ⁸⁶J. B. Goodenough, *Magnetism and the Chemical Bond* (Interscience, New York, 1963), p. 329.
- ⁸⁷R. C. Wayne and L. C. Bartel, *Phys. Lett. A* **28**, 196 (1968).
- ⁸⁸If the suppression of $T_c(x)$ in PdFe relative to PdCo is due primarily to the chemical ordering of Pd_3Fe near $x = 0.25$ and not to invar effects, then the present results imply that pressure stabilizes the ordered phase Pd_3Fe relative to the disordered phase $\text{Pd}_{0.75}\text{Fe}_{0.25}$.
- ⁸⁹C. W. Christoe, A. Forster, and W. B. Holzapfel, *Z. Phys.* **31**, 263 (1971).
- ⁹⁰S. Alexander and P. W. Anderson, *Phys. Rev.* **133**, A1594 (1964).
- ⁹¹T. Moriya, *Prog. Theor. Phys.* **33**, 157 (1965).
- ⁹²M. Inoue and T. Moriya, *Prog. Theor. Phys.* **38**, 41 (1967).
- ⁹³S. H. Liu, *Phys. Rev.* **163**, 472 (1967).
- ⁹⁴R. Ingalls, H. G. Drickamer, and G. DePasquali, *Phys. Rev.* **155**, 165 (1967).
- ⁹⁵It should be noted that measurements of $T_c(p)$ by Fe^{57} Mössbauer thermal scanning do yield direct information on the properties of the host which, neglecting relaxation phenomena, are not complicated by impurity effects [cf. Eqs. (2) and (4)].