

## 4.4.2. Caesium

In caesium the Fermi surface is appreciably distorted (see table 12). According to Ham's calculations the Fermi surface of caesium distorts under pressure, thereby causing those parts of the surface near the zone boundaries to get nearer. This could then account for the minimum in the resistivity-pressure curve illustrated in figure 7. The general idea is that the distortion of the Fermi surface enhances the probability of umklapp processes; presumably this effect eventually overrides that due to the diminishing amplitude of the lattice vibrations and other effects which tend to reduce the resistivity. (Hasegawa has shown that this kind of explanation can account for the anomalous pressure dependence of  $\rho_i$  in lithium.) However, as we emphasized earlier, there could be changes in the anisotropy of the phonon spectrum which would have a similar effect. To find out which effect is more important we need further experiments to find out both how the Fermi surface and how the elastic constants change with pressure.

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## REFERENCES

- Bailyn, M. 1960 *Phys. Rev.* **120**, 381.  
Bailyn, M. & Brooks, H. 1956 *Bull. Amer. Phys. Soc.* **1**, 300.  
Bardeen, J. 1937 *Phys. Rev.* **52**, 688.  
Bloch, F. 1928 *Z. Phys.* **52**, 555.  
Bloch, F. 1930 *Z. Phys.* **59**, 208.  
Bridgman, P. W. 1923 *Proc. Amer. Acad. Arts Sci.* **58**, 149.  
Bridgman, P. W. 1925 *Proc. Amer. Acad. Arts Sci.* **60**, 385.  
Bridgman, P. W. 1952 *Proc. Amer. Acad. Arts Sci.* **81**, 165.  
Bross, H. & Holz, A. 1963 *Physica Stat. Sol.* **3**, 1141.  
Cohen, M. H. & Heine, V. 1958 *Adv. Phys.* **7**, 395.  
Collins, J. G. & Ziman, J. M. 1961 *Proc. Roy. Soc. A*, **264**, 60.  
Daniels, W. B. 1960 *Phys. Rev.* **119**, 1246.  
Darby, J. K. & March, N. H. 1964 *Proc. Phys. Soc.* **84**, 591.  
Dugdale, J. S. 1961 *Science, N.Y.* **134**, 77.  
Dugdale, J. S. & Guban, D. 1960 *Proc. Roy. Soc. A*, **254**, 184.  
Dugdale, J. S. & Guban, D. 1962 *Proc. Roy. Soc. A*, **270**, 186.  
Dugdale, J. S. & Guban, D. 1963 *J. Sci. Instrum.* **40**, 28.  
Greene, M. P. & Kohn, W. 1965 *Phys. Rev.* **137**, A 513.  
Guntz, A. & Broniewski, W. 1909 *J. Chim. Phys.* **7**, 464.  
Hackspill, L. 1910 *C.R. Acad. Sci., Paris*, **151**, 305.  
Hackspill, L. 1911 *C.R. Acad. Sci., Paris*, **152**, 259.  
Ham, F. S. 1962 *Phys. Rev.* **128**, 82, 2524.  
Hasegawa, A. 1964 *J. Phys. Soc. Japan*, **19**, 504.  
Justi, E. 1948 *Ann. Phys., Lpz.* **3**, 183.  
Kelly, F. M. & MacDonald, D. K. C. 1953 *Canad. J. Phys.* **31**, 147.  
MacDonald, D. K. C. 1952 *Phil. Mag.* **43**, 479.  
MacDonald, D. K. C. & Mendelsohn, K. 1950 *Proc. Roy. Soc. A*, **202**, 103.  
MacDonald, D. K. C., White, G. K. & Woods, S. B. 1956 *Proc. Roy. Soc. A*, **235**, 358.

- McLennan, J. C., Niven, C. D. & Wilhelm, J. O. 1928 *Phil. Mag.* **6**, 672.  
Martin, D. L. 1965 *Phys. Rev.* **139**, A150.  
Meissner, W. & Voigt, B. 1930 *Ann. Phys., Lpz.* **7**, 761.  
Nash, H. C. & Smith, C. S. 1959 *J. Phys. Chem. Solids*, **9**, 113.  
Okumura, K. & Templeton, I. M. 1962 *Phil. Mag.* **7**, 1239.  
Okumura, K. & Templeton, I. M. 1963 *Phil. Mag.* **8**, 889.  
Okumura, K. & Templeton, I. M. 1965 *Proc. Roy. Soc. A*, **287**, 89.  
Shoenberg, P. & Stiles, P. J. 1964 *Proc. Roy. Soc. A*, **281**, 62.  
Smith, P. A. & Smith, C. S. 1964 *Bull. Amer. Phys. Soc.* **9**, 238.  
Stager, R. A. & Drickamer, H. G. 1963 *Phys. Rev.* **132**, 124.  
Stewart, A. T., Donaghy, J. J., Kusmiss, J. H. & Rockmore, D. M. 1964 *Bull. Amer. Phys. Soc.* **9**, 238.  
Woods, A. D. B., Brockhouse, B. N., March, R. H., Stewart, A. T. & Bowers, R. 1962 *Phys. Rev.* **128**, 1112.  
Ziman, J. M. 1954 *Proc. Roy. Soc. A*, **226**, 436.  
Ziman, J. M. 1959 *Phil. Mag.* **4**, 371.