III. References

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2. P. W. Bridgman, Proc. Am. Acad. Arts Sci. 70, 93-94 (1935).

3. P. W. Bridgman, Phys. Rev. 27, 68 (1926).

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IV. Discussion

A. Expressions for n^*

The results of the pressure measurements show two important features. First, for the elements lithium, sodium, potassium, and rubidium the value of n^* decreases as the pressure increases. Second, in cesium n^* goes through a minimum as the pressure increases.

In Sec. I, Eq. (I-13), we saw that for a warped, nearly spherical, Fermi surface of the type described by Eq. (I-4) and for an isotropic scattering time $\tau(\vec{k}) = \tau(E)$, n^* is always greater than unity. Increases in the absolute values of the warping parameters, r and t, cause n^* to increase. If we consider the Fermi surface to be nearly spherical at atmospheric pressure and to distort under pressure, as is suggested by Ham's calculations, then n^* is initially unity and increases with increasing pressure. As our data cannot be fitted on this model we may consider the possibility that the surface is already warped at atmospheric pressure and that one of the warping parameters increases in absolute magnitude with increasing pressure while the other decreases in such a manner as to decrease n^*. The energy vs. k curves obtained by Ham are in most cases identical for the 100 and 111 directions for all lattice constants; this condition fixes the ratio of the warping parameters and eliminates the possibility that they change in opposite directions. The magnitude of the warping parameters obtained from Ham's work increases as the lattice constant is decreased from the atmospheric pressure value. This is shown later for an expansion of the wave vector, rather than energy, in fourth-and sixth-order Kubic harmonics; as far as the change in the magnitude of the warping coefficients is concerned the two expansions are similar. We are thus unable to fit the experimental data with a theory that considers only warping of the Fermi surface in the sense of Eq. (I-4).

We now consider the effect on the value of n^* of anisotropic scattering times, $\tau(\vec{k})$ and warped Fermi surfaces. This involves the evaluation of integrals of energy derivatives and scattering times over the Fermi surface; explicit expressions for these integrals are given by Wilson [1]. The work involved in evaluating them is considerable; fortunately, Cooper and Raimes have evaluated them for the case of anisotropic scattering times and warped Fermi surfaces that are described by Kubic harmonics [2,3]. These