ung model is chosen to have
ting the long-range coulomb
e of the form of the coulomb
s r_0 and to be constant inside
e Friedel sum rule. It is thus
suitable radius.
obtained for each metal at
olume alters the Fermi level,
ing radius.
individual screened ion. In
netal (either solid or liquid),
d; the resistivity is then cal-
or appropriate to this array.
resistivity is then as follows
tructure factor):

$$\frac{k_B T}{)^2} \tag{46}$$

$$(\eta_{l-1} - \eta_l) \tag{47}$$

Boltzmann's constant, e the
. It is therefore clear that the
t already discussed and that
be evaluated as:

$$\sigma_R \tag{48}$$

- and N-processes, have been
lly retained, by means of the
he scattering potential. Now

vary with volume for Li, K
inant throughout. In K, the
le, although the d phase shift
ressions. In Cs, the d phase
nt, from the outset and its

The physical origin of these effects can perhaps be understood as follows. In the free ion the possible electron states are bound levels, of which some are occupied. The occupied levels are the X-ray levels; above these are unoccupied levels, and transitions of an electron from one of these to another gives rise to the characteristic atomic spectrum of the element.

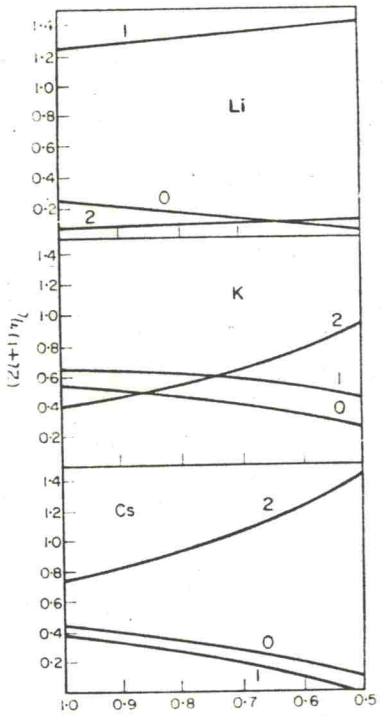

FIG. 25. Phase shifts in Li, K and Cs and the functions of relative volume. (From Dickey *et al.*, 1967.)

In the metal the X-ray levels remain filled. On the other hand, the outermost electron (in a monovalent metal there is just one of these per atom) forms part of the gas of conduction electron which, for simplicity, is here treated as a Fermi–Dirac gas of free particles confined to the volume of the metal. These particles in the Fermi gas screen the ion and, because of this, all the electron levels of the free ion are raised in energy. This in turn causes the unoccupied levels to lie in the continuum of levels available to the electron gas (cf. Fig. 26).