The screening in the Dickey–Meyer–Young model is chosen to have the simplest form consistent with eliminating the long-range coulomb field of the ion. It is therefore chosen to be of the form of the coulomb potential of a single charge outside a radius r_0 and to be constant inside this radius. r_0 is then chosen to satisfy the Friedel sum rule. It is thus equivalent to spherical shell of charge of suitable radius.

In this way a set of phase-shifts, η_l is obtained for each metal at several different volumes. A change in volume alters the Fermi level, as mentioned above, and also the screening radius.

So far the calculation is for a single individual screened ion. In order to calculate the properties of the metal (either solid or liquid), a suitable array of these ions is assembled; the resistivity is then calculated on the basis of a structure factor appropriate to this array. The relevant expression for the electrical resistivity is then as follows (based on a Debye model to deduce the structure factor):

$$\varrho = \frac{2^{2/3}(\hbar k_F)^3 \sigma_R k_B T}{e^2 M (k_B \theta)^2} \tag{46}$$

where:

$$\sigma_R = (4\pi/k_F^2) \sum_l l \sin^2(\eta_{l-1} - \eta_l) \tag{47}$$

Here θ is the Debye temperature, k_B Boltzmann's constant, e the electronic charge and k_F the Fermi radius. It is therefore clear that the expression (46) has the same form as that already discussed and that the parameter K introduced earlier can be evaluated as:

$$K = \frac{2^{2/3}(\hbar k_F)^3 \sigma_R}{k_B e^2} \tag{48}$$

All details of the phonon spectrum, U- and N-processes, have been left out. The feature that has been carefully retained, by means of the phase-shift calculation, is the detail of the scattering potential. Now let us look at the results.

Figure 25 shows how the phase shifts vary with volume for Li, K and Cs. In Li, the p phase shift is dominant throughout. In K, the s, p and d phase shifts are all comparable, although the d phase shift tends to dominate at the highest compressions. In Cs, the d phase shift is important, though not dominant, from the outset and its importance increases with compression.