By definition = 0, so that taking the average of Eq. (42b), we have

where an average of the terms on the right is unnecessary since in the energy range 0 to 3 Mev the intervals over which averages are to be taken are small compared to the widths of single-particle resonances. Using the weighting function in Eq. (7), we have for the left-hand side of Eq. (43a)

where in the last step we have substituted , Eq. (41a), 2 and replaced the summation by an integration. *1/D* is the density of C levels, that is, the number of levels per unit interval which is assumed to be large in the region of interest. is the average width. The imaginary part of Eq. (43b) is which is called the “strength function”. Assuming that is real at low energies, Eqs. (25), and noting that we have by equating the imaginary parts of Eq. (43a) the values of the strength function

In the special case that the incident energy is in the neighborhood of the resonant energy of the complex optical potential, the summation on the right-hand side of Eq. (44a) can be replaced by a single term provided that the single-particle resonances are sufficiently sep arated. The strength function can then be approximated by the following formula

which has the Lorentz shape.

To calculate the total cross section , (Eq. (11c)), it is necessary to determine . At low energies , and if the incident energy is in the neighborhood of , we have from Eq. (28)

so that the total cross section

It is clear from Eq. (45b) that the energy-averaged total cross section has a giant resonance for incident energy which is small and in the neighborhood of the resonant energy .