Letters to the Editor

Comments on Temperature-Dependent Intermediate Neutron Resonance Integrals

Recently Goldstein[1] has proposed a new method for the temperature-dependent treatment of intermediate neutron resonance integrals; however, the interference scattering between potential and resonance was completely ignored in this method. Another method[2] was developed for determining the IR parameters used in the intermediate neutron resonance absorption. With the method[2] the interference scattering between potential and resonance can be readily taken into account and a set of exact IR-parameters can also be obtained. The following conclusions[2-5] had been drawn:

1. For a practical problem, the interference scattering between potential and resonance is extremely important not only for the calculation of the resonance integral itself, but also for the temperature-dependence.

2. When the interference scattering is neglected, the temperature-dependence of the IR parameters is not so important. This is the same result drawn by McKay and Pollard[6] and Seghal.[7]

3. When the interference scattering is taken into consideration, the exact resonance integral is not always between $I_1^{(1)}$ and $I_0^{(1)}$. Hence, the IR parameters should be considered to represent the deviation from the limiting *NR* and *WR* extremes and be permitted to exceed the range between zero and unity.

Therefore, this author believes that any method without the interference scattering between potential and resonance cannot be very powerful for the calculation of the resonance absorption, probably except for very high energy region.

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Reply to "Comments on Temperature-Dependent Intermediate Neutron Resonance Integrals"

Reference is made to the accompanying remarks of Ishiguro[1] concerning an earlier paper on neutron resonance integrals.[2]

One of the main advantages of the intermediate resonance (IR) approximation is that it gives simple, concise results, which may be evaluated analytically.

Much of this advantage is lost by a procedure which requires numerical methods for the determination of the IR parameters.

The analytic extension of the temperature-dependent intermediate resonance formulation to include interference scattering is desirable. However, there are cases in which interference scattering is not significant, yet the temperature dependence of the IR parameters is important.

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