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REMARKS ON A NOTE BY F. S. LOS' "PHASE OF A SCATTERED WAVE"[1]

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LOS' has considered the equation

$$\frac{d^2 G}{d\rho^2} + \left[1 - \frac{l(l+1)}{\rho^2} - U(\rho)\right] G = 0 \qquad (1)$$

and asserts that "it is necessary to find a solution of Eq. (1) which assumes the following form as $\rho \to 0$

$$G = A_0 \rho^{l+1} \qquad (2)$$

and the following asymptotic form at large values of ρ

$$G = \text{const} \cdot \sin(\rho - \pi l/2 + \delta_l); \quad \delta_l = \text{const} \ldots\text{»} \qquad (3)$$

It should be noted that under the condition $\int^{\infty} U(\rho)\, d\rho < C$, given in the author's note, when $\rho \to \infty$, $G(\rho)$ cannot assume the asymptotic form given in (3). The case $\int^{\infty} |U(\rho)|\, d\rho < C$ is considered in Courant and Hilbert[2] where the same system of equations is obtained, using the method employed by Los'. Equations (6) and (7) given by Los' correspond to Eq. (56) and (57) in Courant and Hilbert.

In Ref. 2, a proof is given for the asymptotic formula (3) which is more detailed than that given in the note by Los'; in this proof it is not shown that $A(\rho) \to$ const. when $\rho \to \infty$ in Eq. (4).

For $\rho \to 0$, Los' has obtained expressions for $\delta(\rho)$ and $A(\rho)$ to which the following remarks apply:

1. It is not meaningful to express $\delta(\rho)$ in terms of $\int_0^{\rho} \rho\gamma(\rho)\, d\rho$ since in the approximation which is used only the first terms of the series $\gamma(\rho) = \gamma_0 + \gamma_1\rho + \ldots$ should be retained
2. The constant coefficients in (2) and in the expression for $A(\rho)$ are denoted by the same symbol — A_0. These coefficients differ by a factor of $l + 1$.
3. Even if these errors are ignored, it should be noted that the title of the note does not reflect its contents.

The use of the supplementary condition (5) is valid for $\rho \to \infty$, when $A(\rho) \to$ const and $\delta(\rho) \to$ const. However, when $\rho \to 0$, in place of (5) any other supplementary condition can be used. The different supplementary conditions correspond to different phases $\delta(\rho)$. The problem becomes indeterminant. By the definition of the phase of a scattered wave it follows that the phase $\delta(\rho)$ found by means of such an additional condition is not the phase of the scattered wave.

Thus, in the form in which it has been published the note given by F. S. Los' is not useful for an analysis of scattering and can only introduce confusion on the part of the reader.

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SECOND MOMENT OF THE PARAMAGNETIC ABSORPTION CURVE WHEN THE SPIN MAGNETISM IS NOT PURE

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IN Refs. 1 — 5, equations were given for the second moment $\langle \nu^2 \rangle$ of the curve $f(\nu)$ of paramagnetic absorption in the absence of a static magnetic H_0, and for the second moment $\langle (\Delta\nu)^2 \rangle$ of the