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The Scattering of X-Rays by Camphor

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controlled velocity. In accordance with some earlier observations by Dr. J. A. Eldridge, it is found that the lines divide into two classes. In one class the intensity of the line increases uniformly from zero to a certain limit as the velocity of the electrons increases above the minimum exciting velocity. In the other class the intensity rises rapidly to a maximum at a velocity not far above the minimum exciting velocity, and then decreases to a certain limit. The lines which have so far been found to be in the first class are: $2p_2$-2S, $2p_2$-$4d_2$, 2P-mD (m = 5, 6, 7, 8), $2p_2$-$3d_2$, $2p_1$-$3d_2$; $2p_2$-4D: and in the second class; $2p_1$-3s, $2p_3$-2s, $2p_1$-4s, 2P-4S, $2p_1$-$4d_1$, $2p_1$-$3d_1$.

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ELECTRICTY AND MECHANICS

JOHN A. ELDRIDGE

When electric charges are in motion the forces between them differ from the electrostatic forces. The magnetic concept is used to take account of these non-electrostatic forces. The magnetic effect of a moving charge is relative to the electrostatic extremely small except when the velocity approaches that of light. However due to the circumstance that the electrostatic effects often, as in a wire carrying a current, practically cancel, the magnetic forces are very important.

According to our present beliefs any field of force changes in an analogous manner if it be moved. There is theoretically the same excuse for speaking of a magnetic field about a moving mass as a moving charge. The difference is that in this latter case the discrepancy from the gravitostatic force is not of practical importance.

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THE SCATTERING OF X-RAYS BY CAMPHOR

ROGER M. MORROW

(ABSTRACT)

The ionization chamber method of analysis was used. A Soller slit placed between the scattering material and the x-ray tube, gives a wide beam of nearly parallel rays; one placed between the

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scattering material and the ionization chamber limits the angle of divergence of the rays and yet permits a wide beam to enter the ionization chamber. Thus a large sample of material could be used thereby increasing the intensity without any sacrifice of resolving power.

The following spacings were found for camphor:

Crystalline camphor at room tempertature	10.2 A.U.	6. A.U.	5.6 A.U.
Crystalline camphor above 100°C.........	10.2 A.U.	6. A.U.	......
Liquid camphor.........................	11.6 A.U.	6.4 A.U.	......

The change in structure found for crystalline camphor agrees with crystallographic data. The change in spacing from solid to liquid agrees with that calculated from the densities of the two states. The scattering curve for the liquid state is strikingly similar to that for the crystalline state. It seems that the structure responsible for the scattering of x-rays is the same in both states.

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FOURIER ANALYSIS OF THE FLOW OF ELECTRICITY IN FLAT PLATES

C. LEONARD ALBRIGHT

A Fourier analysis of the flow of electricity in a two-dimensional plate depends upon the solution of Laplace's equation in two dimensions. The problem considered in this paper is that of a rectangular plate, the potential being applied at two adjacent sides. The results of the experiment depended upon the finding of the equipotential lines. This was done by means of a dish forty centimeters wide and fifty centimeters long. Copper strips were placed on two adjacent sides. An ordinary storage battery was used as a source. The lines were then found by exploring the dish with the terminals of a D'Arsonval galvanometer. The lines of flow are then found to be at right angles to these equipotential lines.

In order to check on these equipotential lines and thus locate the lines of flow, a Fourier integral was set up under the conditions of the problem and then integrated. The result is an equation for the equipotential lines. This is,

$$V = \frac{b}{\pi}\left[\tan^{-1}\frac{b-y}{x} - \tan^{-1}\frac{b+y}{x} + 2\tan^{-1}\frac{x}{y}\right]$$
$$-\frac{a}{\pi}\left[\tan^{-1}\frac{y-x}{y} - \tan^{-1}\frac{y+x}{y} + 2\tan^{-1}\frac{y}{x}\right]$$