X-Rays and Optics

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have not been successful. Simple explanation is, however, found in the assumption that the X-rays consist of rapidly moving particles which we may call photons which are deflected by electrons. On this view when a photon bounces from an electron the electron recoils leaving the photon with less energy than before. This reduction in energy corresponds to an increase in wave-length which is found to be in exact accord with experimental measurements.

When this theory was first proposed no electrons recoiling from scattered X-rays were known, but they were discovered by Wilson and Bothe within a few months after their prediction. Now we know that the number, energy and spatial distribution of these recoil electrons are in accord with the predictions of the photon theory. The final test of the theory consisted in following a photon after its collision with one electron until it collided with a second. Photographs showing the paths of the electrons recoiling from such a photon made it possible to follow its path and to show that energy and momentum were conserved when it collided with the first electron. Unless there is some fault with this experiment it would seem to show definitely that the X-rays consist of minute particles.

Waves or Corpuscles?

Thus we see that as a study of the scattering of radiation is extended into the very high frequencies of X-rays, the manner of scattering changes. For the lower frequencies the phenomena could be accounted for in terms of waves. For these higher frequencies we can find no interpretation of the scattering except in terms of the deflection of corpuscles or photons of radiation. Yet it is certain that the two types of radiation, light and X-rays, are essentially the same kind of thing. We are thus confronted with the dilemma of having before us convincing evidence that radiation consists of waves, and at the same time that it consists of corpuscles.

It is these changes in the laws of optics when extended to the realm of X-rays which have been in large measure responsible for the recent revision of our ideas regarding the nature of the atom and of radiation.

Science News-Letter, December 17, 1927

PHYSICS

Latest Nobel Laureate

(Picture of Prof. Compton on Page 387)

When it comes to winning Nobel prizes in physics, few, if any, institutions can equal the record of the Ryerson Laboratory of Physics at the University of Chicago. The first came in 1907 to Prof. A. A. Michelson. Then, in 1923, Prof. R. A. Millikan received the prize, after he had left Chicago to go to the Norman Bridge Laboratory in Pasadena, but for work done at the Ryerson Laboratory.

Now, the third award comes with the announcement that Dr. Arthur H. Compton shares the prize this year with Prof. C. T. R. Wilson, of Cambridge University. It is very appropriate that these two should be paired, for it is Prof. Wilson's method of photographing the tracks of moving atoms by their trail of fog that Dr. Compton has employed in his work.

Dr. Compton belongs to a physical family, for his older brother, Prof. Karl T. Compton, professor of physics at Princeton, is also one of America's leading physicists.

It was in Wooster, Ohio, that Dr. Compton first saw the light of day on September 10, 1892, and it was from Wooster University that he graduated in 1913 with a B. S. After graduate work at Princeton and teaching and research work at Wooster, Princeton, Minnesota, the Westinghouse research laboratory and Washington University, St. Louis, Dr. Compton became professor of physics at Chicago, where he is actively at work. This year he is vice-president of the American Association for section B, a position which his brother held in 1925.

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