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Nobel Prize in Physics 1918

Max Karl Ernst Ludwig Planck

The Nobel Prize in Physics 1918 was awarded to Max Planck *"in recognition of the services he rendered to the advancement of Physics by his discovery of energy quanta"*.

RESEARCH INFORMATION:

The Royal Academy of Sciences has decided to award the Nobel Prize for Physics, for the year 1918, to Geheimrat Dr. Max Planck, professor at Berlin University, for his work on the establishment and development of the theory of elementary quanta.

From the time that Kirchhoff enunciated the principle "that the intensity of radiation from a black body is dependent only upon the wavelength of the radiation and the temperature of the radiating body, a relationship worth while investigation", the theoretical treatment of the radiation problem has provided a rich, fertile source of fresh discoveries. It is only necessary here to recall the fertile Doppler principle, and further, the transformation of our - concept of the nature of light as seen now in the electromagnetic theory of light formulated by that great man, Maxwell, the deduction of Stefan's Law by Boltzmann, and Wien's Law of Radiation. Since it was clear, however, that this did not correspond exactly with the reality, but was rather, like a radiation law propounded by Lord Rayleigh, only a special case of the general radiation law, Planck sought for, and in

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1900 found, a mathematical formula for the latter, which he derived theoretically later on. The formula contained two constants; one, as was demonstrated, gave the number of molecules in a gram molecule of matter. Planck was also the first to succeed in getting, by means of the said relation, a highly accurate value for the number in question, the so-called Avogadro constant. The other constant, the so-called Planck constant, proved, as it turned out, to be of still greater significance, perhaps, than the first. The product *hv*, where *v* is the frequency of vibration of a radiation, is actually the smallest amount of heat which can be radiated at the vibration frequency *v*. This theoretical conclusion stands in very sharp opposition to our earlier concept of the radiation phenomenon. Experience had to provide powerful confirmation, therefore, before Planck's radiation theory could be accepted. In the meantime this theory has had unheard-of success. The specific heat of substances, Stokes' Law for phosphorescence and fluorescence phenomena and the photoelectric effect provide, as Einstein has first suggested, most powerful support for Planck's radiation theory as against the older, usual concept. A still greater triumph was enjoyed by Planck's theory in the field of spectral analysis, where Bohr's basic work, the work of Sommerfeld and Epstein, and other complementary efforts provided an explanation for the enigmatic laws ruling within this part of science. Recently, basic physico-chemical phenomena, such as the effect of temperature upon speed of reaction and the heat of reaction, have also had a new light shed upon them as a result of the work of W.C. McCullagh, Lewis, Perrin and others, using Planck's theory.

Planck's radiation theory is, in truth, the most significant lodestar for modern physical research, and it seems that it will be a long time before the treasures will be exhausted which have been unearthed as a result of Planck's genius.

Professor Planck. The Swedish Academy of Sciences has awarded you the Nobel Prize for 1918 in recognition of your epoch-making investigations into the quantum theory. This theory, which was originally connected with black-body radiation, has now demonstrated its validity for other fields and relationships of Nature, and the constant number, named after you, is a proportionality factor which describes a common, but until now unknown,

property of matter. The Academy now begs you, Professor, to receive the prize from the President of the Nobel Foundation.

For more details please visit:

http://www.nobelprize.org/nobel_prizes/physics/laureates/1918/press.html