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Discovery

November 8, 1895: Roentgen's Discovery of X-Rays

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1. INTRODUCTION

Wilhelm Roentgen, a German professor of physics, was the first person to discover electromagnetic radiation in a wavelength range commonly known as X-rays today. Roentgen was the first one to study X-rays systematically. To highlight the unknown nature of his discovery, he called them X-rays though they are still known as Roentgen-rays as well. For his remarkable achievement he was honored with the first Nobel Prize in Physics in 1901.

2. EARLY LIFE

Wilhelm Conrad Roentgen was born on March 27, 1845, at Lennep in the Lower Rhine Province of Germany, as the only child of a merchant in, and manufacturer of, cloth. His mother was Charlotte Constanze Frowein of Amsterdam, a member of an old Lennep family which had settled in Amsterdam. He did not show any special aptitude, but showed a love of nature and was fond of roaming in the open country and forests. In 1862 he entered a technical school at Utrecht. In 1865 he then entered the University of Utrecht to study physics. In 1869 he graduated Ph.D. at the University of Zurich. In 1874 he qualified as Lecturer at Strasbourg University and in 1875 he was appointed Professor in the Academy of Agriculture at Hohenheim in Württemberg. In 1876 he returned to Strasbourg as Professor of Physics, but three years later he accepted the invitation to the Chair of Physics in the University of Giessen.

3. PUBLICATIONS

Roentgen's first work was published in 1870, dealing with the specific heats of gases, followed a few years later by a paper on the thermal conductivity of crystals. Other studies include where the electrical and other characteristics of quartz; the influence of pressure on the refractive indices of various fluids; the modification of the planes of polarised light by electromagnetic influences; the variations in the functions of the temperature and the compressibility of water and other fluids; the phenomena accompanying the spreading of oil drops on water. In 1895 he studied the phenomena accompanying the passage of an electric current through a gas of extremely low pressure. Previous work in this field had already been carried out by J. Plucker (1801-1868), J. W. Hittorf (1824-1914), C. F. Varley (1828-1883), E. Goldstein (1850-1931), Sir William Crookes (1832-1919), H. Hertz (1857-1894) and Ph. von Lenard (1862-1947), and by the work of these scientists the properties of cathode rays - the name given by Goldstein to the electric current established in highly rarefied gases by the very high tension electricity generated by Ruhmkorff's induction coil - had become well known. Roentgen's work on cathode rays led him to the discovery of a new and different kind of rays.

4. DISCOVERY OF X-RAY BEAMS

Wilhelm Roentgen was worked with cathode rays during 1895, before he discovered X-rays. His experiments involved the passing of electric current through gases at extremely low pressure. On November 8, 1895 while he was experimenting, he observed that certain rays were emitted during the passing of the current through discharge tube. His experiment involved working in a totally dark room with a well covered discharge tube resulted in the emission of rays which illuminated a barium platinocyanide covered screen. The screen became fluorescent even though it was placed in the path of the rays, two meters away from discharge tube. He continued his experiments using photographic plate to capture the image of various objects of random thickness placed in the path of the rays. He generated the very first "roentgenogram" by developing the image of his wife's hand and analyzed the variable transparency as showed by her bones, flesh and her wedding ring. Based on his subsequent research and experiments, he declared that X-ray beams are produced by the impact of cathode rays on material objects.

5. X-RADIATION (X-RAY)

X-Ray has extremely short wavelength and high frequency ranging from about 10−8 to 10−12 meter and corresponding frequencies from about 1016 to 1020 hertz (Hz). The frequency of X-rays is higher than the frequency of ultraviolet light but less than that of a gamma ray. X-rays are extensively used in medicine and industry to produce images of internal structures because they are absorbed by many forms of matter, including body tissues.

6. HARMFUL EFFECTS OF X-RAY EXPOSURE

Technicians working closely with X-rays began reporting skin damage, and scientist Thomas Edison made reports of eye irritation from working with X-rays. Other reports include circulate about hair loss, lesions and cancer caused by excessive exposure to X-rays. More efficient equipment and precautionary measures have significantly reduced the potential harm of X-ray machines. According to the Food and Drug Administration, the health risk posed by X-ray machines is fairly small. X-rays are no longer a mystery, but a major tool of medical diagnosis.