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1.1 Discovery of X-ray

When you take an annual comprehensive medical examination like in Japanese schools and companies, radiography (X-ray examination) is used. X-ray was first discovered by German physicist Roentgen in 1895, therefore radiography is often called as Roentgen in Japan. This X-ray is an electromagnetic wave having a wavelength of about 1 \AA ($0.1 \text{ nm} = 100 \text{ pm}$). X-ray was accidentally found by Roentgen, when he noticed that an invisible ray had the ability to expose a photographic dry plate. Since it was an unknown ray, it was named as X-ray from the association of an unknown quantity X in mathematics. Roentgen received the first Nobel Prize in Physics in 1901 for his discovery of X-ray.

1.2 X-ray Generation

Roentgen employed a bulb tube as illustrated in Fig. 1.1 in order to carry out a discharge experiment in vacuum. During this experiment, he noticed that a photographic dry plate was accidentally exposed, and that an unknown ray was emitted from this bulb tube. In this tube, he used a metal block called a target as the anode, and applied a high voltage to irradiate electrons from the cathode into the target. At that time, he found that this target emitted an unknown invisible light of X-ray.

As can be seen from Fig. 1.2, the intensity of the X-ray increases depending on the voltage applied between the anode and the