X-ray imaging

An electron beam is emitted form a heated cathode (filament). This beam is focused and accelerated towards an angled anode (target) called the focal spot. Only around 1 % of the kinetic energy of the electrons is converted into x-ray and the excess heat is dissipated via a heat sink. At the focal spot, X-ray photons are emitted in all direction. There is a small window in the x-ray tube directly above the angled target, allowing the x-ray beam to exit the tube with little attenuation. The beam is projected on a part of the body. This part of the body absorbs part of the beam and a part is transmitted. The more photons pass the blacker the image on transparent film (photograph).



X-ray absorption

1- Differential absorption in body

If an X-ray penetrate the body and are transmitted with no interaction at all, then they affect the film and make a dark on the film. But those X-rays which are absorbed inside the body will not reach the film and do nothing to it. Hence, an X-ray image results from the difference between those X-rays absorbed and those which are not absorbed at all. This is called the differential absorption fig. (6)