

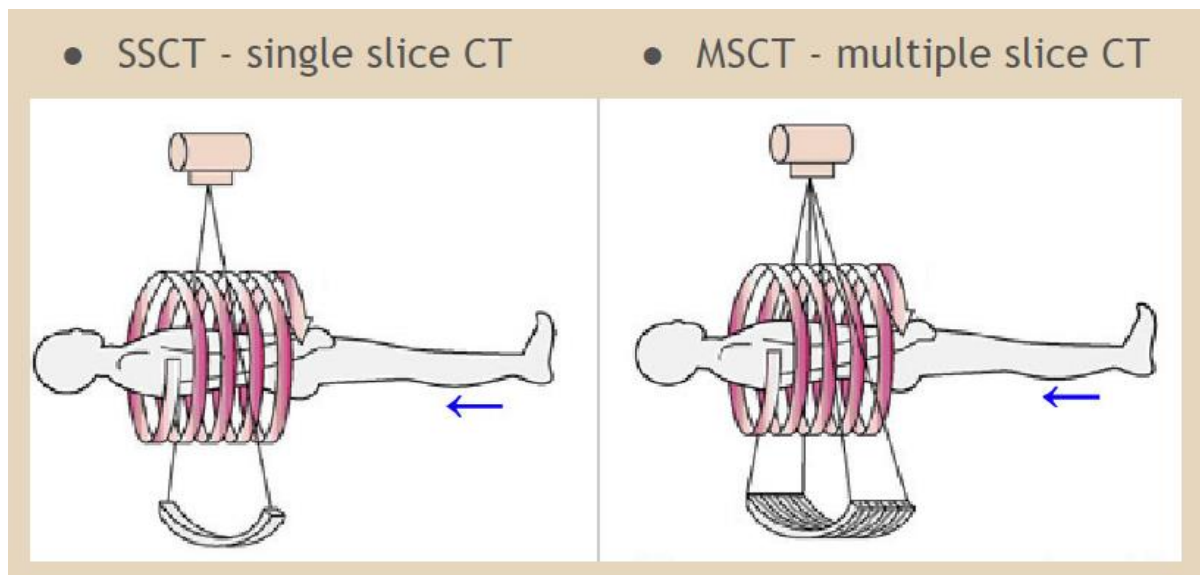
## Computed (Axial) Tomography (CT or CAT scan)

**Tomography** is imaging by sections or sectioning, through the use of any kind of penetrating wave. CT or CAT scans, are special X-ray tests that produce cross-sectional images of the body using X-rays and a computer. CT scans are also referred to as computerized axial tomography.

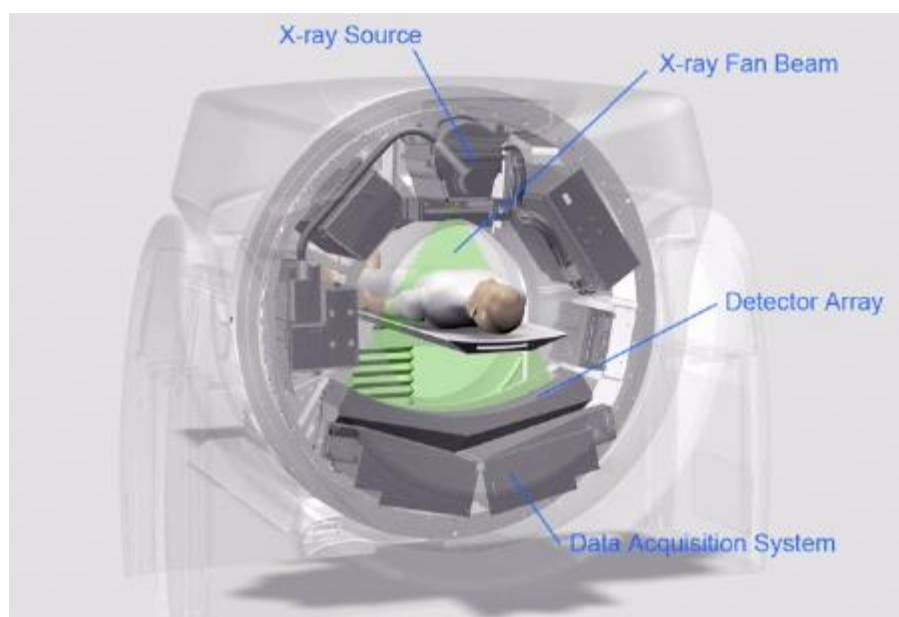
CT was developed independently by a British engineer named Sir Godfrey Hounsfield and Dr. Alan Cormack. For their work, Hounsfield and Cormack were jointly awarded the Nobel Prize in 1979.

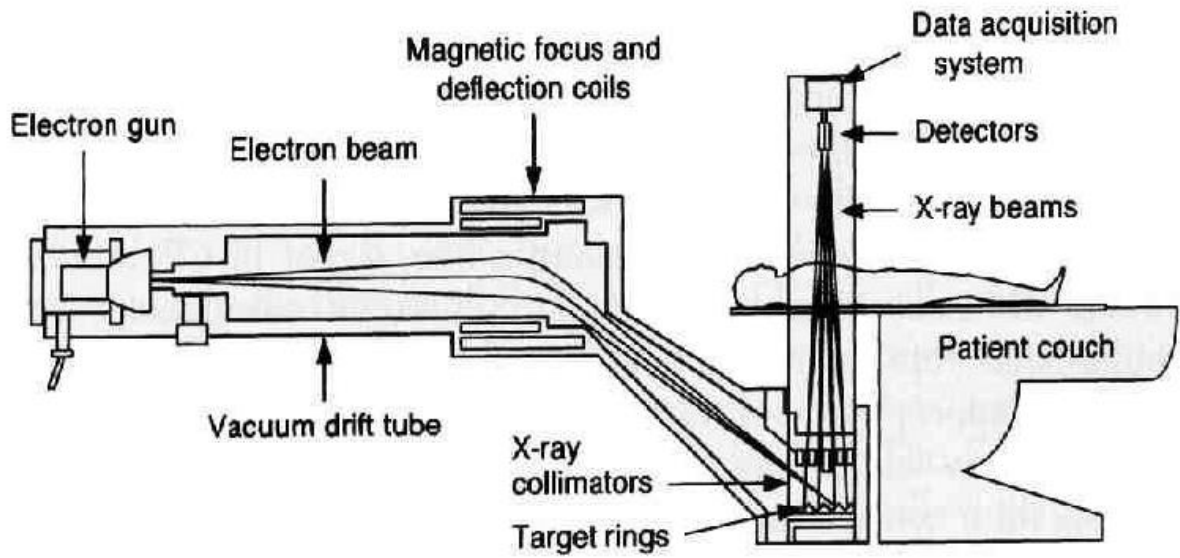
CT is able to image bone, soft tissue and blood vessels all at the same time. It provides the radiologist with details of bony structures or injuries, diagnosing lung and chest problems, and detecting cancers. While it is a painless process, there is X-ray radiation exposure with CT scans. Hence, CT is generally not recommended for pregnant women or children unless absolutely necessary.

CT scans slices of the body at various angles and rotations. With the introduction of the slip ring, electrical power and signals could be transferred without fixed connections, making continuous rotation of the X-ray tube and detectors possible. In spiral CT, or helical CT, the examination table is smoothly moved through the tunnel during the examination. In this way, data is collected in a spiral shaped path allowing much shorter scanning times.

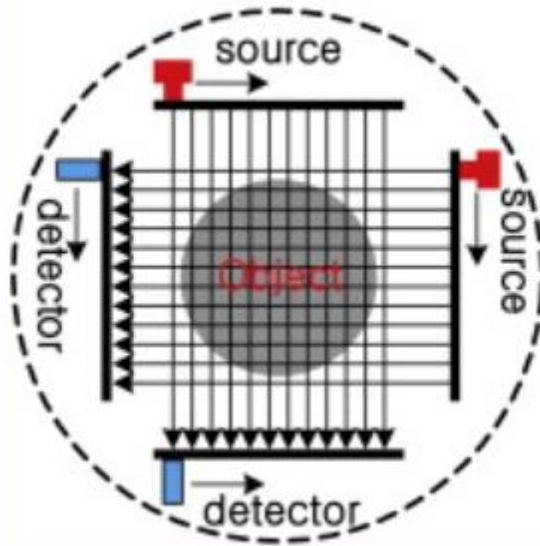


### Basic Structure of CT machine

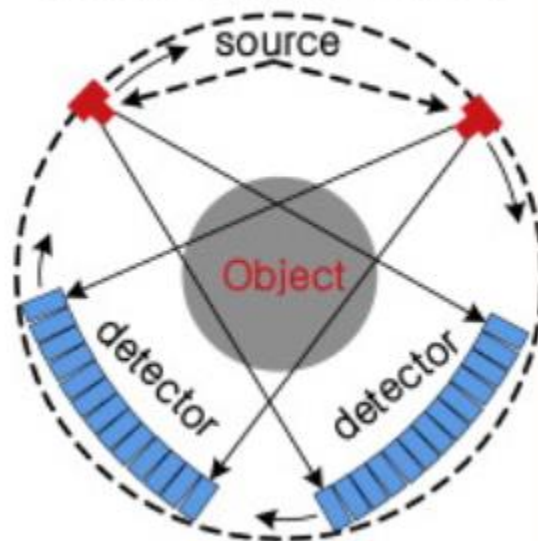




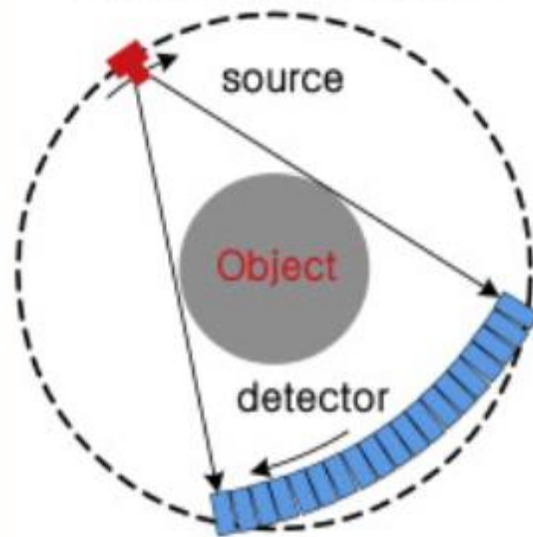
### 1<sup>st</sup> generation scanning



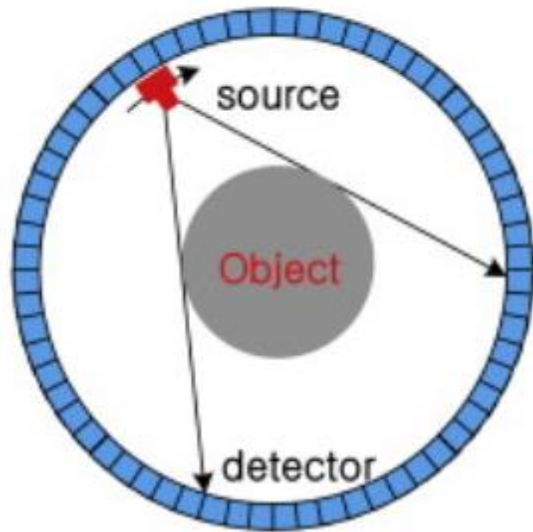
### 2nd generation scanning



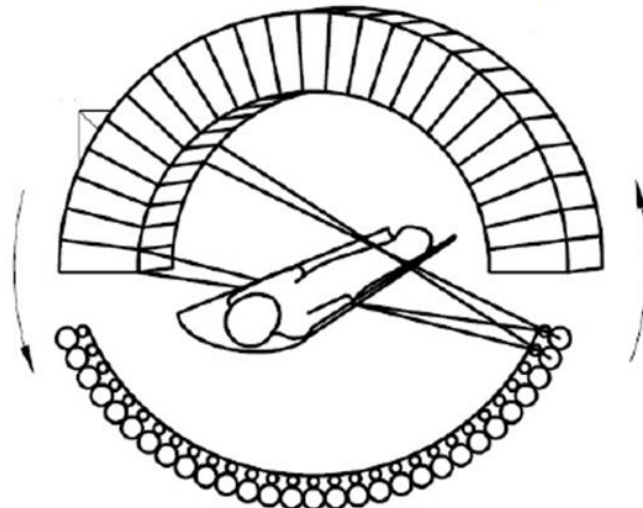
3rd generation scanning



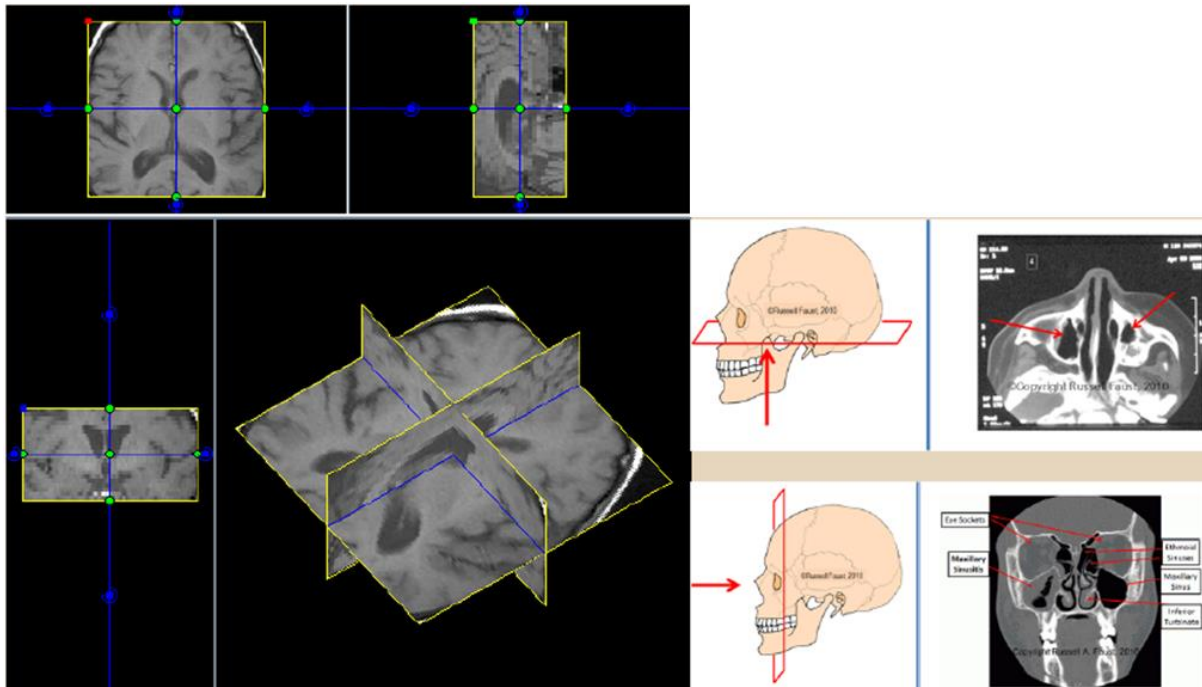
4th generation scanning



5th Generation scanning

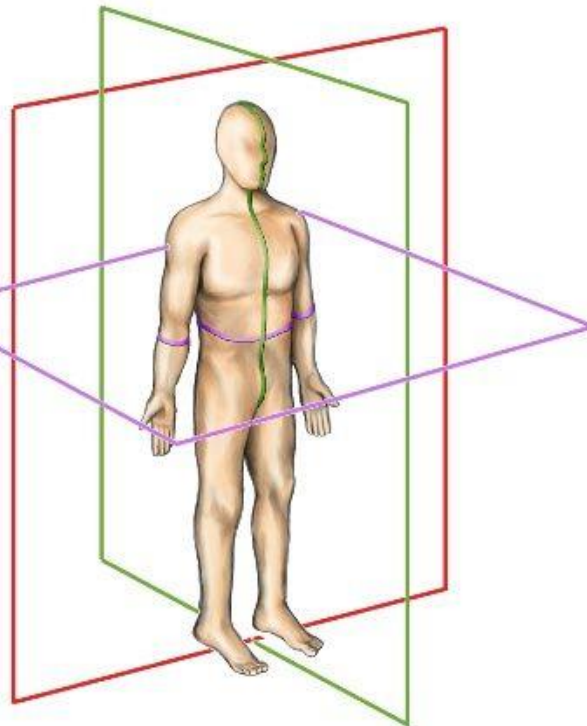


## Image reconstruction:



## Anatomical Planes

- Anatomical position
- Anatomical planes
- **Coronal (Frontal) Plane** divides the body into front and back sections
- **Sagittal Plane** divides the body into left and right sections
  - **Median** - divides the body into equal left and right parts
- **Axial (Horizontal or Transverse) Plane** - divides the body into upper and lower segments



### Comparison between CT, MRI and PET scans

<b>CT Computed Tomography</b>	<b>MRI Magnetic Resonance Imaging</b>	<b>PET Positron Emission Tomography</b>
uses X-rays	uses powerful magnetic fields and radio frequency pulses	uses small amounts of radioactive materials called radiotracers
Looks into anatomy of the human body. Takes detailed pictures of organs, soft tissues, bone and other internal body structures.	Looks into anatomy of the human body. Takes detailed pictures of organs, soft tissues, bone and other internal body structures with more clarity than CT.	Investigates metabolic activity of organs and tissues. Evaluates organ and tissue functions by identifying body changes at the cellular level.