

Belgian Museum of Radiology

Item

Object

Title

Betatron X-ray tube

ObjectDate

1960

MainSpecification

2000 Technology

Specification

2230 X-Ray Tubes

ImageID

639

Number

O-314

**Description**

The betatron, built by D.W. Kerst(1911-1992), is a circular device in which electrons are accelerated by magnetic induction. It has a doughnut-shaped vacuum tube sandwiched between the poles of an electromagnet. Electrons injected into the tube receive a certain acceleration for each completed turn. At a cut-off, the accelerated electrons hit a target and emerge as x-rays. The construction difficulty consisted in making the vacuum tube and in distributing the magnetic field, which must be smooth. The first betatron model worked fine the very first time it was "turned" on, on July 15, 1940.

For its weight of 50 kg, it had a beam with an energy of 2.3 MeV.

This 24 MeV tube built by the Allis-Chalmers Manufacturing Company(USA) was used at the Catholic University of Louvain (KUL) circa 1960.

Now this type of accelerator can produce high-energy electrons up to 340 MeV for research purposes in industry and medicine, including the production of high-energy X-rays.