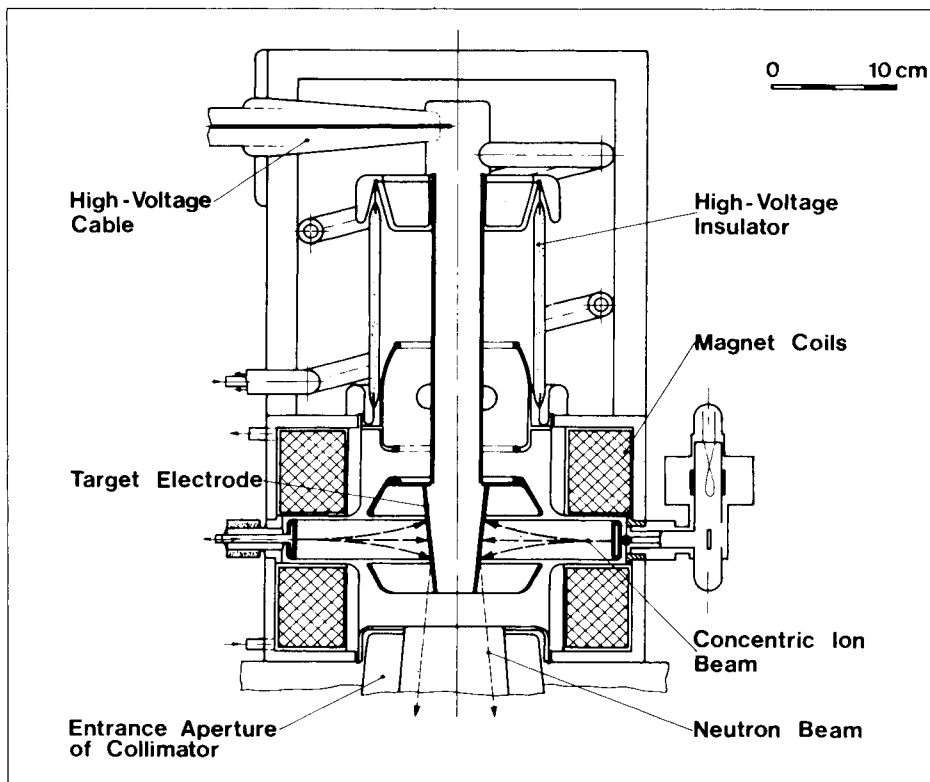




Schematic diagram of KARIN, the intense neutron generator tube, developed at Karlsruhe. A beam of deuterium and tritium ions is accelerated to strike a target giving fusion reactions at such a rate that the tube produces more than 5×10^{12} neutrons per second at 14 MeV.

The neutron generator as marketed by Haefely for use in fast neutron cancer therapy. The generator tube is surrounded by a shielding source head to absorb neutrons not directly directed towards the patient. The generator can be rotated around the patient to achieve irradiations from several directions.

(Photo Haefely)

Tomoscanner

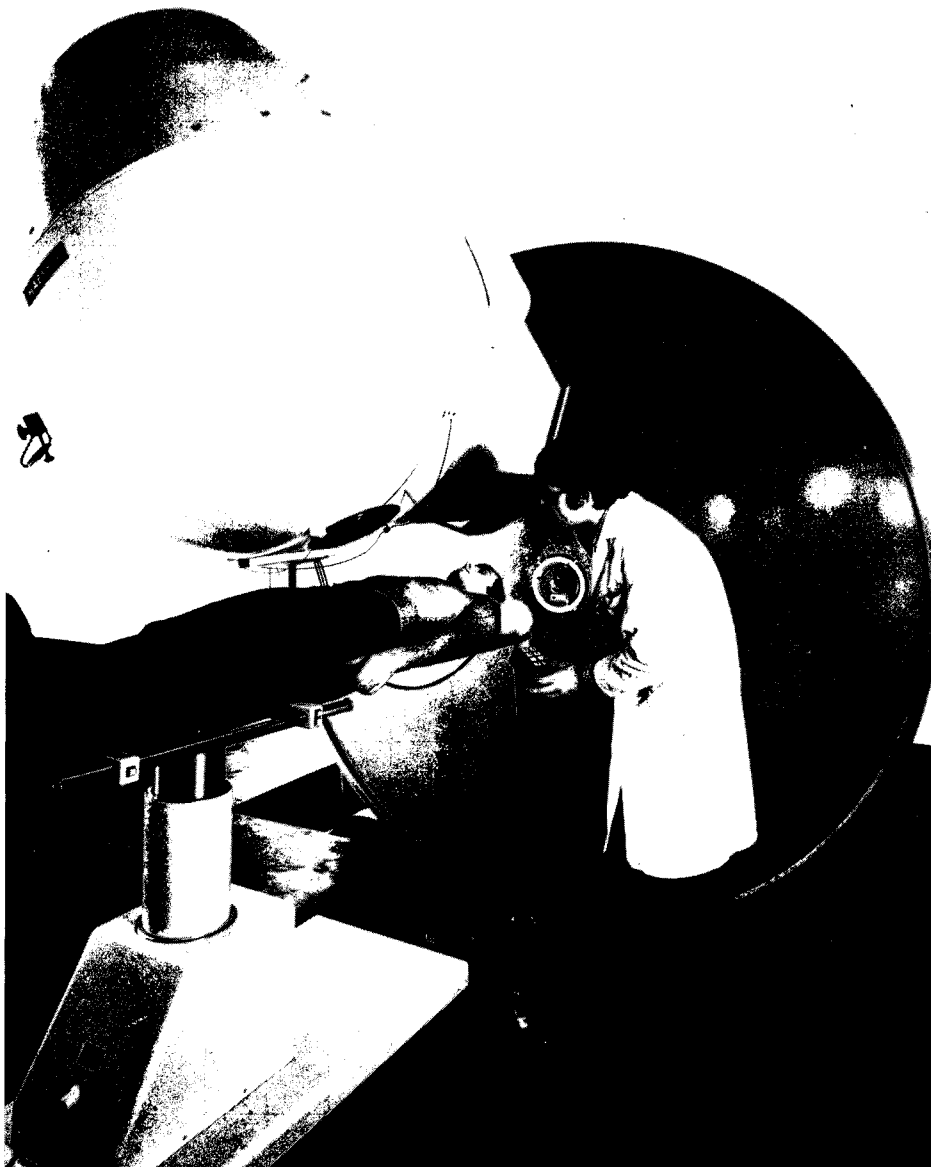
At the end of January, J. and P. Engineering, Reading, UK, announced the availability of the first isotope tomoscanner for medical diagnosis. This adds a new diagnostic technique related to the EMI X-ray scanner, which has been brought into widespread use in recent years.

The X-ray scanner detects abnormalities by measuring variations in X-ray transmission through the body. The new Tomoscanner detects abnormalities by measuring variations in radioactivity from isotopes injected into the body. Like its X-ray antecedent, the Tomoscanner rotates around the region of interest and, via computer calculations, can give information on slices through the region (from the Greek, 'tomos' - slice).

The two techniques can perform many of the same diagnostic investigations but there are abnormalities where each technique has the advantage. For example, the EMI scanner can spot lesions which will not be picked out by the other method; the Tomoscanner can spot some types of tumour which are elusive to the X-ray method. Ideally both techniques would be available.

The Tomoscanner has two detectors which are located on opposite sides of the patient and are moved around, picking up the radiation at different angles. A computer feeds a colour display of the variations in radioactivity from the region being investigated. The whole process normally takes between four and seven minutes.

The design of the Tomoscanner was initiated at Aberdeen Royal Infirmary by W. Keyes and has been developed at J. and P. Engineering by Anthony Bernard and Paul Bradstock. Anthony Bernard said that 'In producing sophisticated medical instruments such as the Tomoscanner, we value very highly the experience gained in





The Tomoscanner in use for the investigation of possible brain tumour. Experience from about a thousand such scans shows that the Tomoscanner can confirm lesions which are equivocal in other scans and can distinguish between cerebral infarcts, subdural and extradural haematoma.

(Photo J. and P. Engineering)

working in research physics establishments, such as CERN. The Tomoscanner is one example of the spin off from modern physics research into other aspects of life.'

The first production machine has been on evaluation at the hospital in Tübingen in Germany and has now moved to the Kantonsspital in Zurich. The first order has been received from the hospital of Essen in Germany and the company hopes that the comparatively low price of the Tomoscanner (£ 65 000) will open a big market in medical diagnosis.

Sitting at present in the HiRise building at Fermilab is this model of the High Intensity Laboratory which is now under construction in the Proton Area. The proton beam entering from the left will hit a heavily shielded target and secondary beams can be drawn off at zero degrees and fed to an underground experimental hall via a beam transport system of superconducting magnets.

(Photo Fermilab)

FERMILAB Progress on High Intensity Laboratory

Construction is proceeding rapidly on the new High Intensity Laboratory in the west branch of the Proton Area at Fermilab. It will permit operation with high intensity pion and other beams and, ultimately, will be able to operate at 1000 GeV with the advent of beams from the Energy Doubler/Saver. Since ground-breaking in the middle of summer 1976, the 240m of beam tunnel and a 70m long experimental hall have been completed. Brad Cox, Head of the Proton Department, who has led the design and construction of this new Laboratory, hopes that the construction phase will be complete in the early summer. At present, the installation of 3000 tons of steel shielding is taking place at the target zone.

The design of the superconducting magnets and helium refrigeration systems for the beam transport into the High Intensity Laboratory is under way in the Proton Department. The magnets will be particularly important in handling 1000 GeV beams. Installation of the first of these magnets will take place in late summer and a 400 GeV beam transport system is scheduled to be in place by the summer of 1978 when the first experiments should begin. At that time it will be possible to draw both neutral and charged particle beams at zero degrees from the proton target. High intensity charged particle beams (up to 10^{10} pions per 10^{13} protons on target) will be provided by the sextupole corrected beam transport system. In addition, experimentation with high quality and high intensity antiproton and electron beams is planned for this new Laboratory.

KARLSRUHE Superconducting quads for SPS experiment

In 1974, CERN and the Laboratories of the GESSS collaboration (Karlsruhe, Rutherford and Saclay) decided not to pursue the development of pulsed superconducting magnets for the SPS. Instead, the Labs. tackled other projects for CERN where superconducting magnets were desirable. It was

