X-Y-STEERER TO SWEEP K=20 ION BEAMS

Werner Konowalczyk, Helmut Knigge, Gerd Wolber
Institute of Radiology, Cyclotron Group, German
Cancer Research Center, D-6900 Heidelberg

To distribute beam current load across the vacuum and entrance foils of our neon-F_2 gas target (Figure 1) and hence raise safety of routine ^{18}F production we installed a magnetic beam sweeper about 3 meters upstream which has proven to increase the life time of the foils appreciably. This is now more than 1000 μA-hrs.

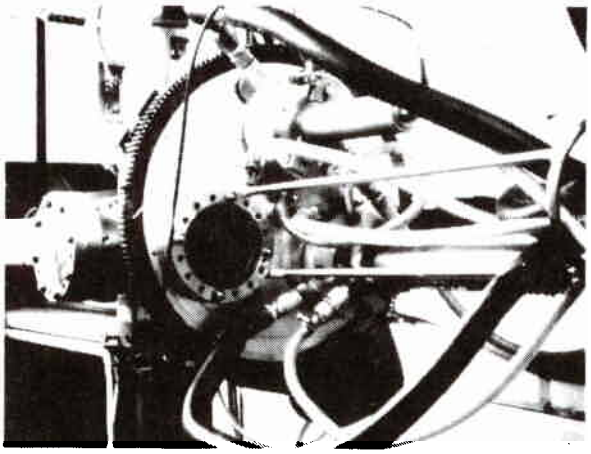

Figure 1 The rotatable target changer at the Heidelberg compact cyclotron supporting two neon gas targets and a quartz screen (left) for routine check of the beam current density.

The stator magnet of a commercial electromotor (model AEG-AM 90 with 90 mm bore and 36 grooves) has got two times two opposed special windings[1] to produce two perpendicular magnetic fields. The magnet currents are supplied by a commercial two channel audio amplifier[2] (Figure 2). The inputs are fed from an adjustable low frequency sine wave generator (7-60 Hz), one of the inputs via a phase shifter. This allows linear, elliptic or circular motion of the beam spot depending on the magnitude and phase difference of the low frequency voltage amplitudes (Figure 3).

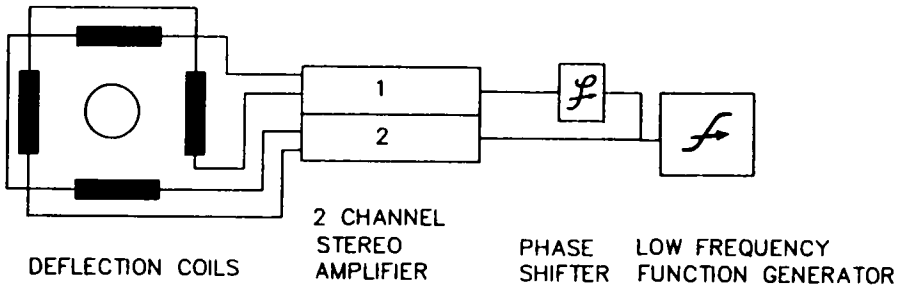

Figure 2 Sketch of the beam steerer assembly.

Generator and phase shifter are of standard design and have been built by our electronic workshop. Details are available on request.

As a result of the high inductance of the soft iron core the maximum amplitude of the elongation decreases markedly above 30 Hz. Nevertheless, the velocity of dislocation of the beam spot seems to be fast enough to provide effective smearing of the heat pattern across the foils.

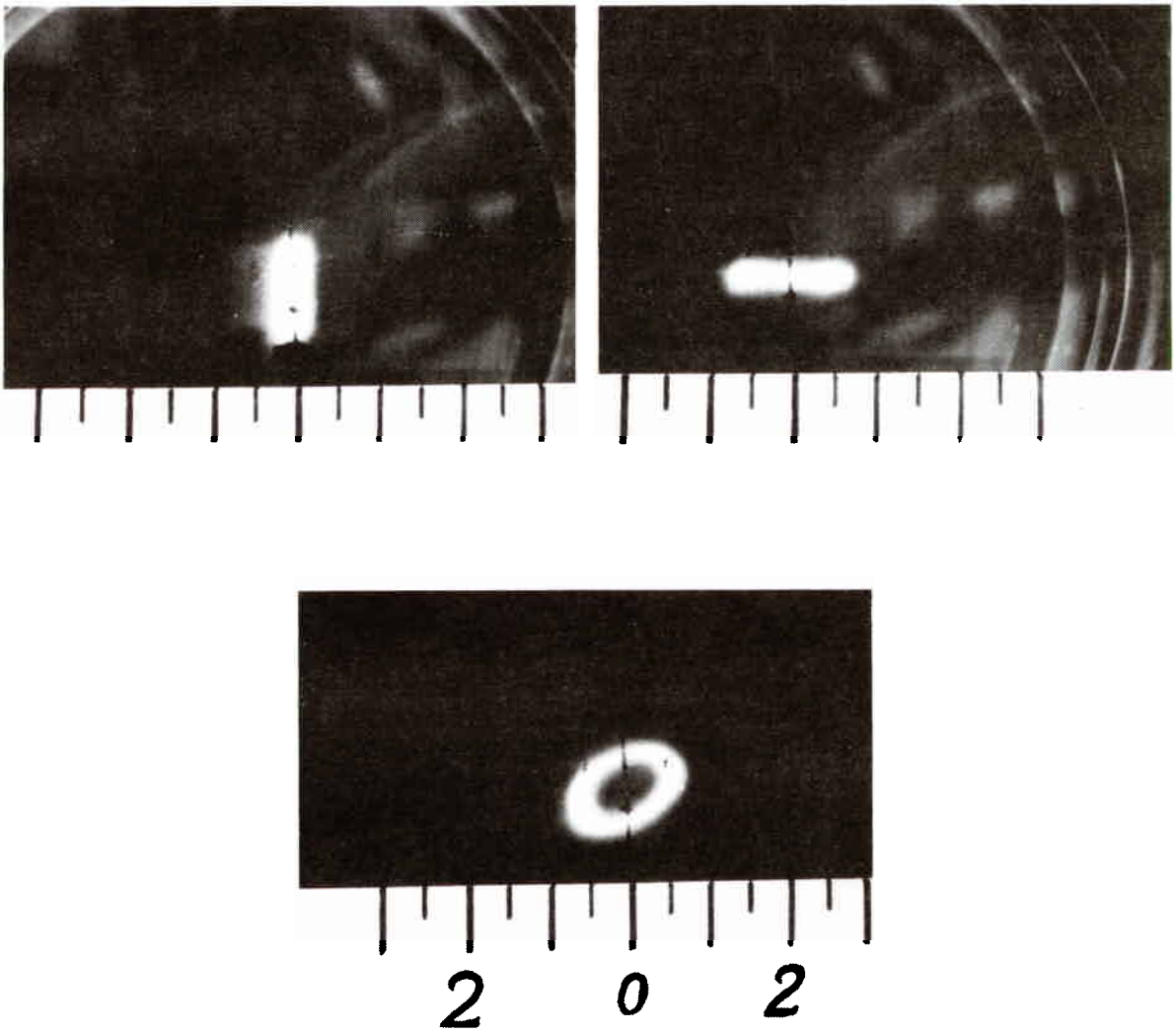

Figure 3 Flourenscence of 11.7 MeV deuteron beam on the quartz screen shown in Figure 1. Heavy bars indicate cm scale. A: horizontal amplitude x=0, B: vertical amplitude y=0, C: x,y>o, phase approx. 60 deg.

REFERENCES

1. H. Liesem, AEG internal report E 333.10.69, 1969. Design drawing will be sent on request.
2. Type DAC-MOS 100-200-300, Supplier: albs - Alltronic Balthasar Schmitt, D-7136 Oetisheim.