JUN FOR THE FEL CLIO

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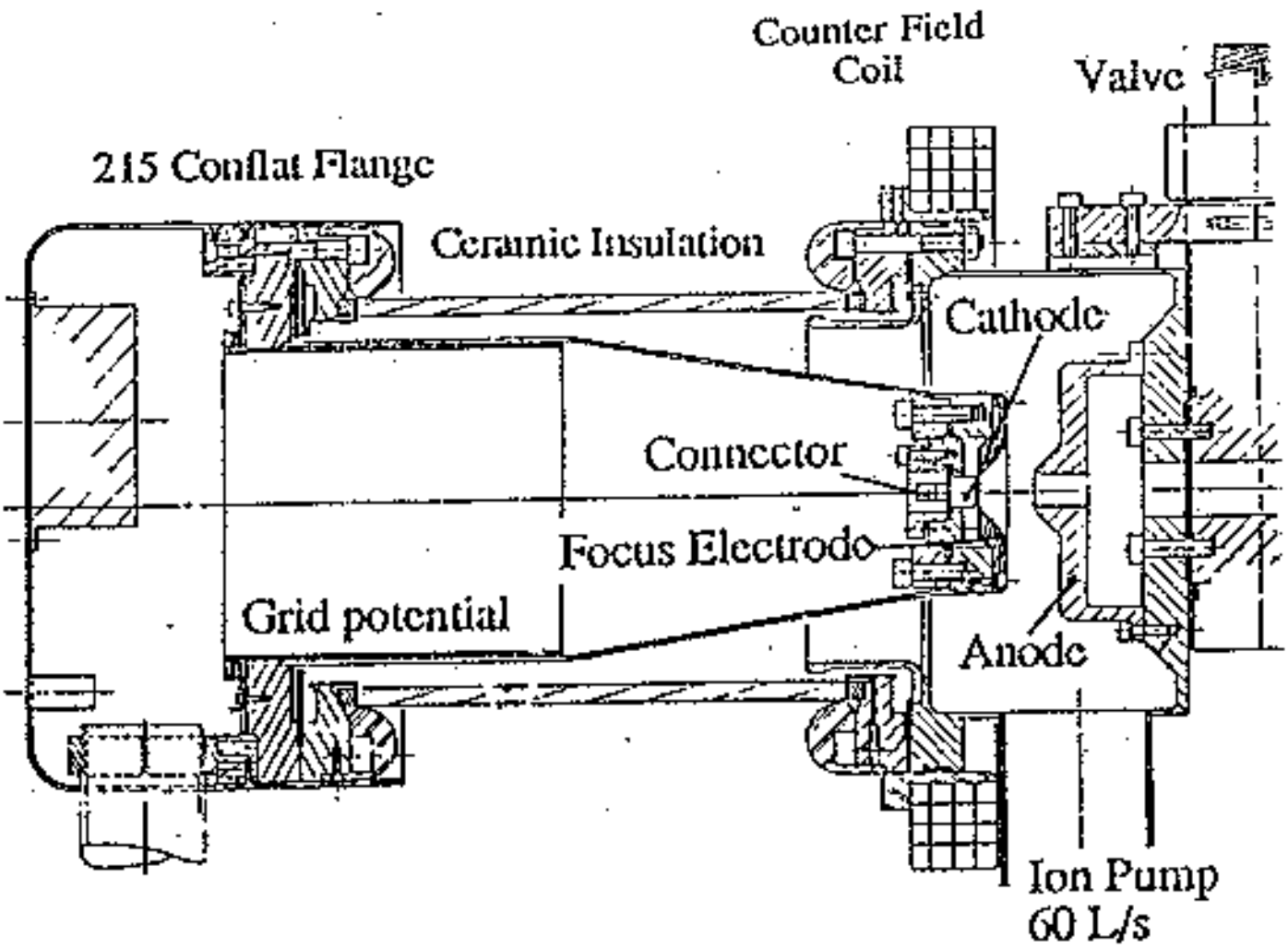


Fig. 1 Structure of the gun assembly

We have roughly evaluated the grid lens effect and finally estimated a normalized emittance $\varepsilon^N \approx 15\ \pi$ mm mrad in

In the same time the grid pulse of adjustable duration is used for doing a window that eliminate the first microsecondes while the power amplifier has small amplitude oscillations.

With a minimum grid bias of -20 V, beam micropulses of 1.5 Amp./1.4 ns were achievied.

Along the 12 µs, the residual macropulse amplitude droop is compensated by an adjustable counter voltage slope applied on the grid up to ± 10 mA/µs.

The average cathode and grid currents are monitored by two currents transformer on their connexions, and measured from the ground level by the way of analogical opto-link.

In the "CW mode" the total charge aimed in the macropulse is 6 µC (0.5 Amp. 12 µs) a 15 nF buffer capacitor in the H.V. supply yields this charge and keep constant the high voltage at 4×10^{-3}. Fig. 3 shows a block diagram of the modulator.

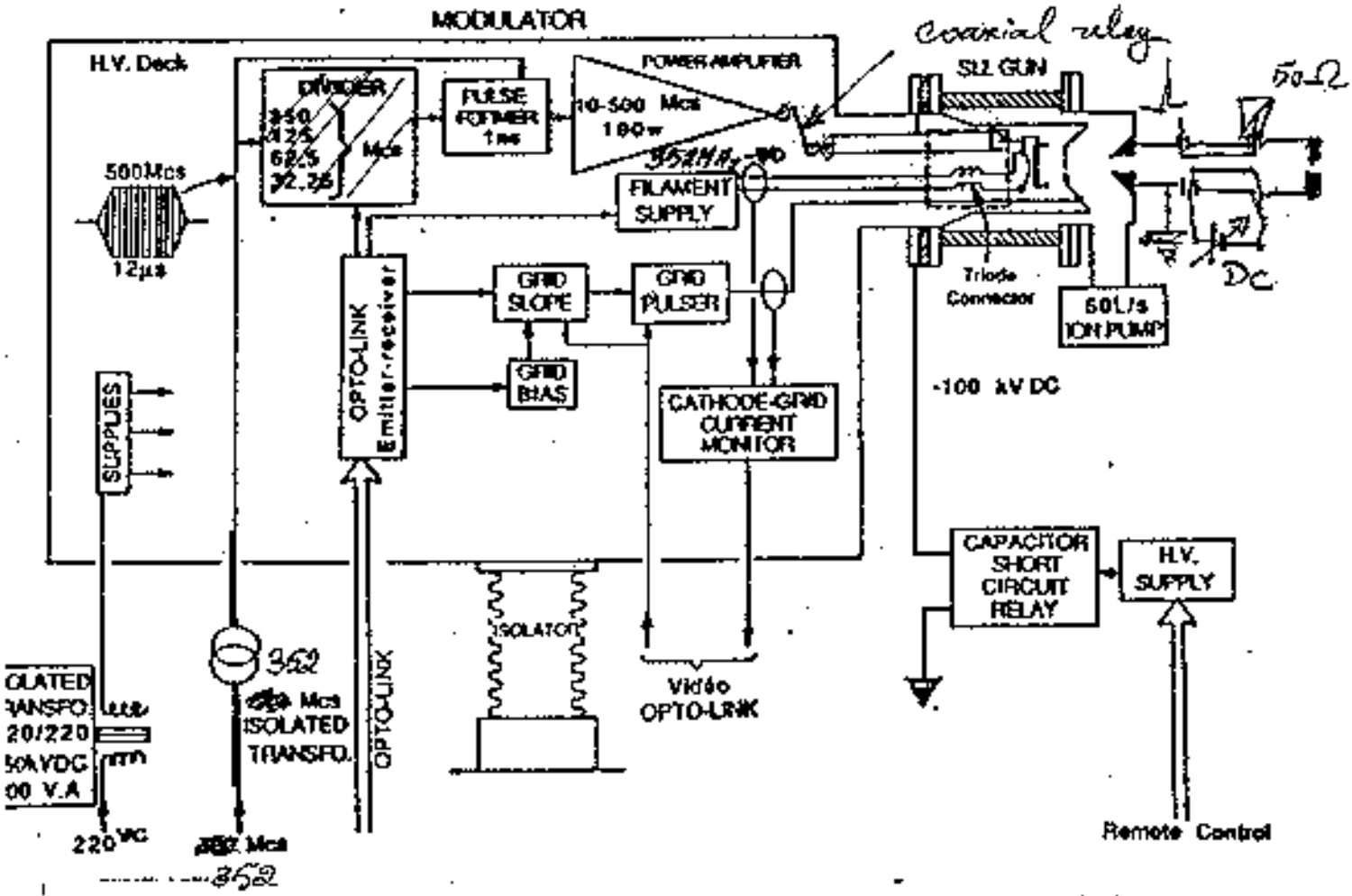


Fig. 3 Block diagram of the high voltage deck modulator

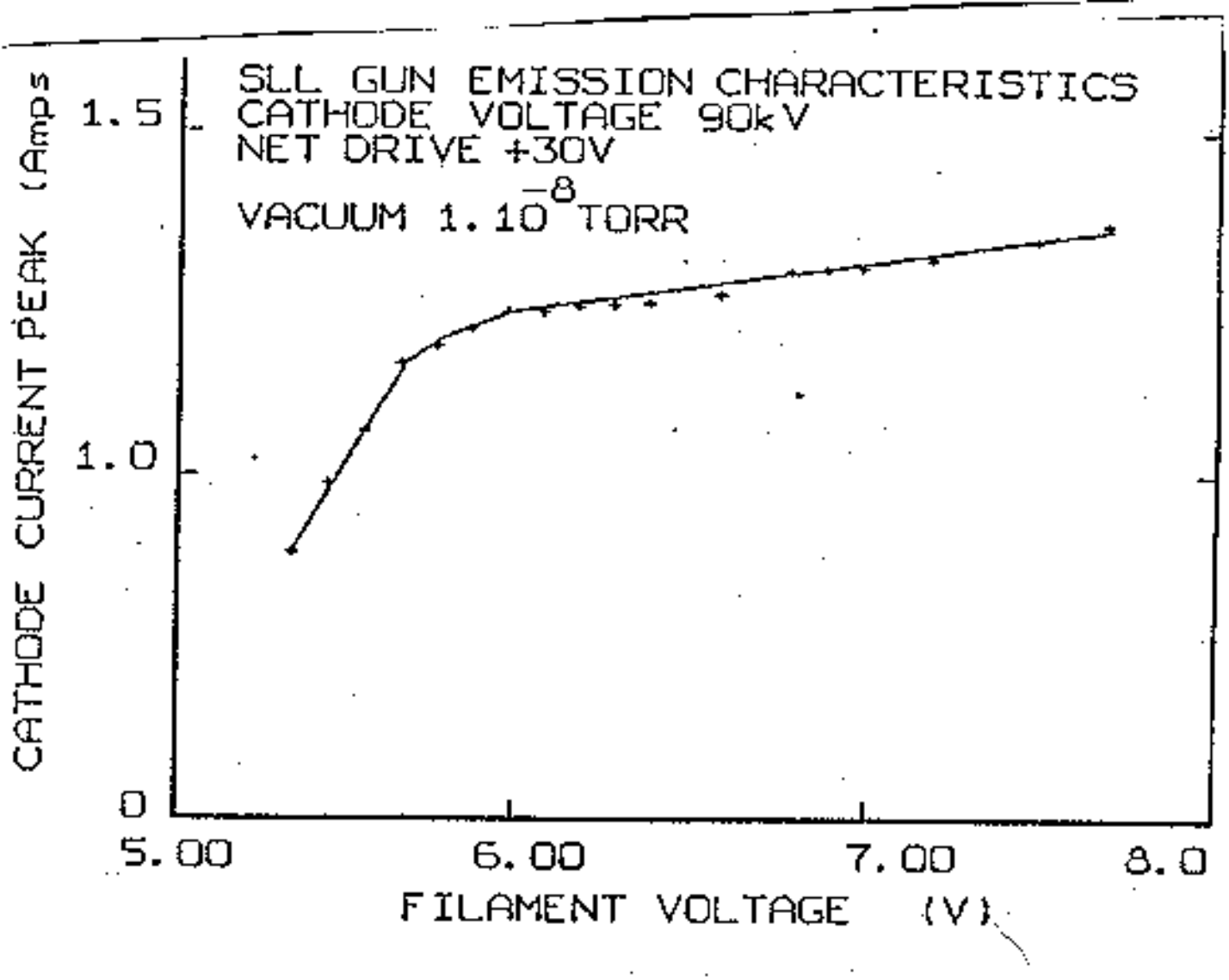


Fig. 4 Emission characteristics of the dispenser cathode Y 646 B

In the space charge rate, the cathode current follows the general equation of triode $I_K = G(Vg + Vp/\mu)^{3/2}$ with an amplification factor $\mu \approx 10^4$ and a perveance $G \approx 5.2 \times 10^{-3}$ A/V$^{3/2}$. The cut off amplification factor is μ C.O. $\approx$ 6600.

The grid interception or screening fraction depends of the grid and anode/cathode voltages for 90 kV anode potential, it increases about linearly with the cathode current from 12% at 0.5 Amp. up to 21% at 2.6 Amp.

The Fig. 5 shows the transfer characteristics in short pulses at filament voltage 6.3 V the maximum anode current available is limited by a perveance of 0.15 μAmp./V$^{3/2}$.

and the anode hole diameter is 8 mm. At the cross over the beam diameter is 2.6 mm. Fig. 2 shows the calculated beam trajectories.

The ceramic isolator is designed to withstand up to 200 kVDC. Each side is brazed on a 215 conflat flange surrounded by anticorona rings. This ceramic isolator was especially manufactured by SCT CERAVER France.

The vacuum chamber is large enough to receive another set of more large electrodes used with the 4796 cathode.

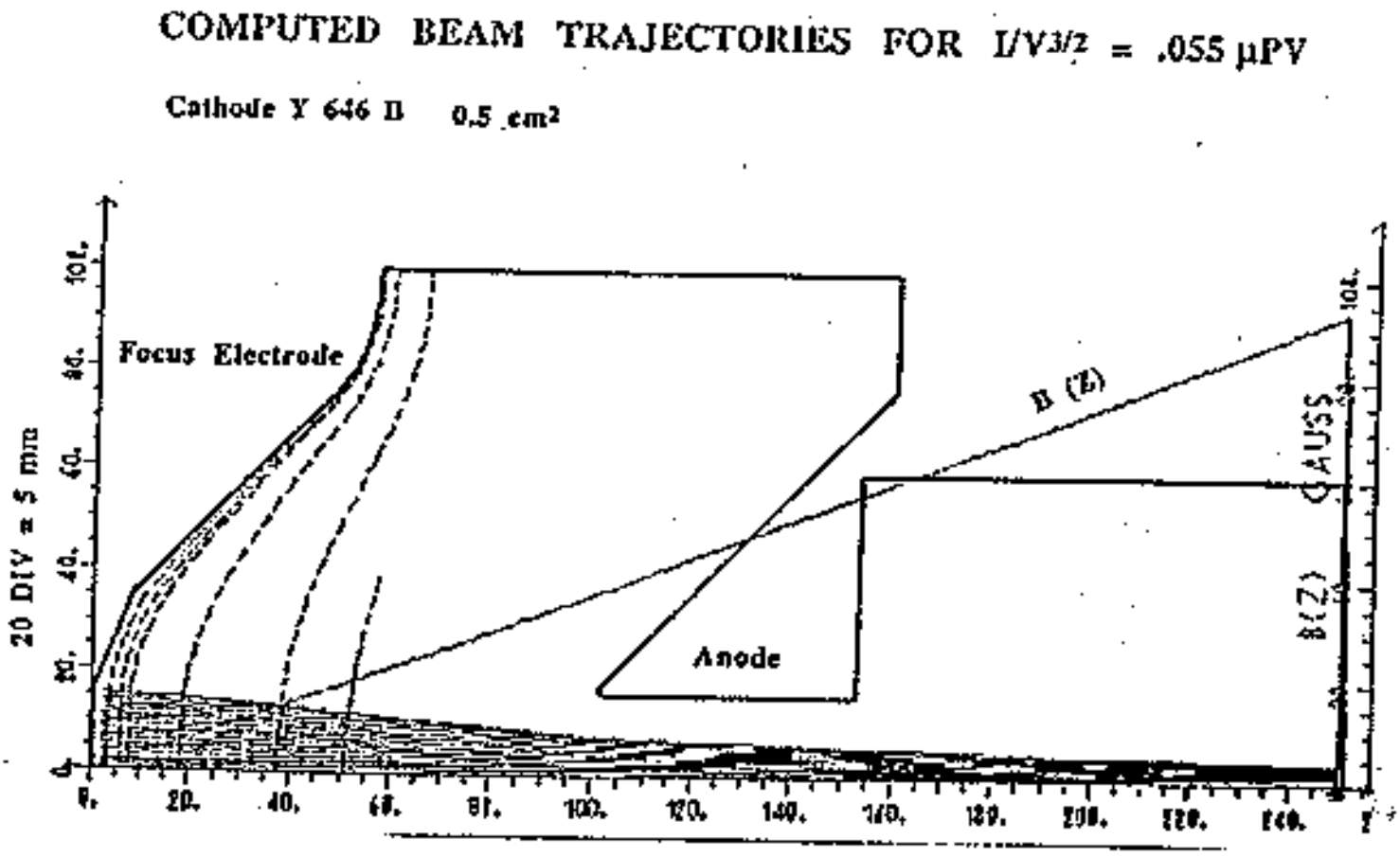
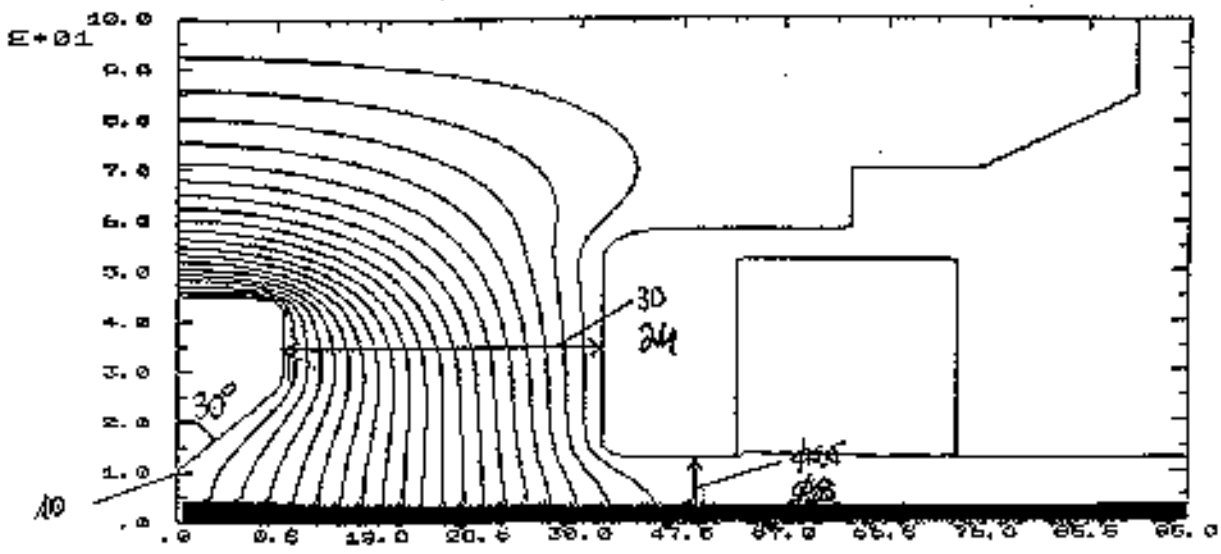


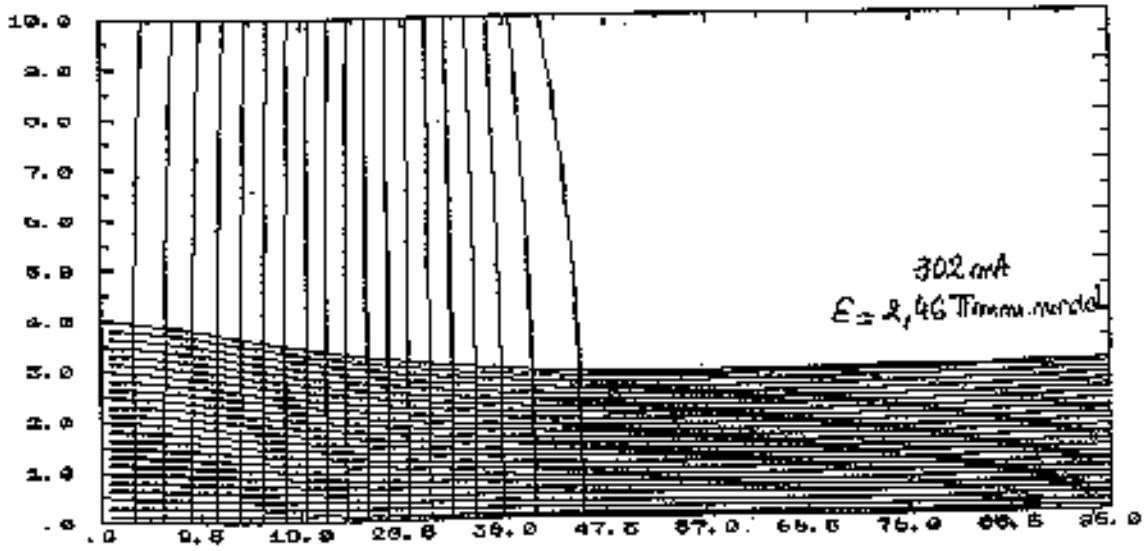
Fig. 2 Computed beam trajectories from the cathode to the cross over

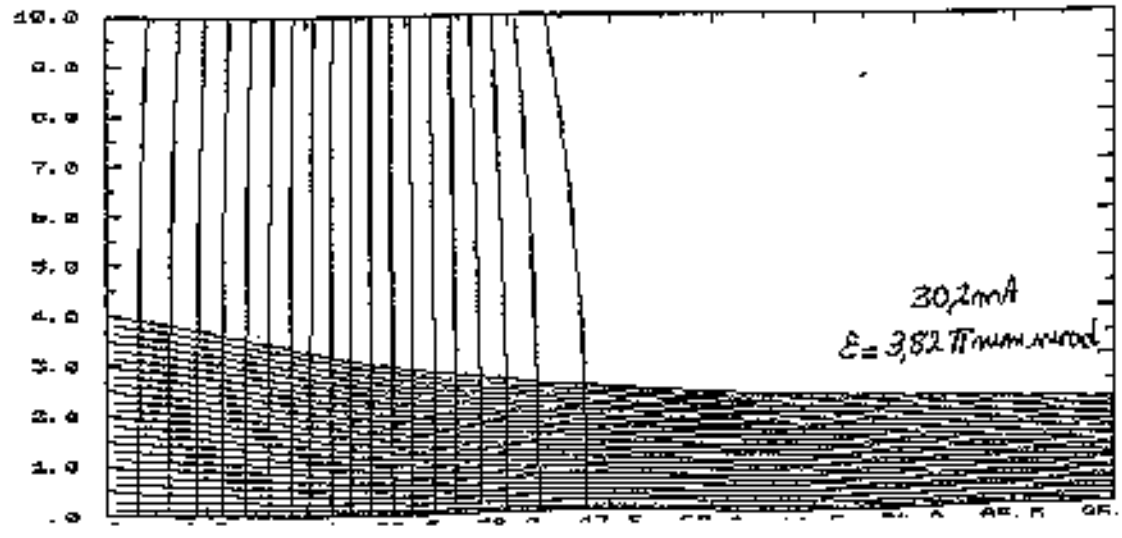
Meilleur compromis

Géométrie Canon Soleil. Opt. 3

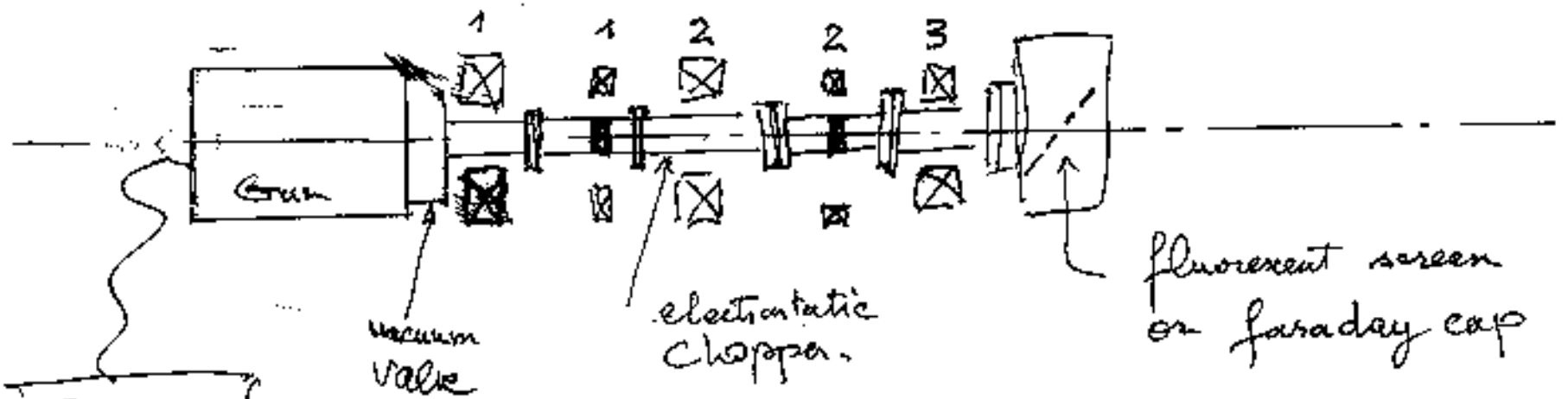
(Base Wehnelt = R10, Angle Wehnelt = 30 deg, Φanode = 25 mm







Test stand for SOLEIL GUN.



1, 2, 3 Shielded focusing coils (800 Gauss for 1A)

1, 2 fast current transformer