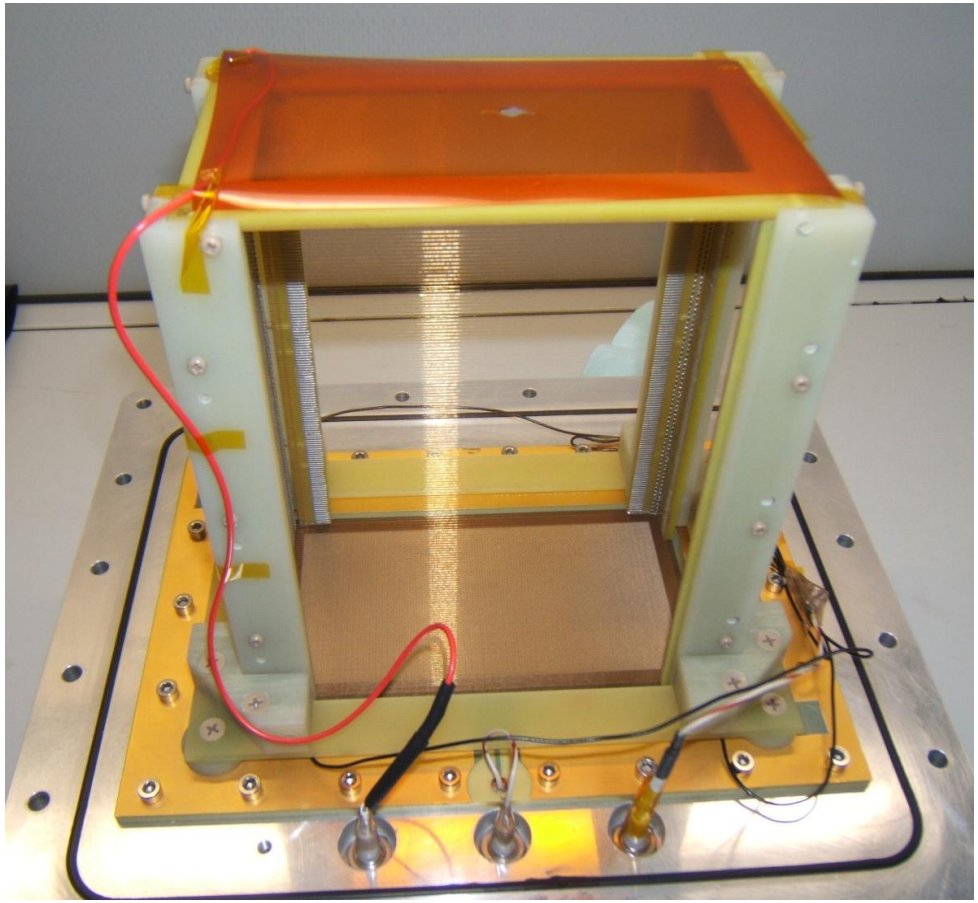
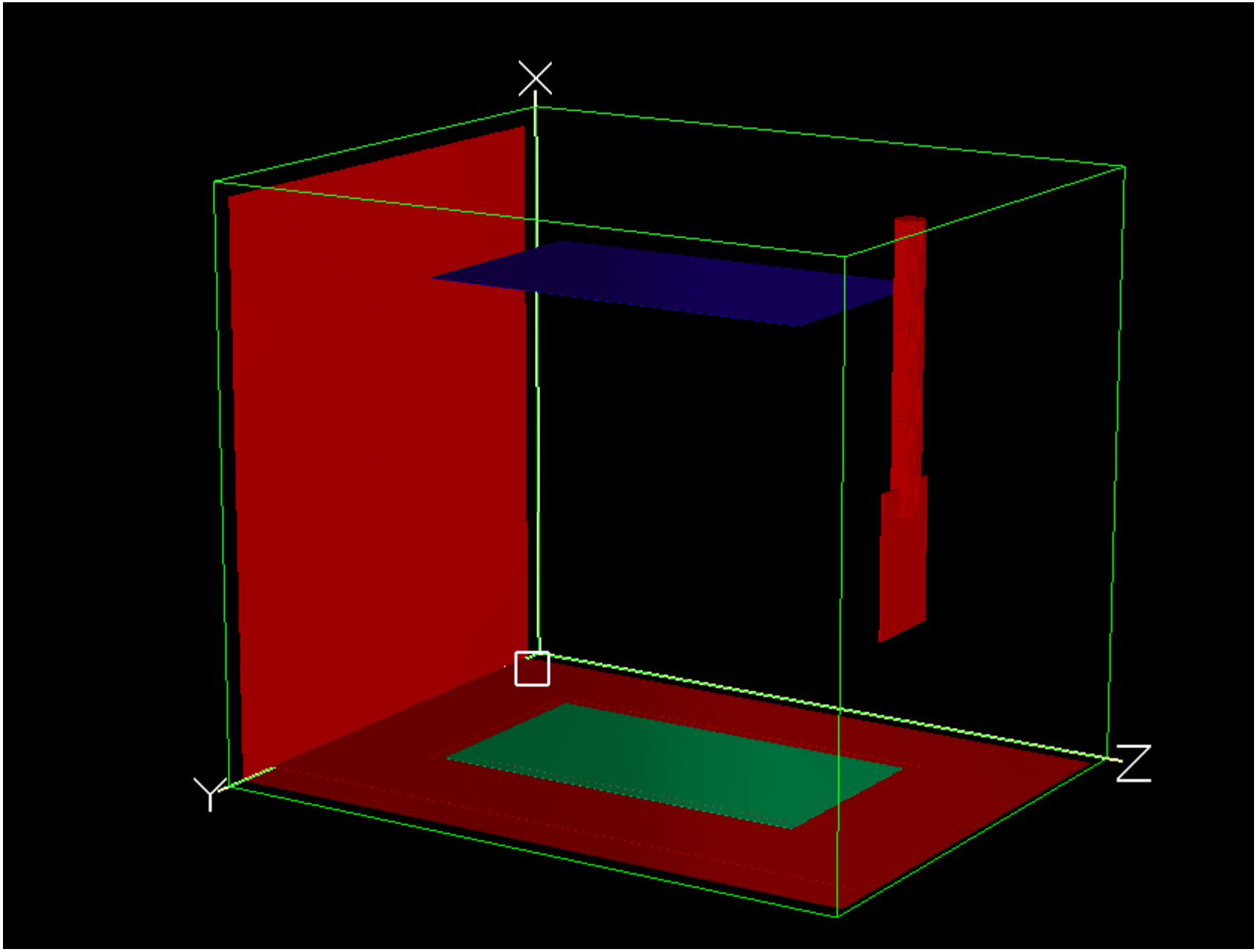
Drift field in particles detectors

- Demo ACTAR cage
  -> automatic generation of array of electrodes, small anisotropic cells/ big files.
- MAYA electrostatic beam mask
  -> use of space charge (simion examples\static_charge)
- Beam profile monitor MIGR
  -> LUA / EXCEL for automatic analysis of beam profile while changing potentials

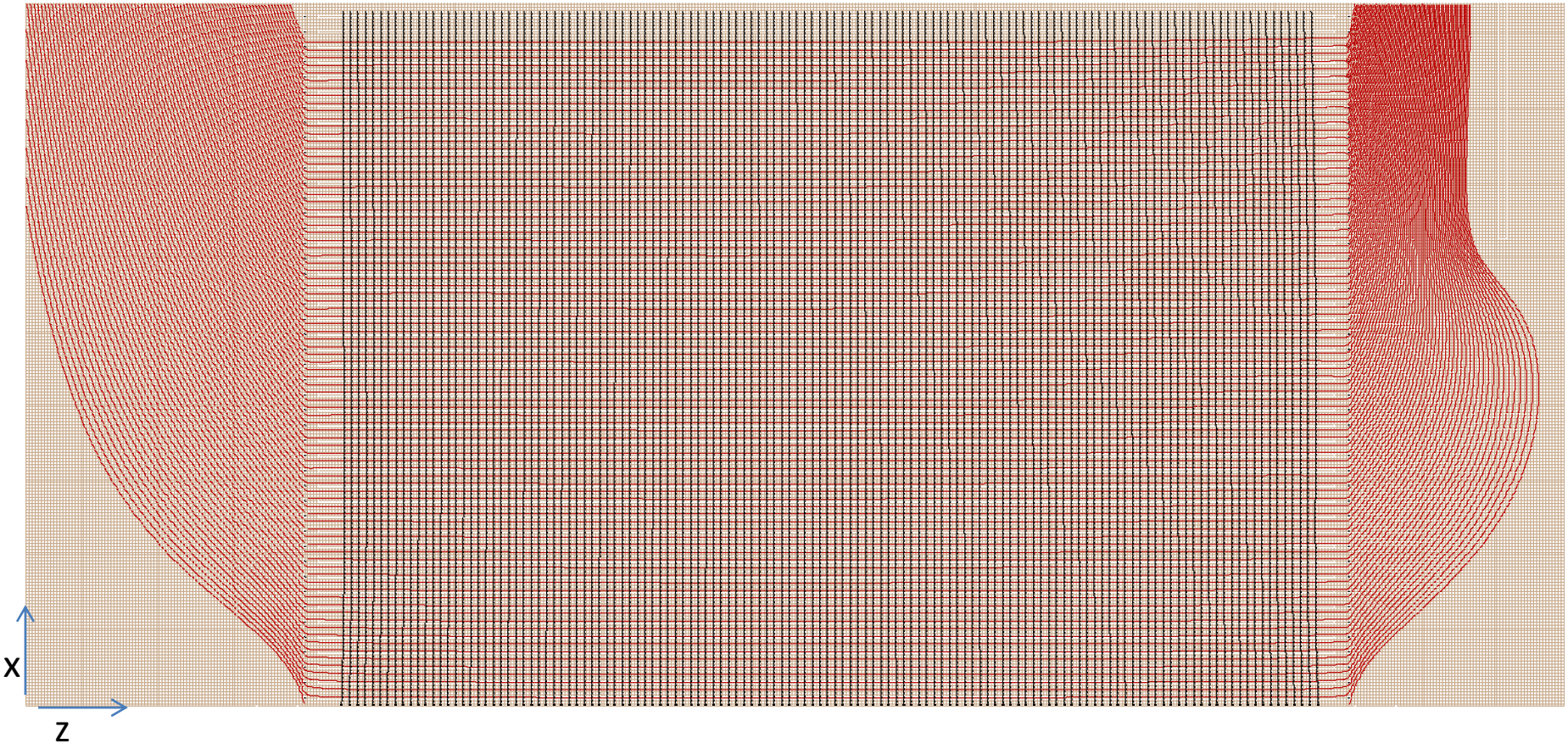
Demo ACTAR cage



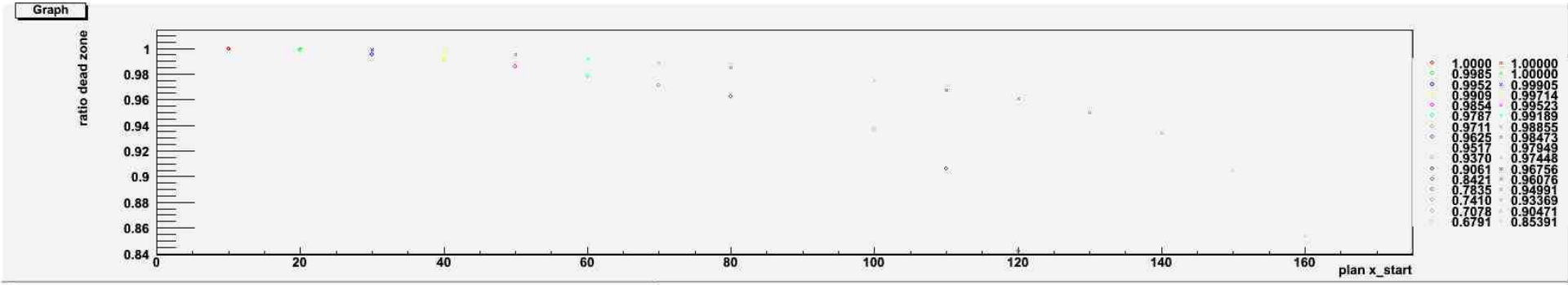
Grounded Source (red) ; mesh :-450V (green) ; cathode : -3850 (blue)

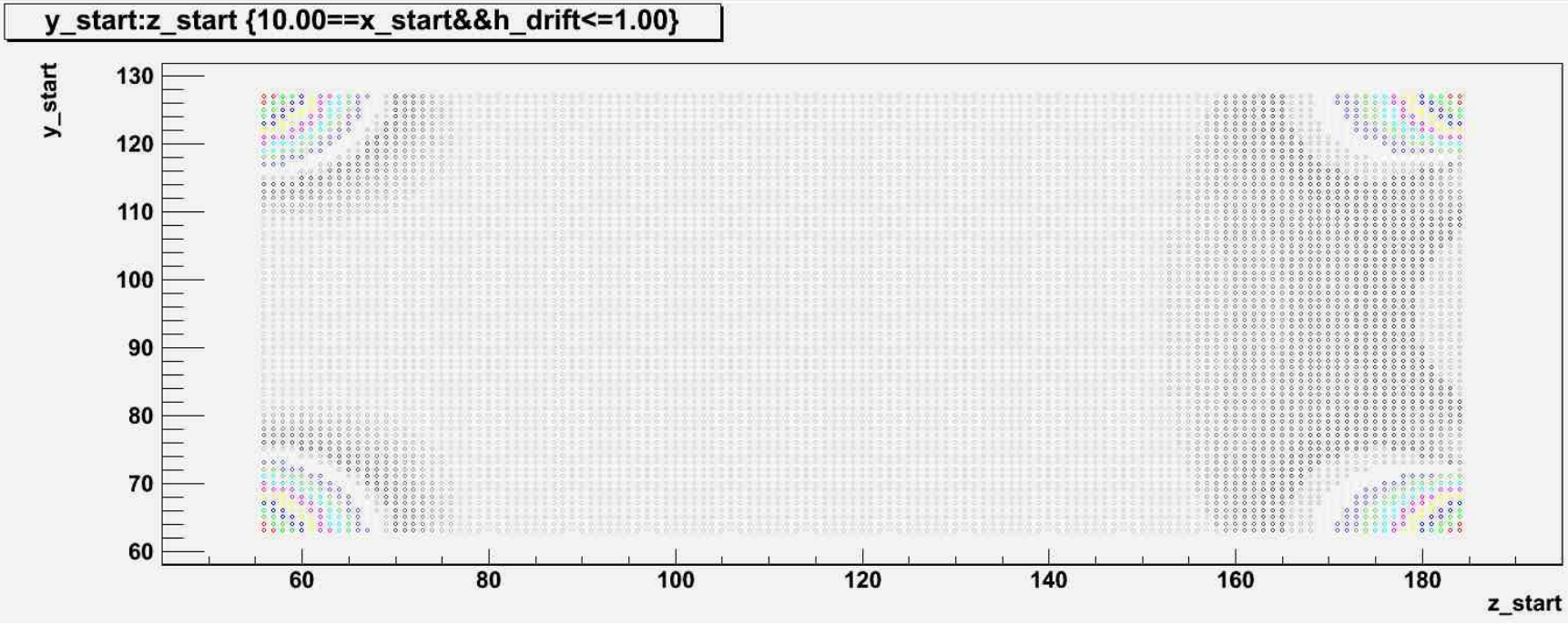


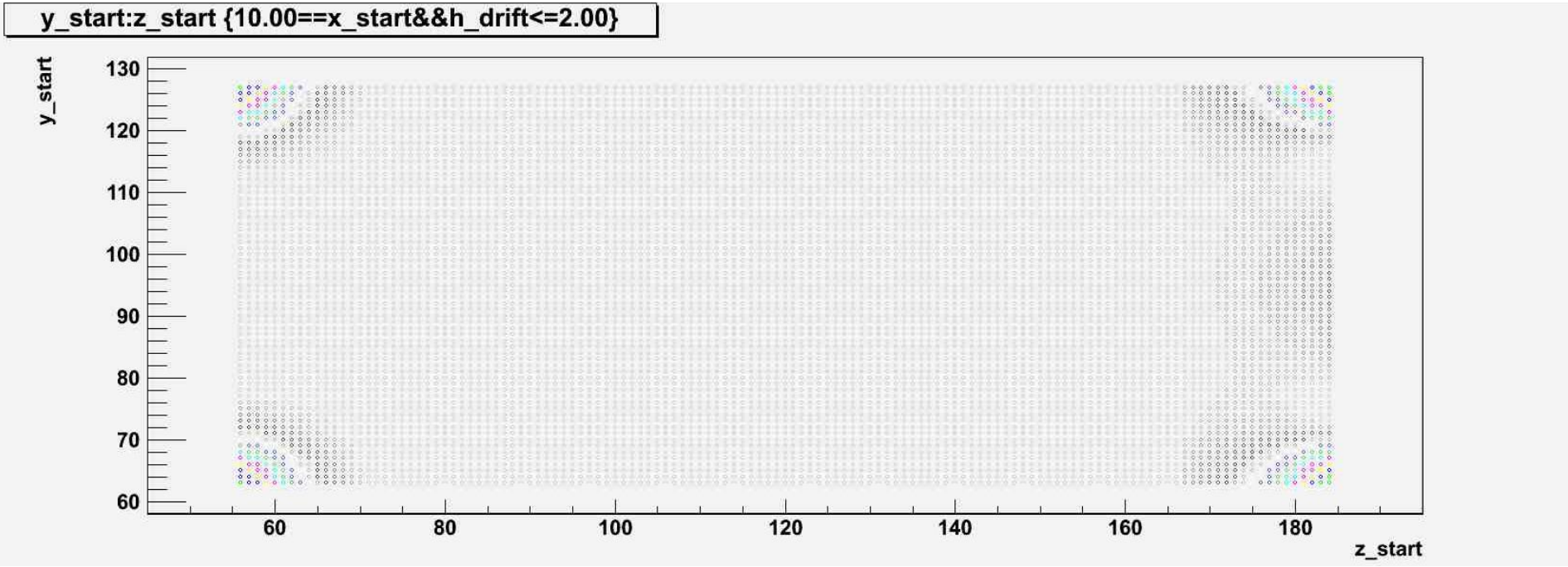
Vertical trajectories (electrons black, isopotentials red), xz plan (cuting plan= center y).
Start plan e- x=95mm (cathode non visible at x~175mm); every 1 mm along z (beam direction) .
Speed reset every 0.1ns to simulate slow drift in gaz (with gaz and low field, e- follow electric field lines)

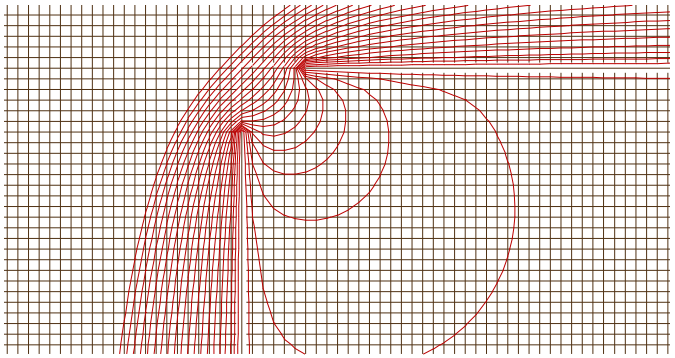


Courbes en haut: fraction de la surface des pads pour laquelle la dérive horizontale est inférieure à 1 et 2mm, en fonction de la hauteur de départ des électrons (plan milieu x~90, blanc)
Graphes en bas: chaque point correspond à 1 électron dont la dérive horizontale est < 1mm (<2mm page suivante); la couleur correspond à la hauteur de départ (rouge->10mm…).

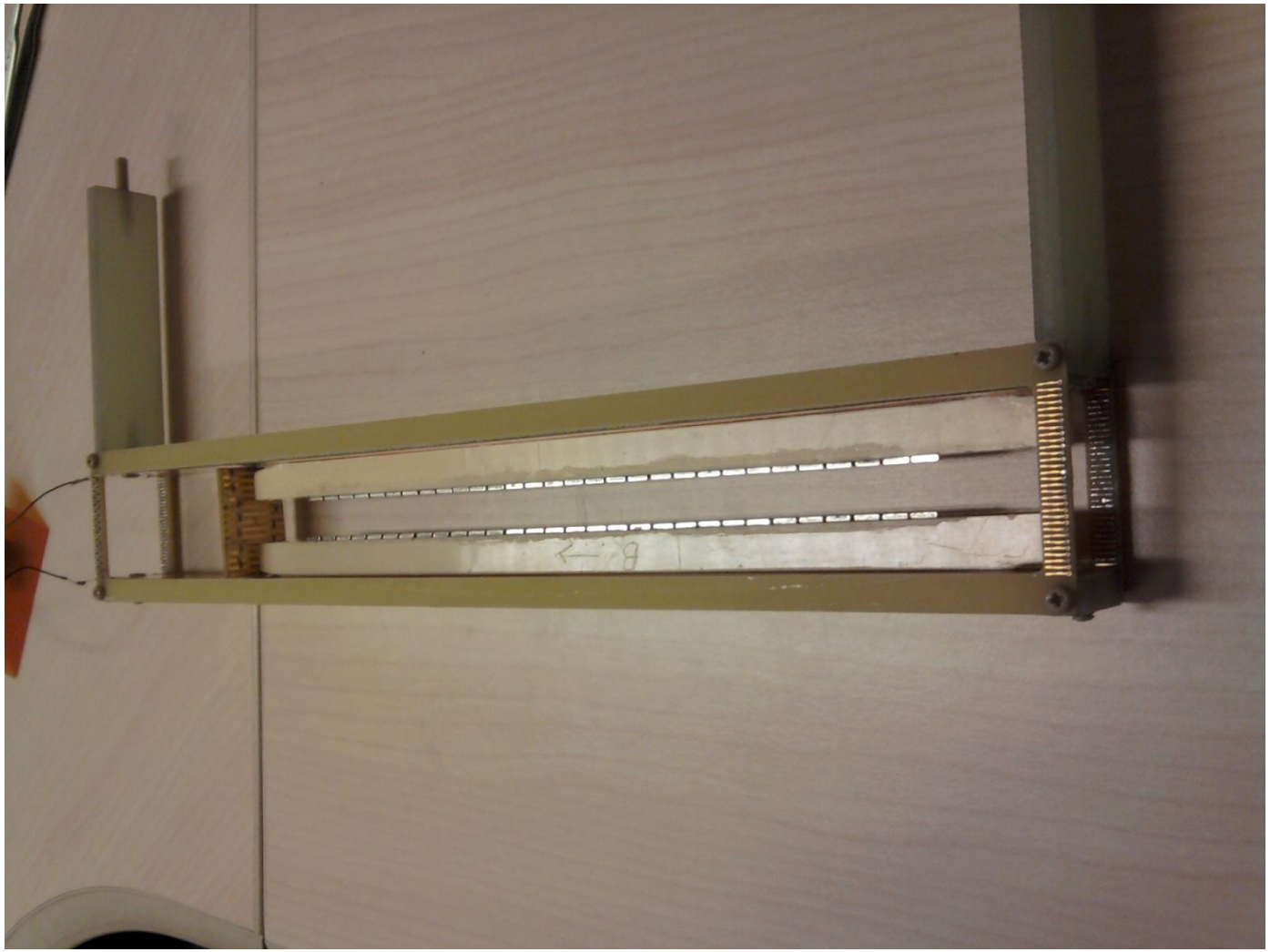





y_start:z_start {10.00==x_start&&h_drift<=2.00}
y_start
130
120
110
100
90
80
70
60
60
80
100
120
140
160
180
z_start



MAYA electrostatic beam mask



Manip test E653

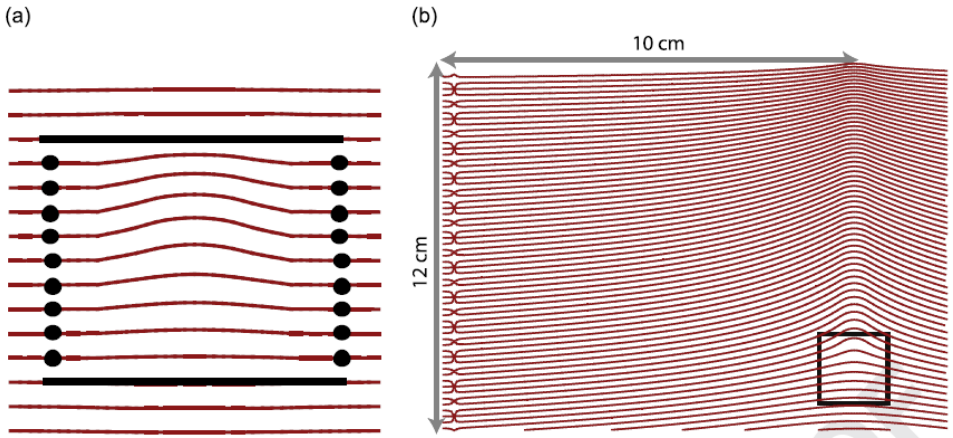
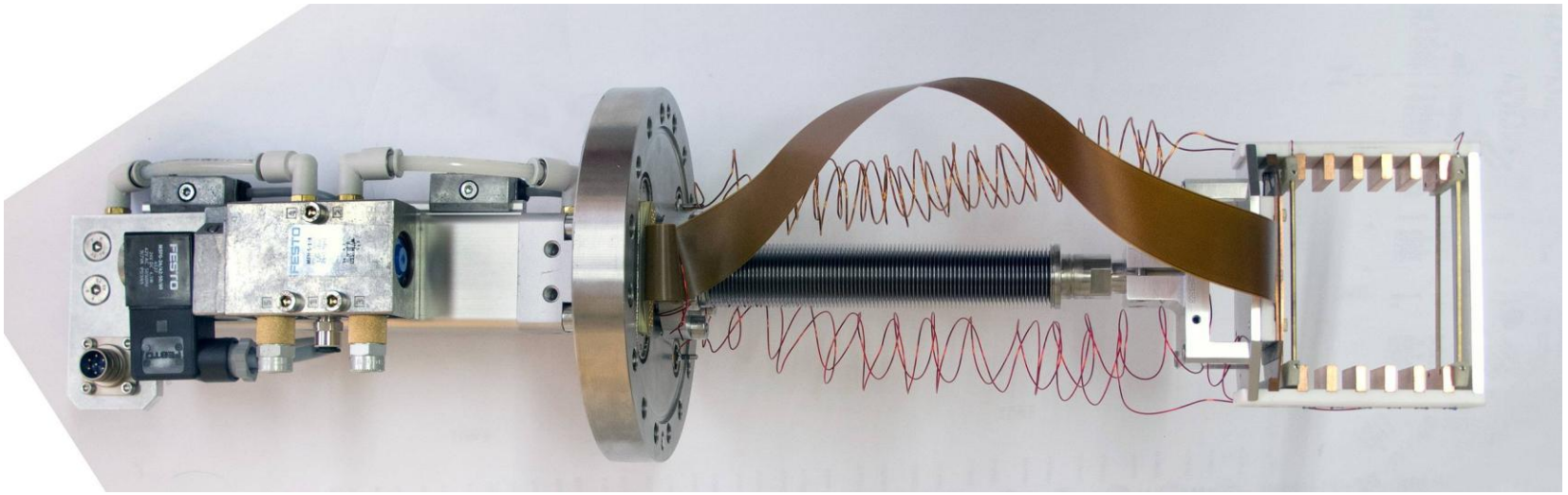
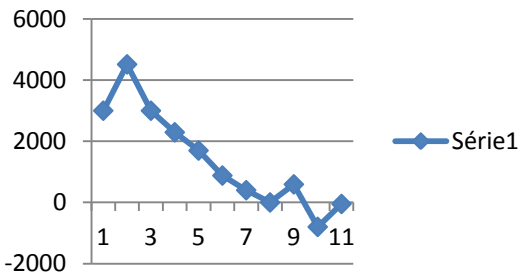


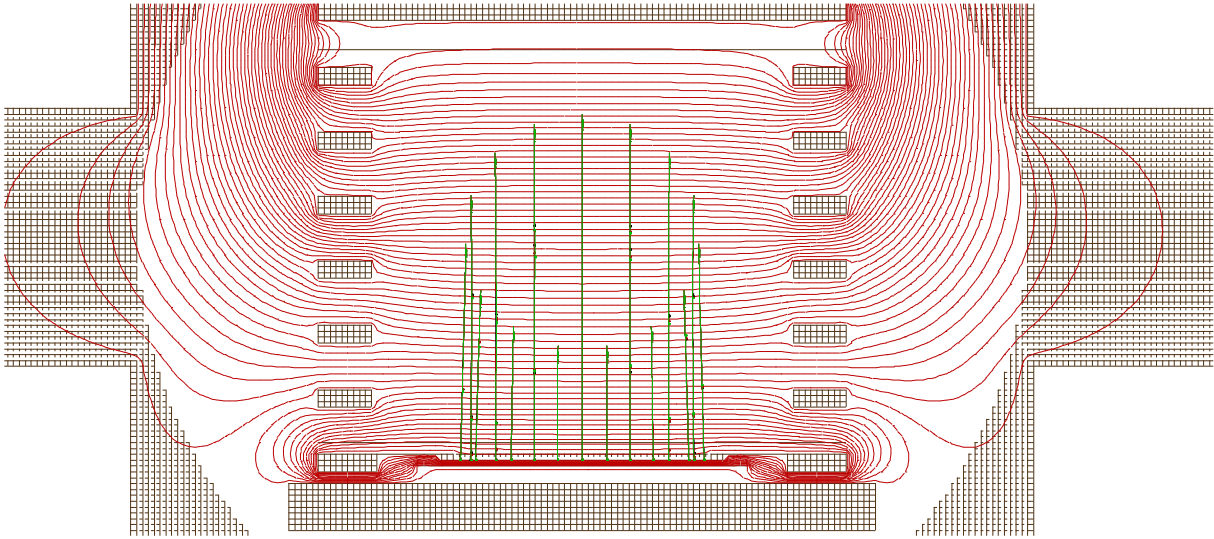
Fig. 3. Simulation of the electric field in MAYA. Equipotential lines in the presence of a charge density of 14 pC/cm^3 are represented in red. They aim to reproduce the effect of a 10^5 pps beam of ^{136}Xe. Results are shown with (a) and without (b) the beam mask. In (b), a square indicates the equivalent region covered by the mask. An electric drift field of 150 V/cm was considered, while the maximum field due to the charge density created by the beam accounts for 80 V/cm. (For interpretation of the references to color in this figure caption, the reader is referred to the web version of this paper.)

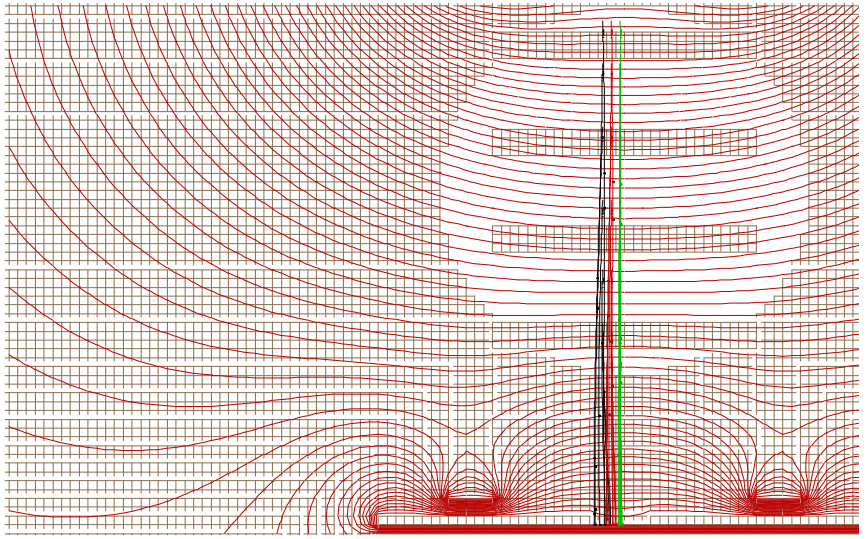
Beam profilemonitor MIGR



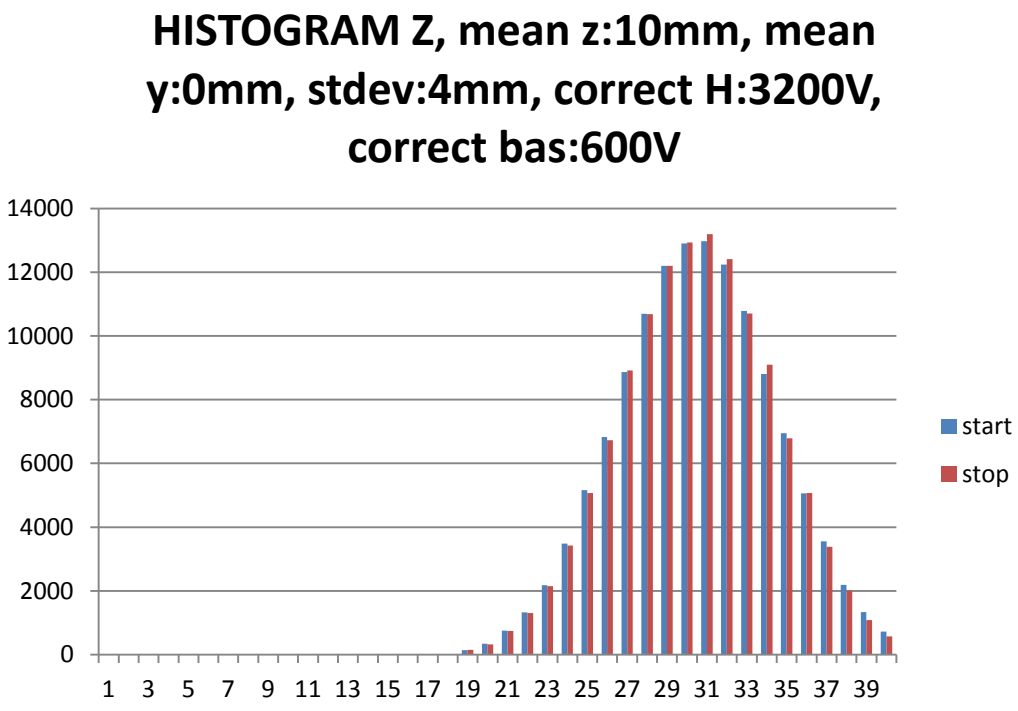
Optimisation electrodes voltage

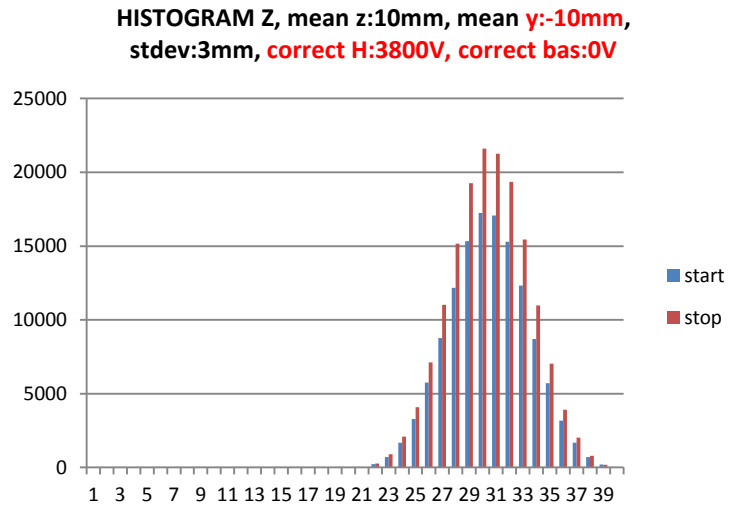






Analysis of beam profile vs voltage correction





Effects on cables/connectors?