THE UNIVERSITY OF WARWICK

LEBT Beam Steering

John Back
University of Warwick

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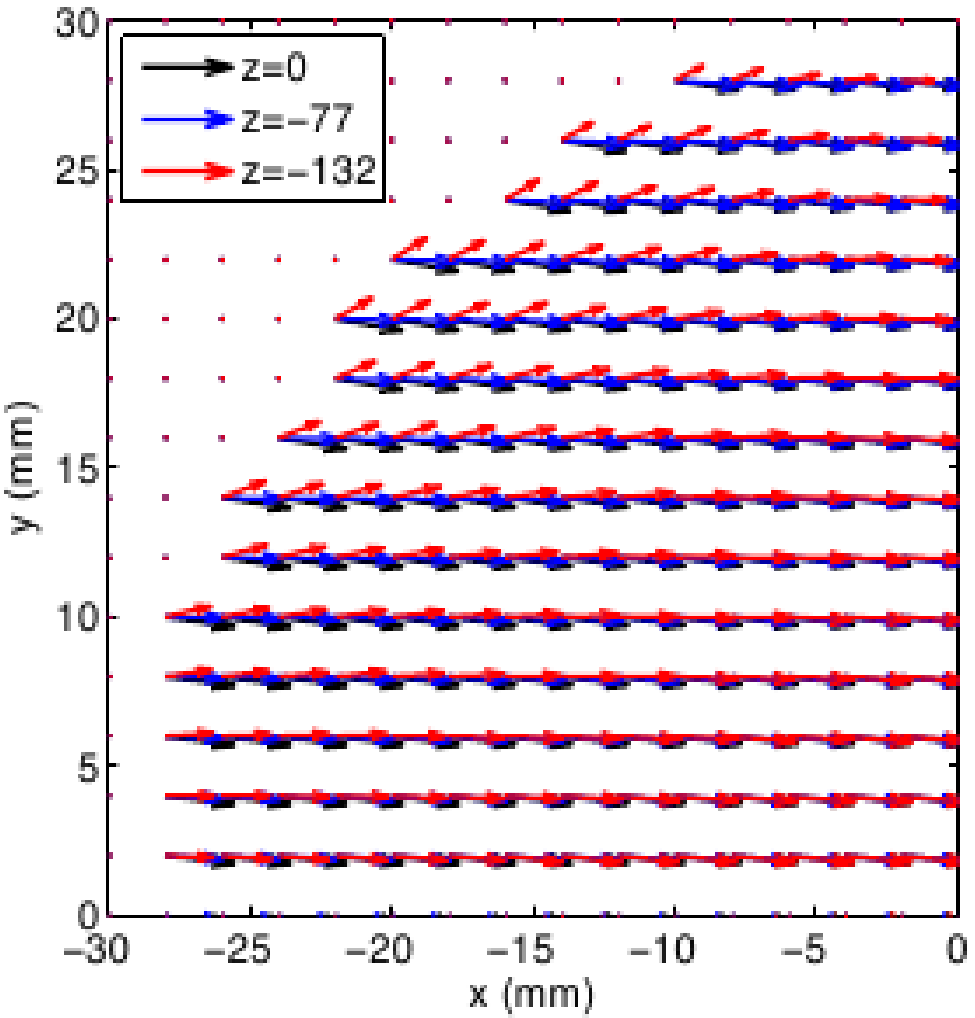
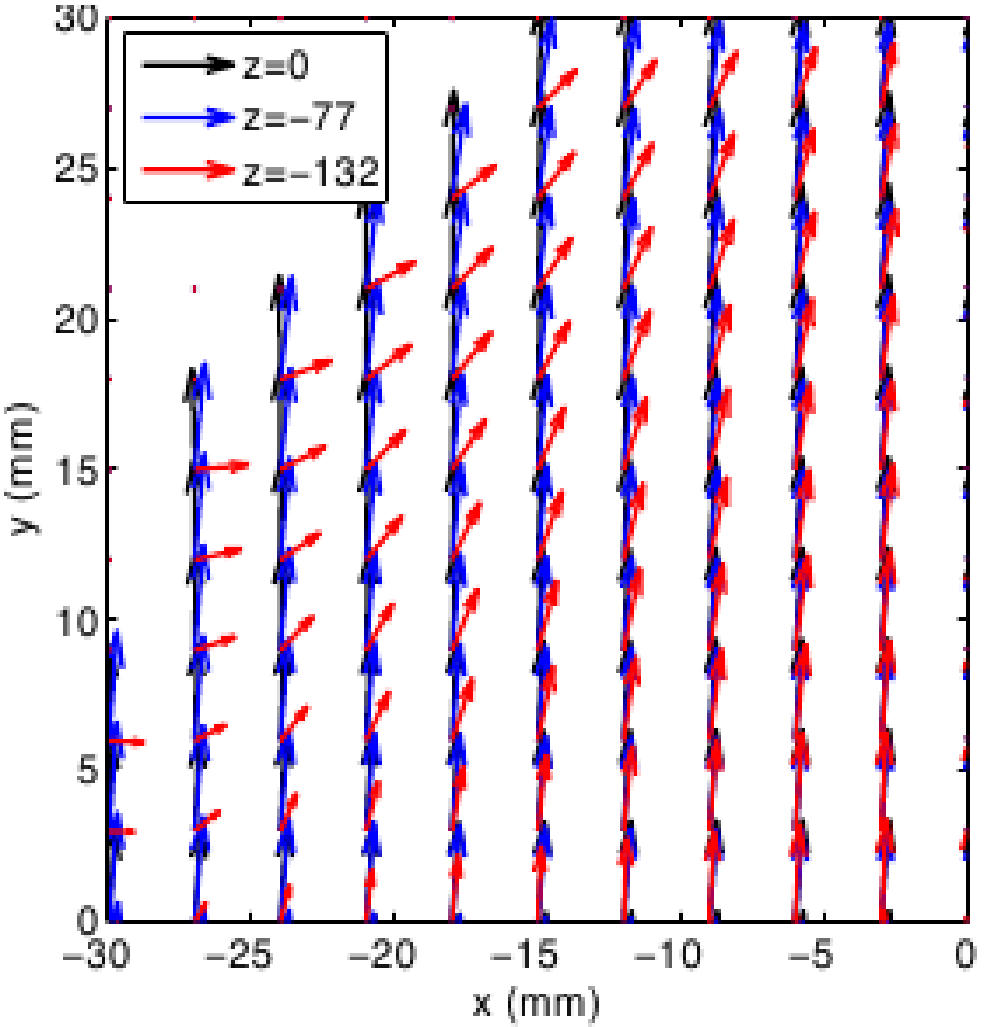
Introduction

- Studies on LEBT alignment pencil beam data (65 keV) investigating effect of dipole steerers
  - 3 mm radius aperture inserted into post-accel section
  - 2D profile images from Quartz scintillator & CCD camera 240 mm from end of LEBT: fit Gaussian functions to get μ & σ
  - Data from Christoph, Scott, Dan August '13 measurement campaign
- Comparison with GPT simulations
  - Using horiz and vert dipole field maps from Ibon/Bilbao
- Plots show comparison of data beam centre with GPT simulation
  - No tilt angles/rotations introduced to any field maps

Dipole field maps

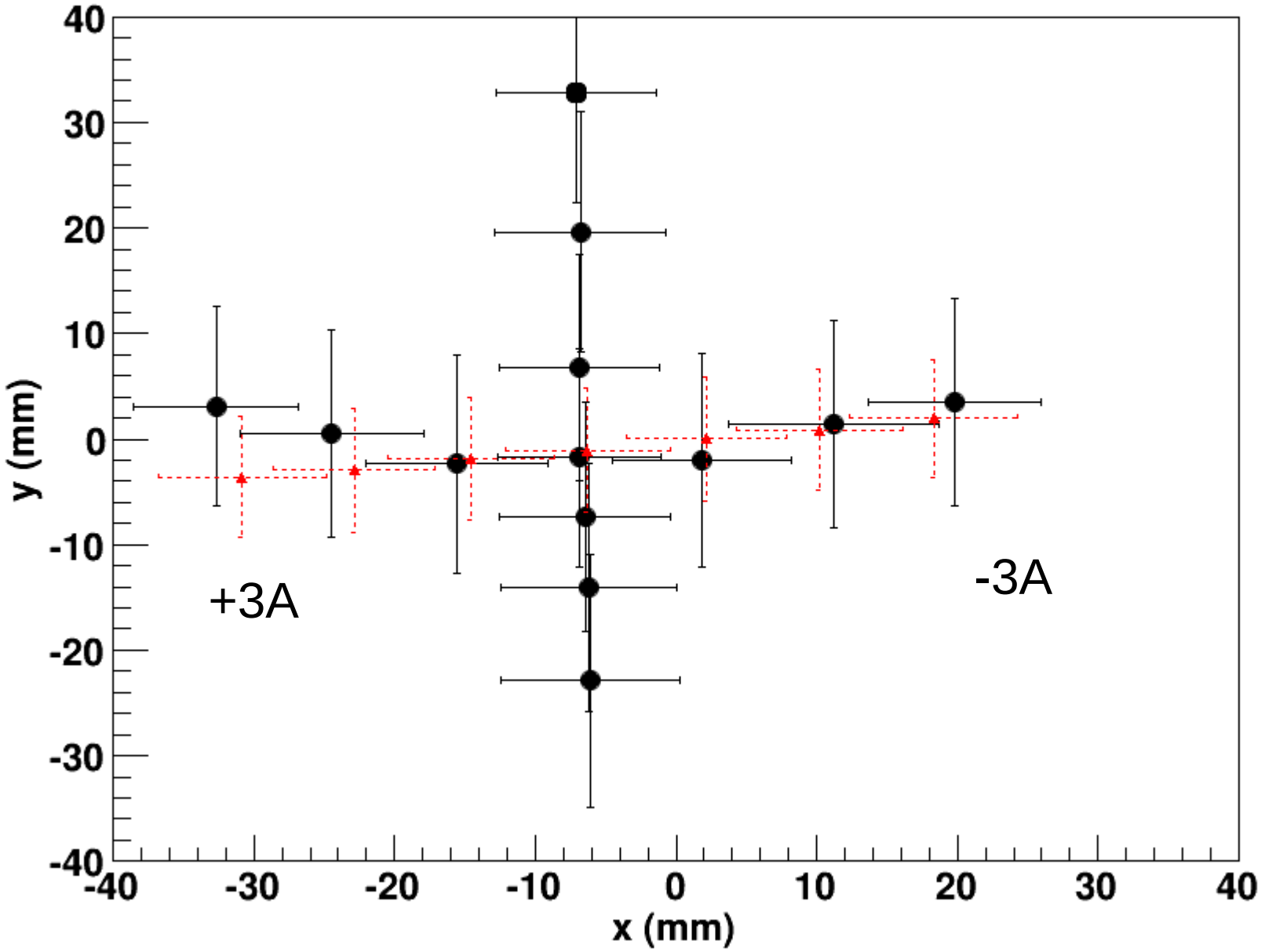


Vertical steerer: B in +x dir
Pos dipole current in +x dir
⇒ H- travelling along +z goes Up



Horizontal steerer: B in +y dir
Pos dipole current in +y dir
⇒ H- travelling along +z goes Left

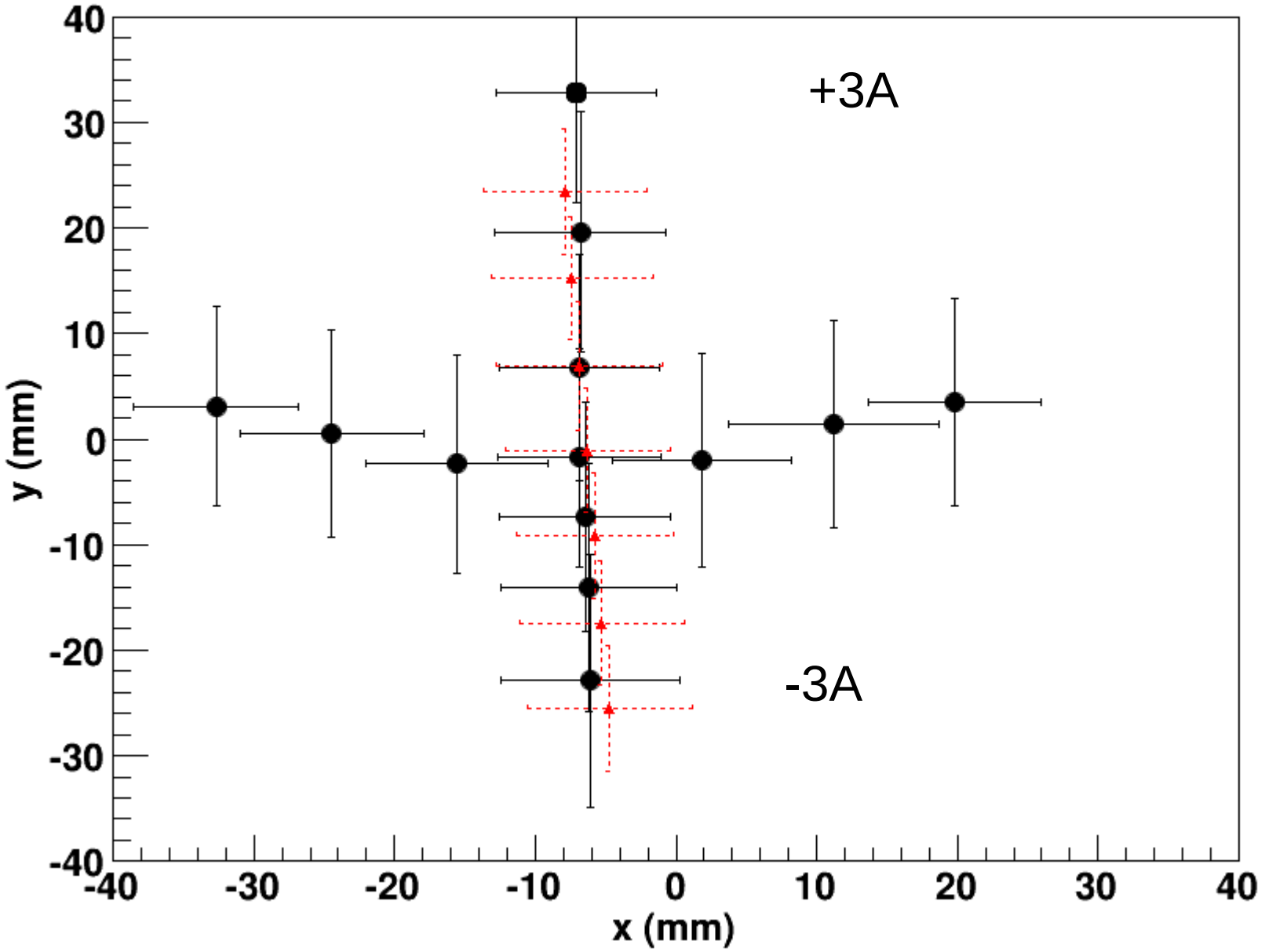
Horizontal Dipole 1



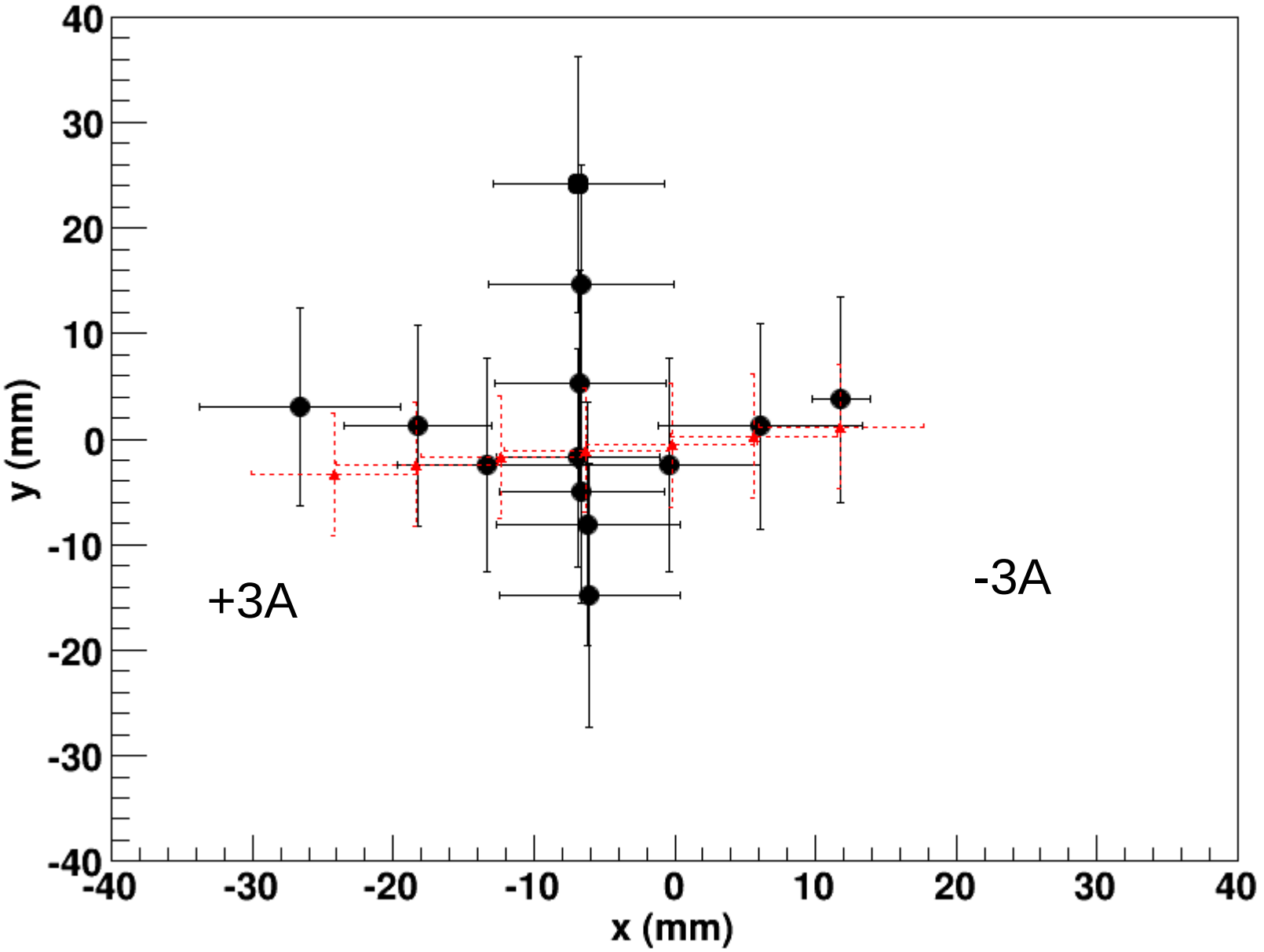
Data

GPT

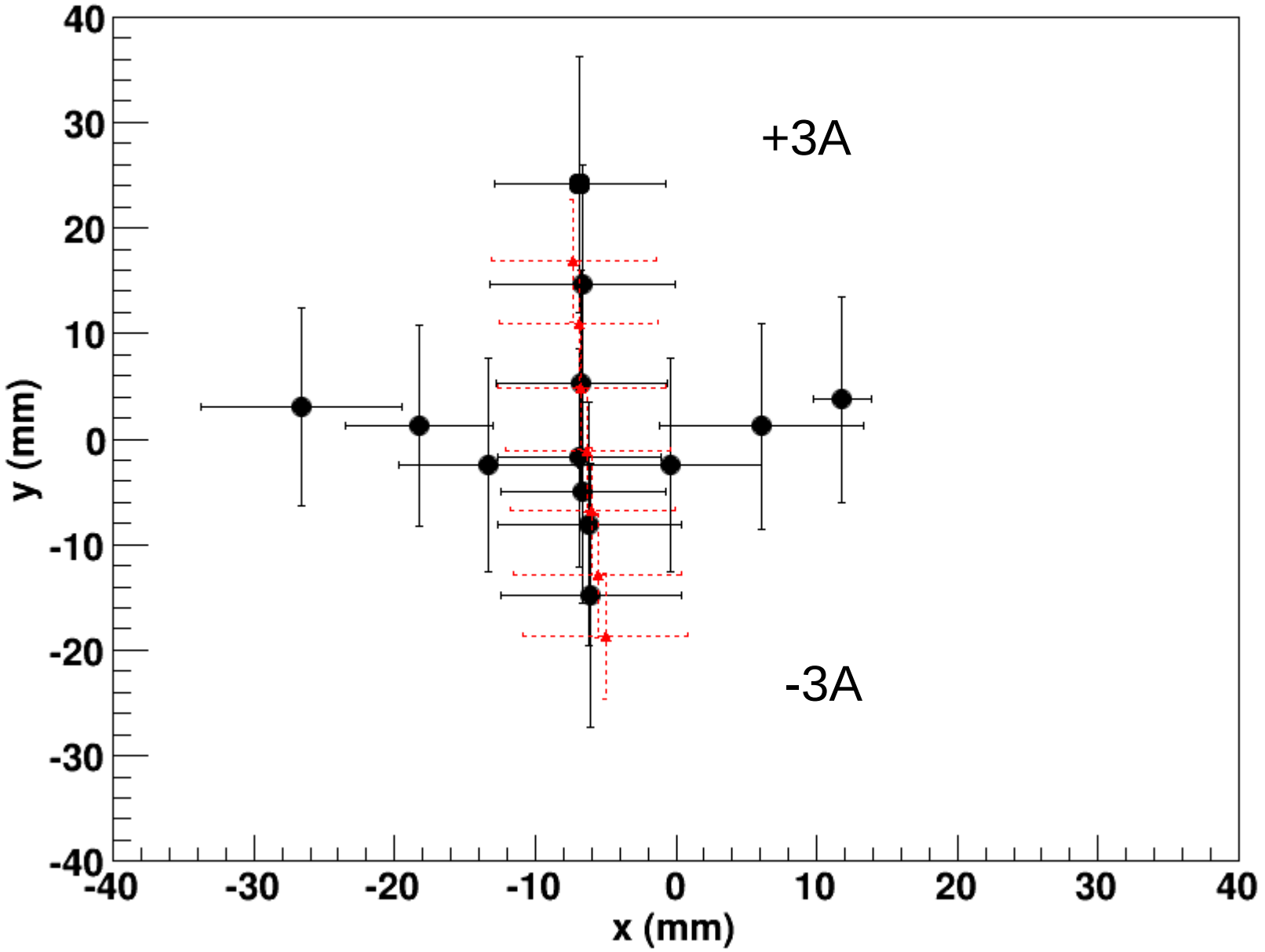
Vertical Dipole 1



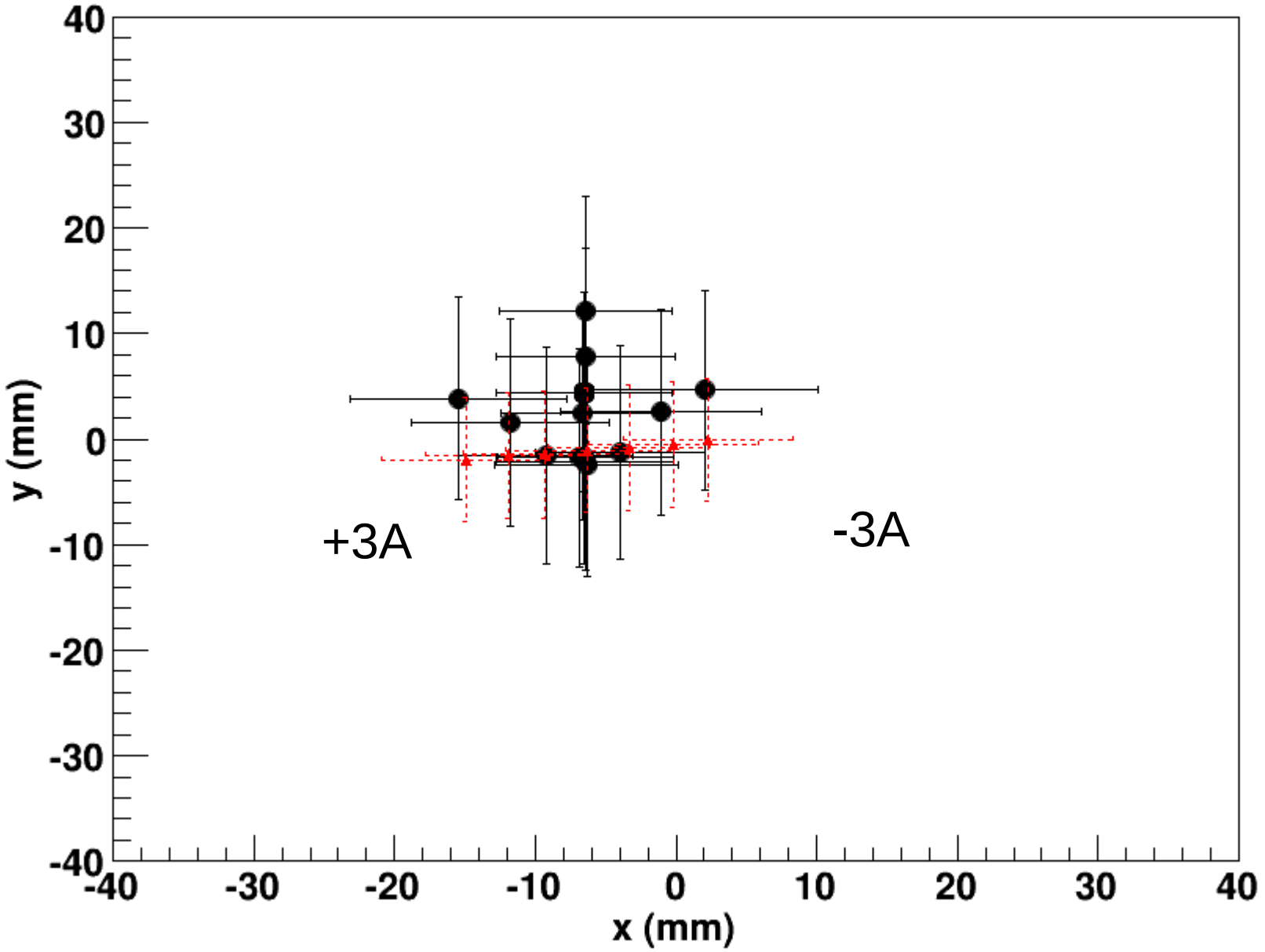
Horizontal Dipole 2



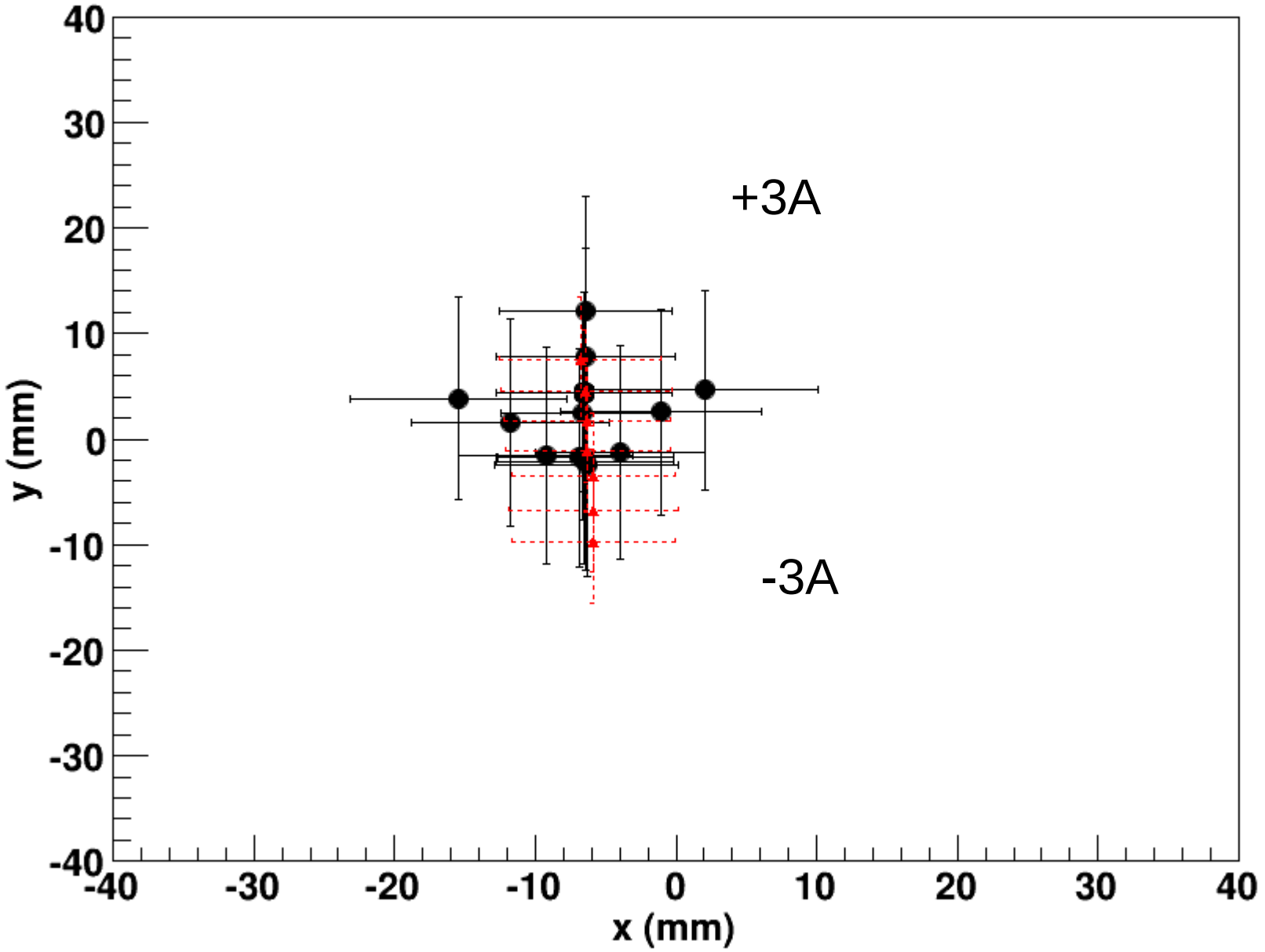
Vertical Dipole 2



Horizontal Dipole 3

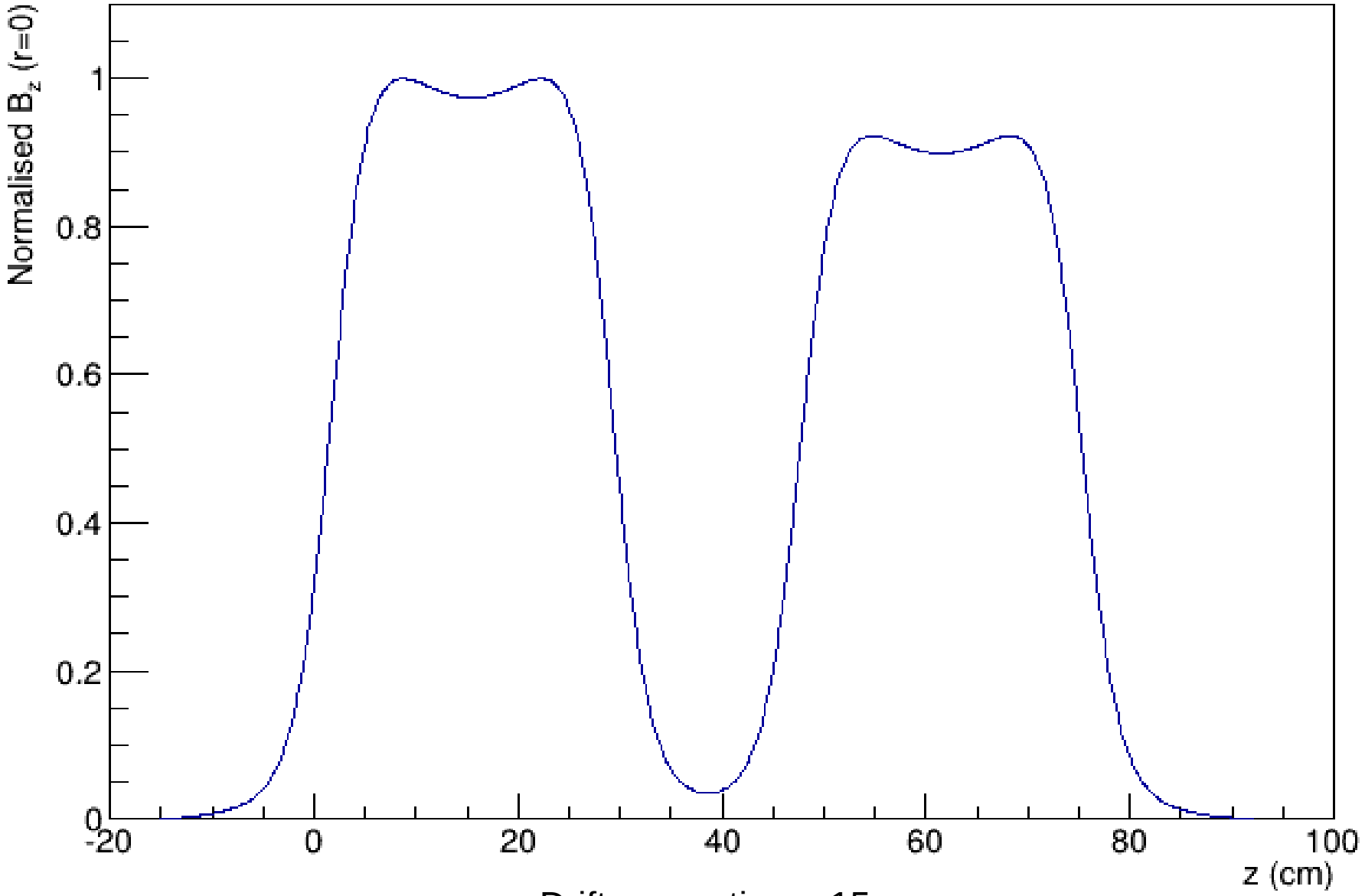


Vertical Dipole 3



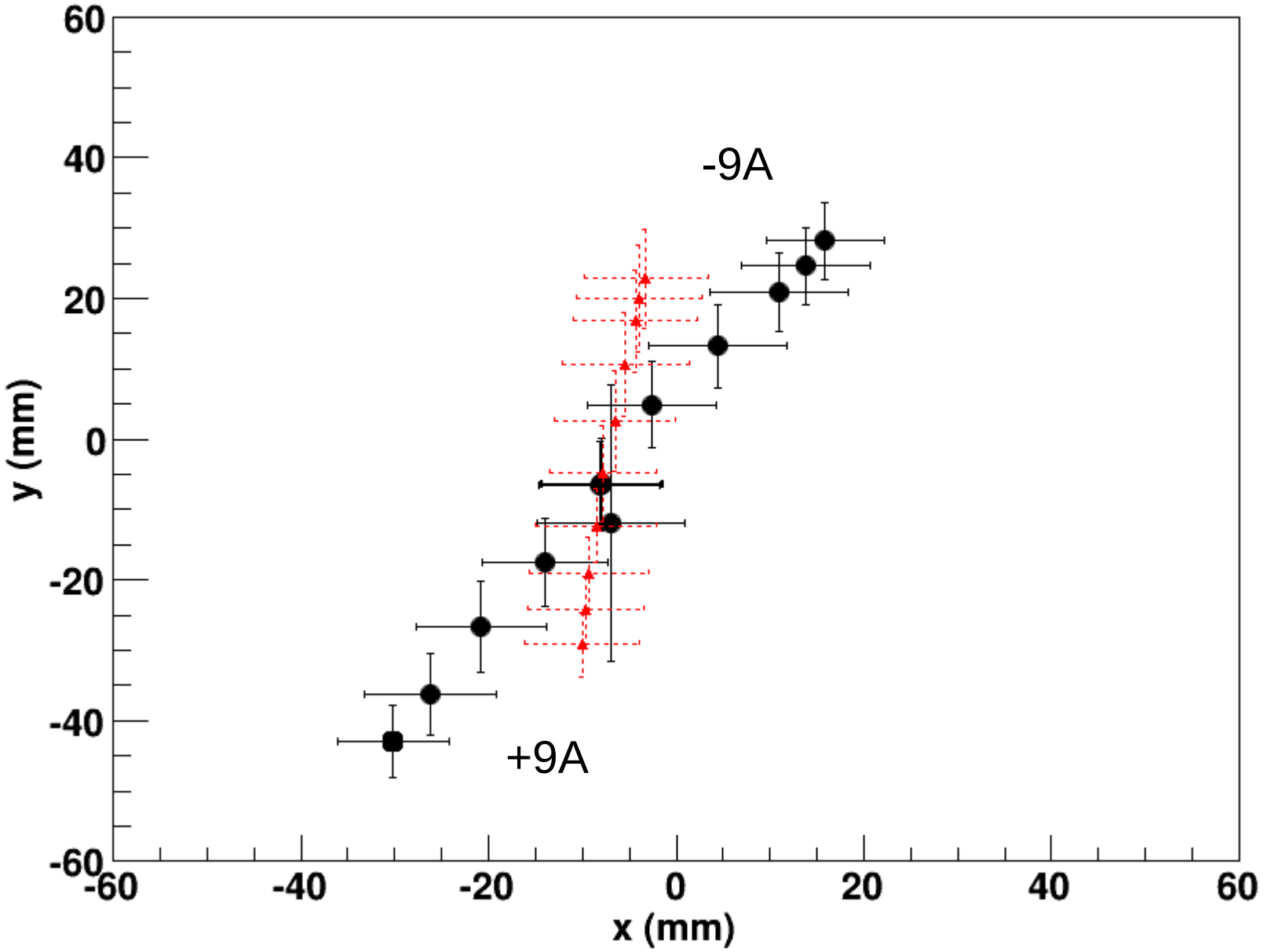
Comsol B_z field map of Sol1+Sol2

31 cm long solenoids with pancake 4-10-4 inner radii design. Iron yoke.



Drift separation = 15 cm

S1 130A, S2 120A + Horiz Dipole 1

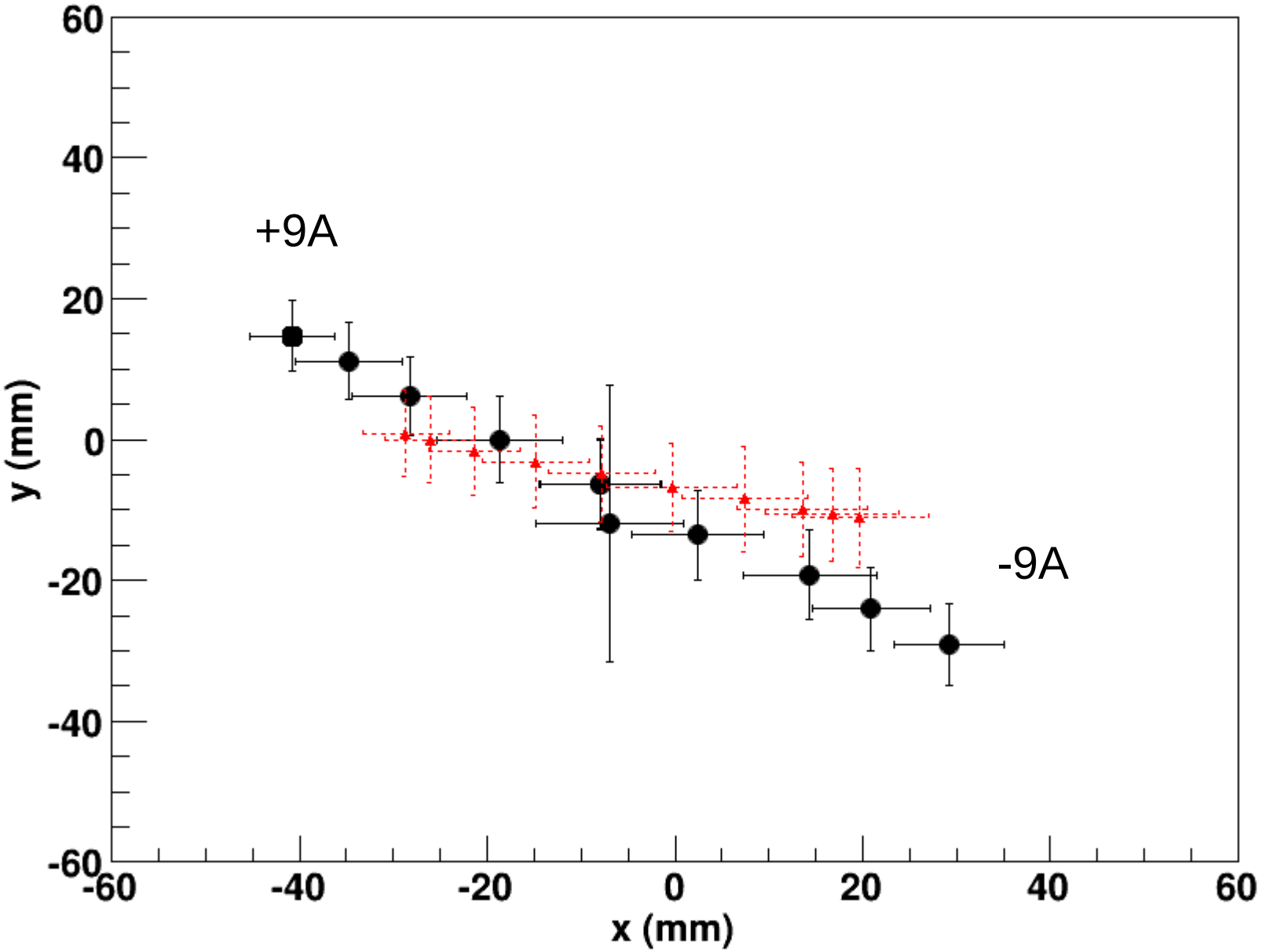


Data

GPT

Beam has gyrated anti-clockwise by “90 degrees” ⇒ flips horiz and vertical dipole effects

S1 130A, S2 120A + Vert Dipole 1



Data

GPT

Beam has gyrated anti-clockwise by “90 degrees” ⇒ flips horiz and vertical dipole effects