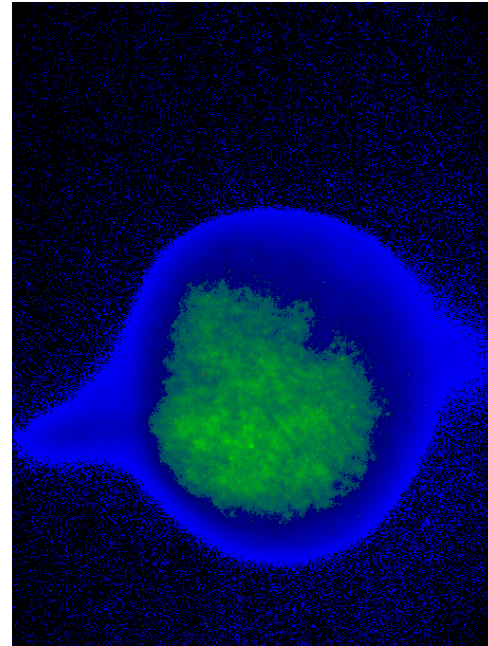


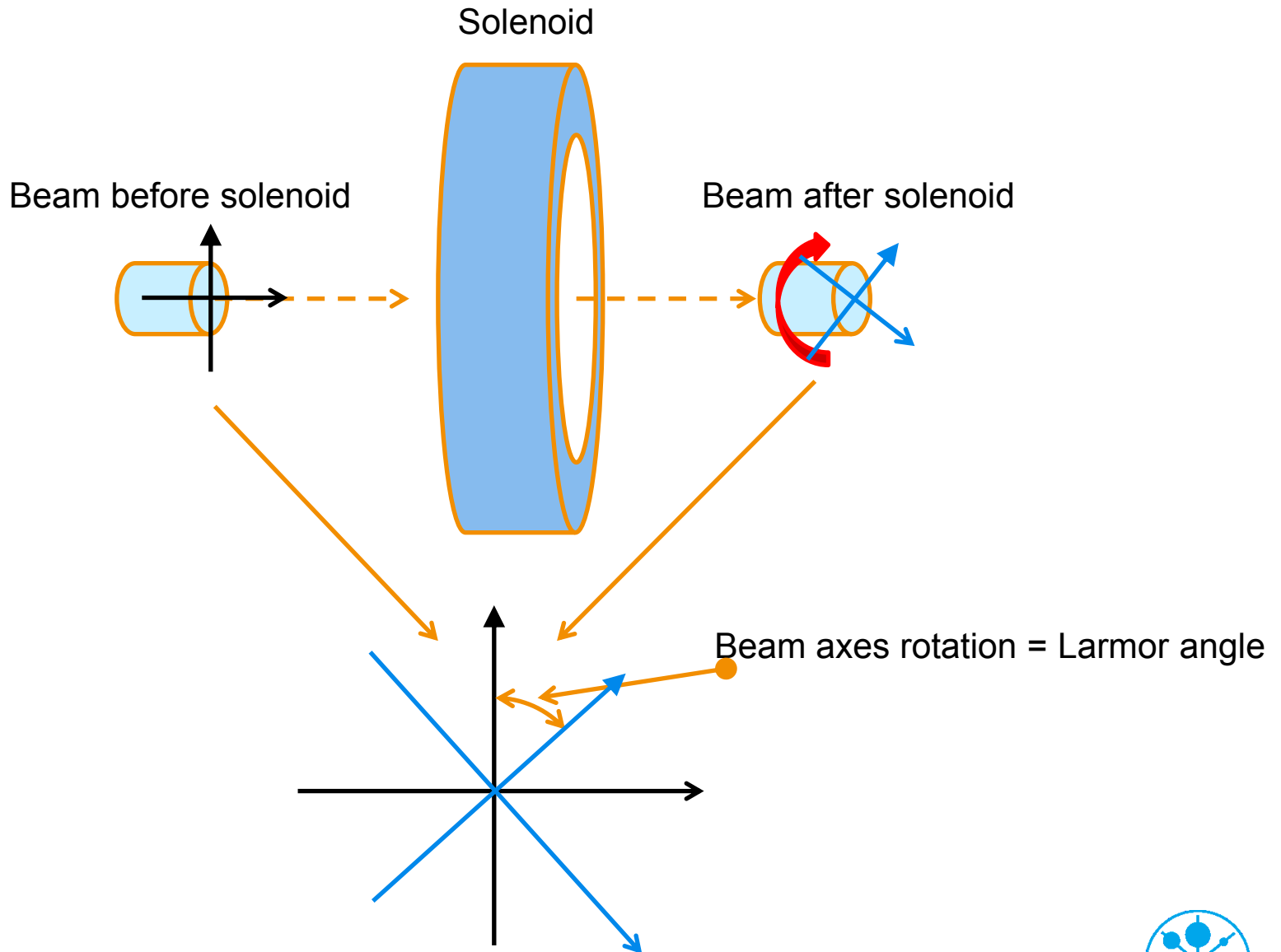
The Larmor angle studies for beam asymmetry source investigations.



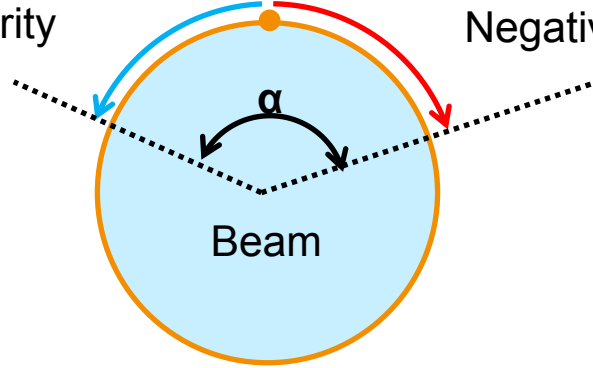
Igor Isaev

PITZ

Zeuthen, 01.10.2015

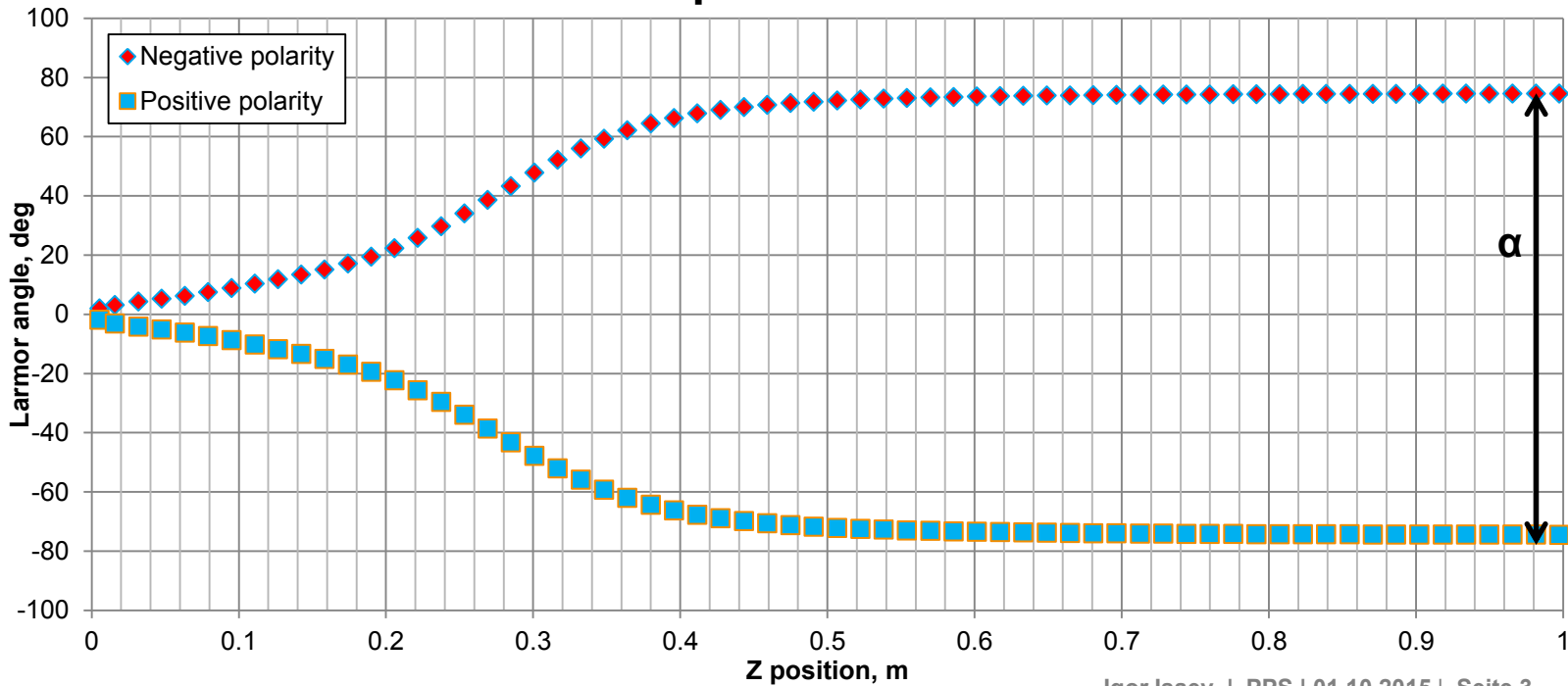


Positive solenoid polarity



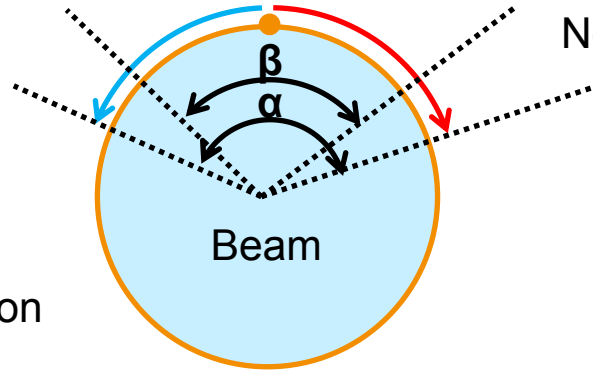
Negative solenoid polarity

Larmor angle for positive and negative solenoid polarities



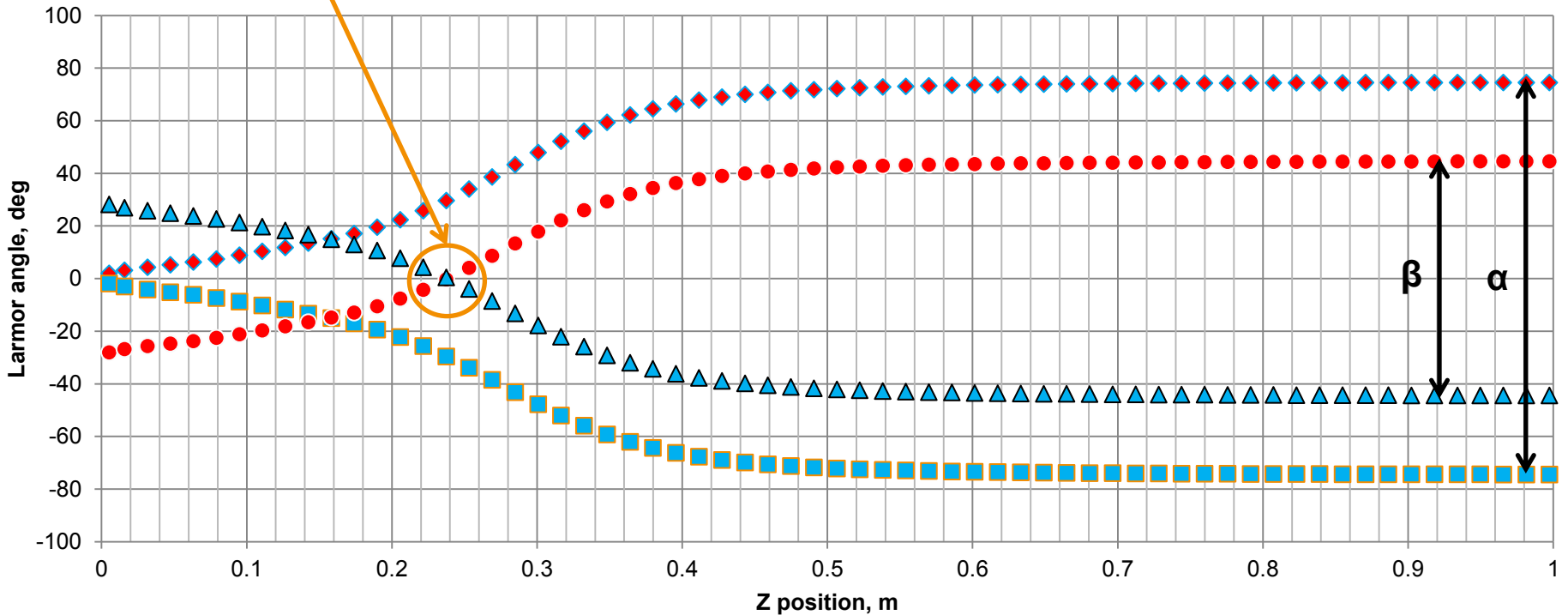
Larmor angle simulations

Positive solenoid polarity



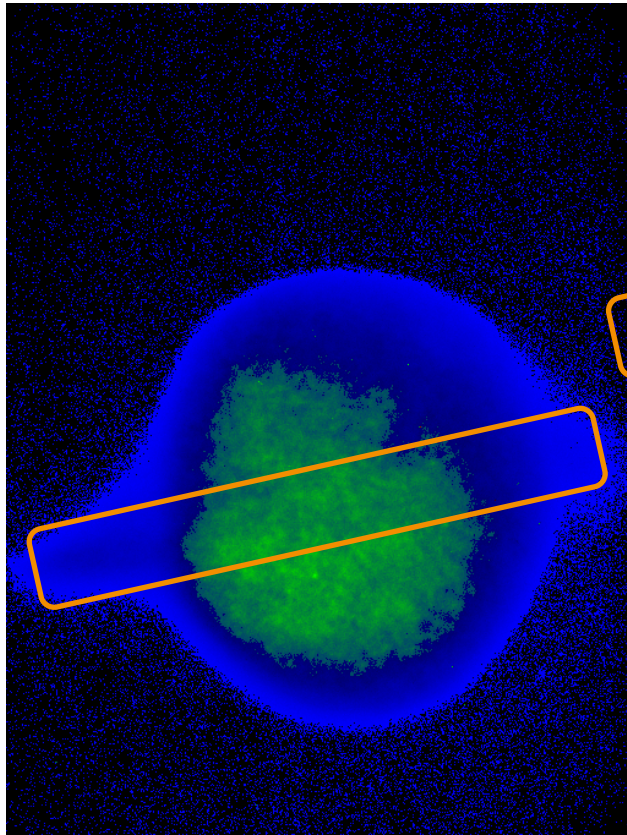
Negative solenoid polarity

The source of a field distortion

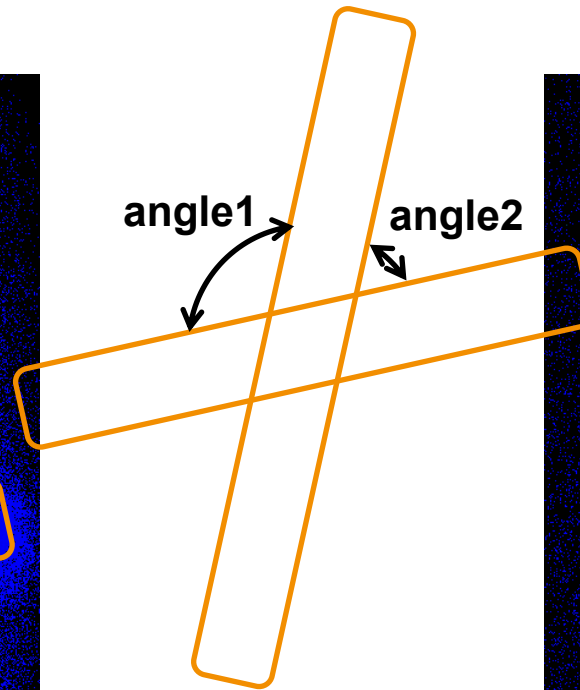
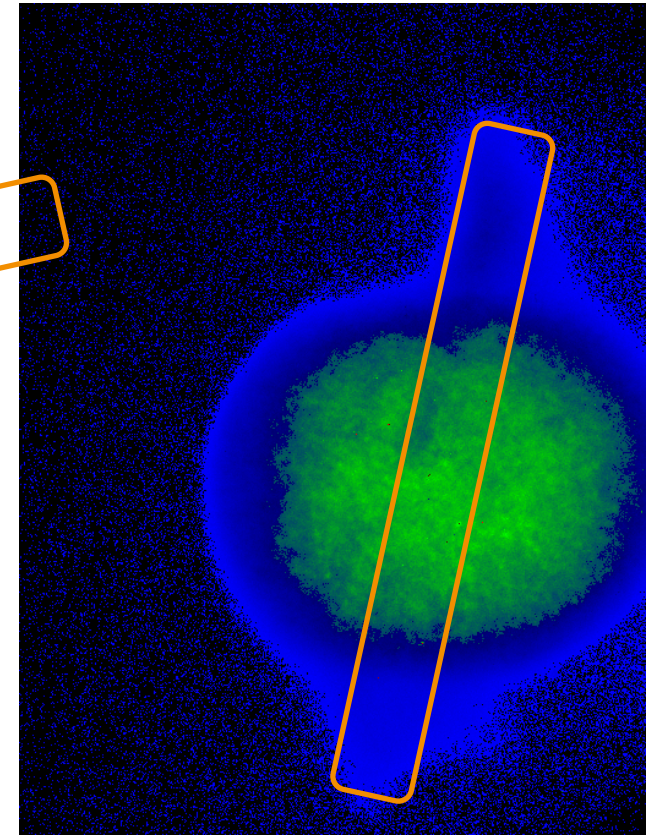


Beam at High1.Scr1

Main solenoid current is 360 A,
normal polarity,
bucking current is 0



Main solenoid current is 360 A,
opposite polarity,
bucking current is 0



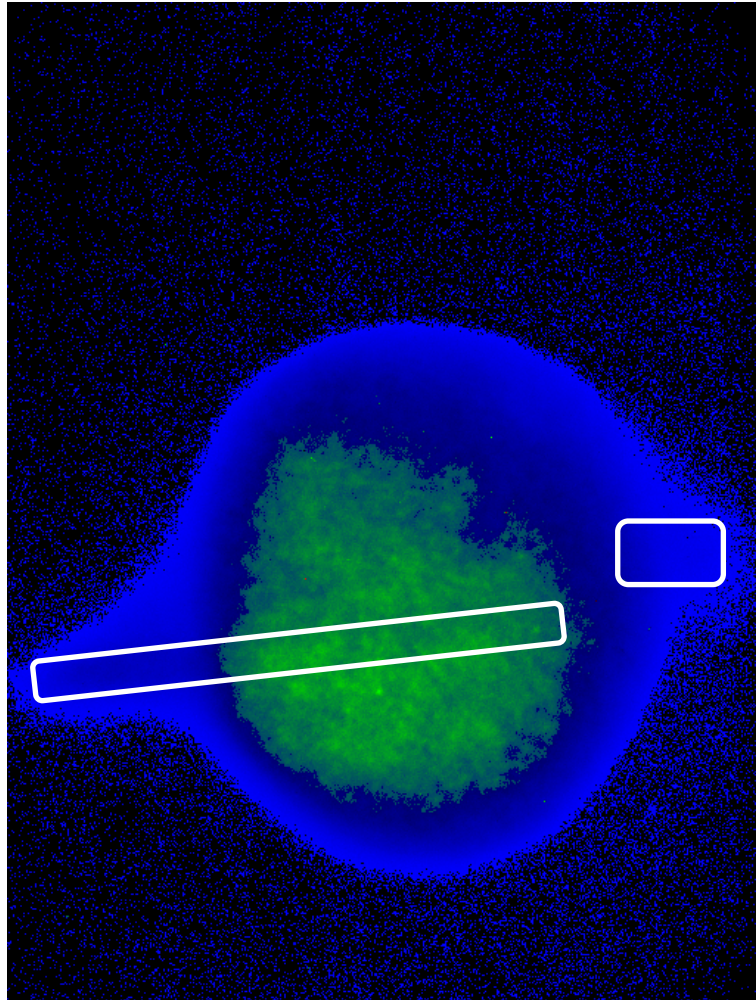
Angle1=111 deg
Angle2=69 deg
=>

Z position 1=0.1899 m
Z position 2=0.2755 m

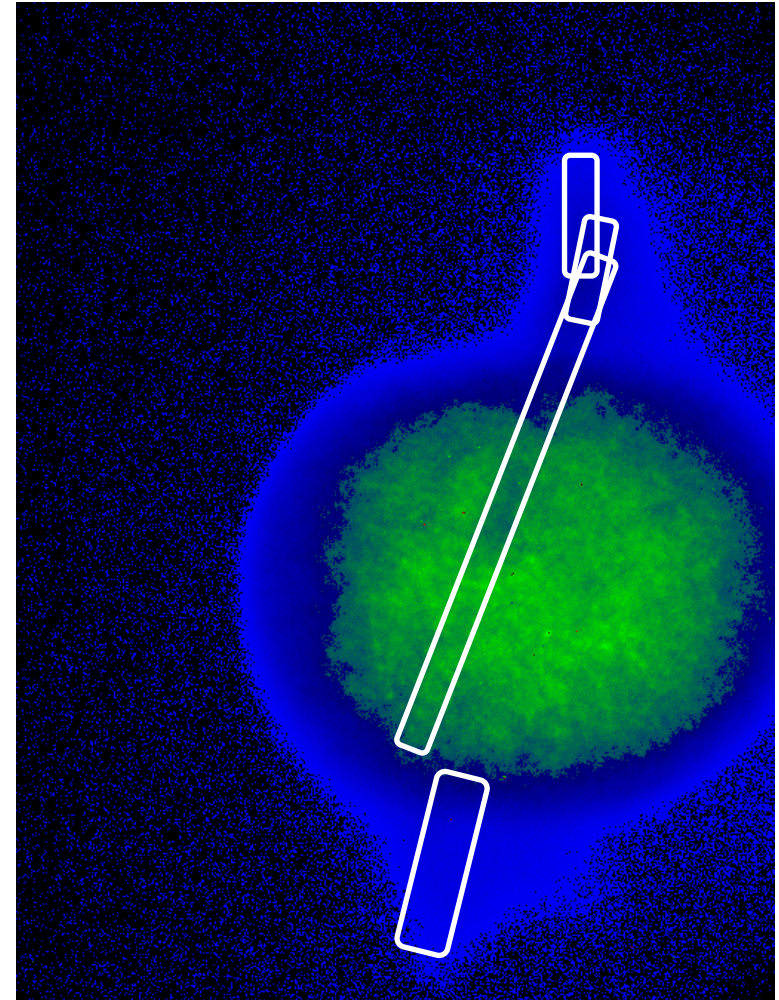
Measurements and data analysis

The beam features are not symmetric and located at a bit different angles compare to the beam center

normal polarity



opposite polarity

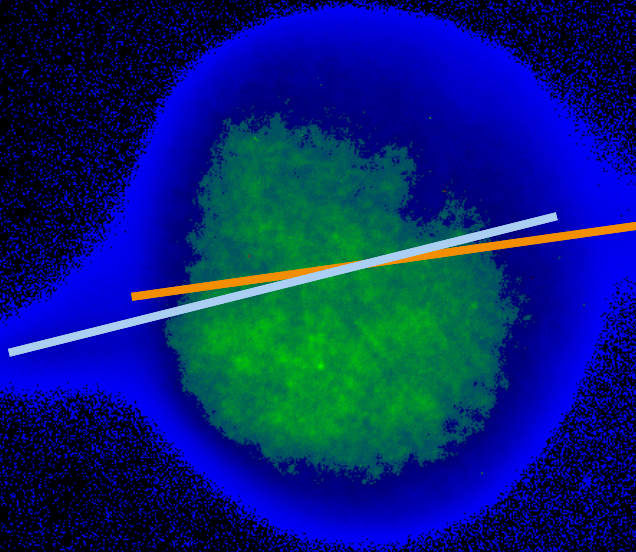


Beam at High1.Scr1

Main solenoid current is 360 A,
normal polarity,
bucking current is 0

Tilt orange = -8 deg

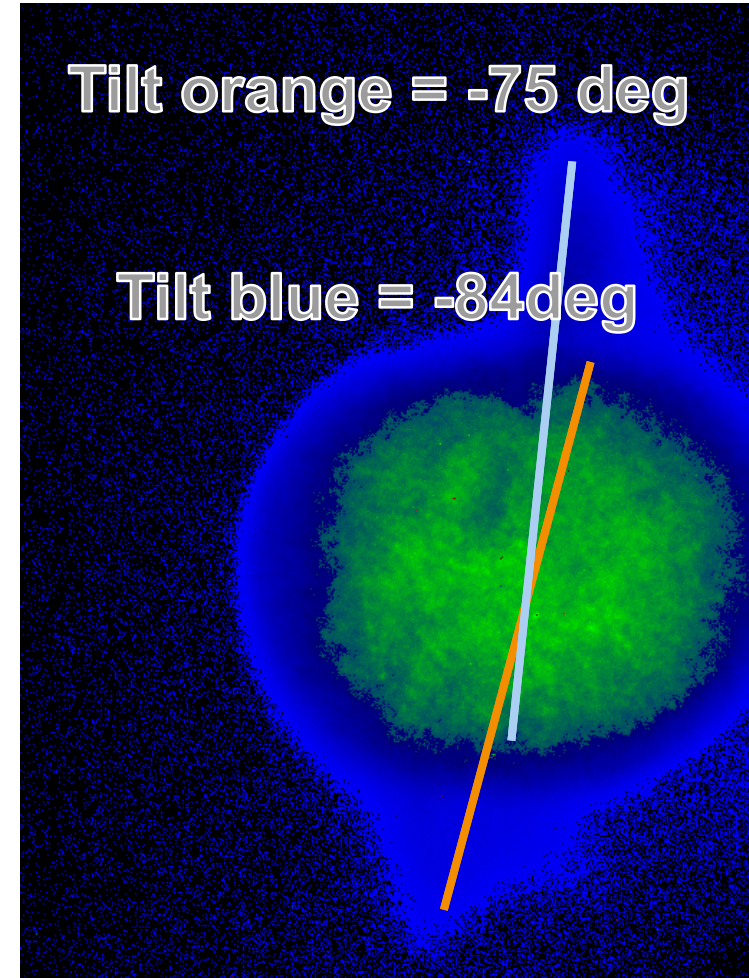
Tilt blue = -14deg



Main solenoid current is 360 A,
opposite polarity,
bucking current is 0

Tilt orange = -75 deg

Tilt blue = -84deg



Combinations of
beam features give
us following angles:

Angle 3 = 67 deg
Angle 4 = 70 deg
Angle 5 = 104 deg
Angle 6 = 119 deg

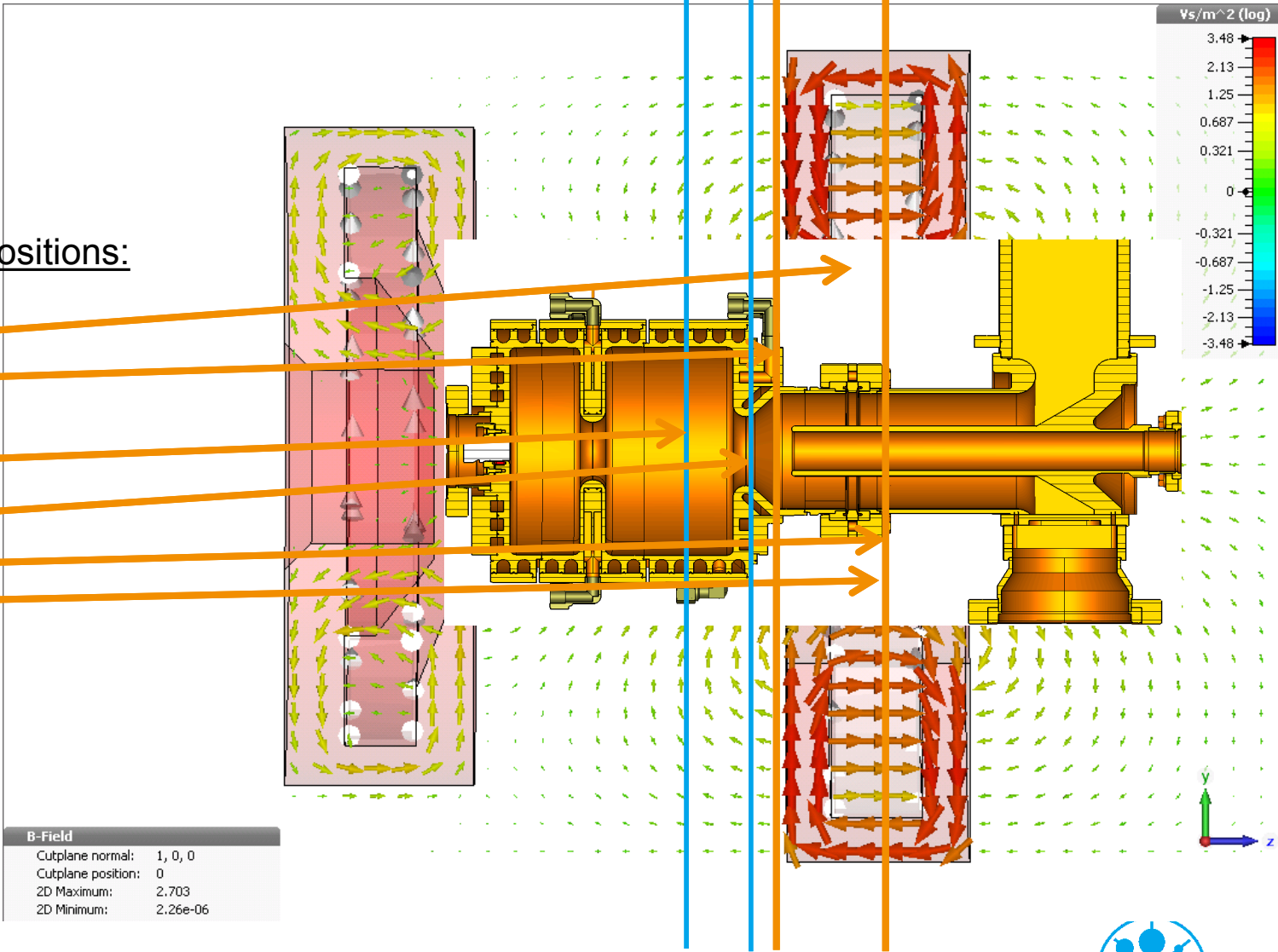
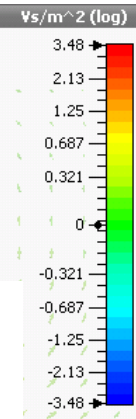
=>

Z 3=0.278 m

Z 4=0.273 m

Z 5=0.2084 m

Z 6=0.0161 m



The list of possible positions:

- 0.2755 m
- 0.1899 m
- 0.1610 m
- 0.2084 m
- 0.2730 m
- 0.2780 m

B-Field	
Cutplane normal:	1, 0, 0
Cutplane position:	0
2D Maximum:	2.703
2D Minimum:	2.26e-06



- The most probable places of the beam irregularity sources are:
 - The center of the main solenoid
 - The transition from the coaxial coupler to the full gun cell
- The z location at 0.161 m is inside the full cell has very low probability of the fields distortions.
- The combination of the main solenoid tilt and the RF coupler field asymmetry could be reason of that beam irregularity.