

Field maps for the -200 kV new CEBAF gun

@-130 kV and -180 kV.

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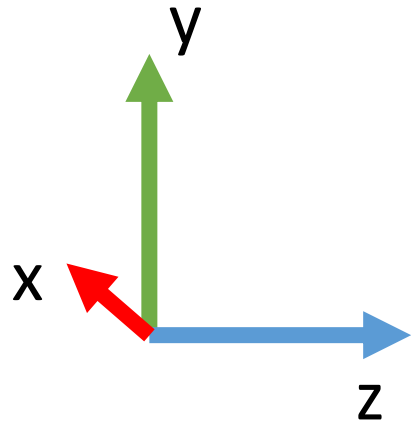
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07/09/18

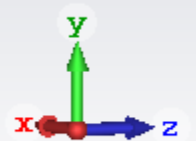
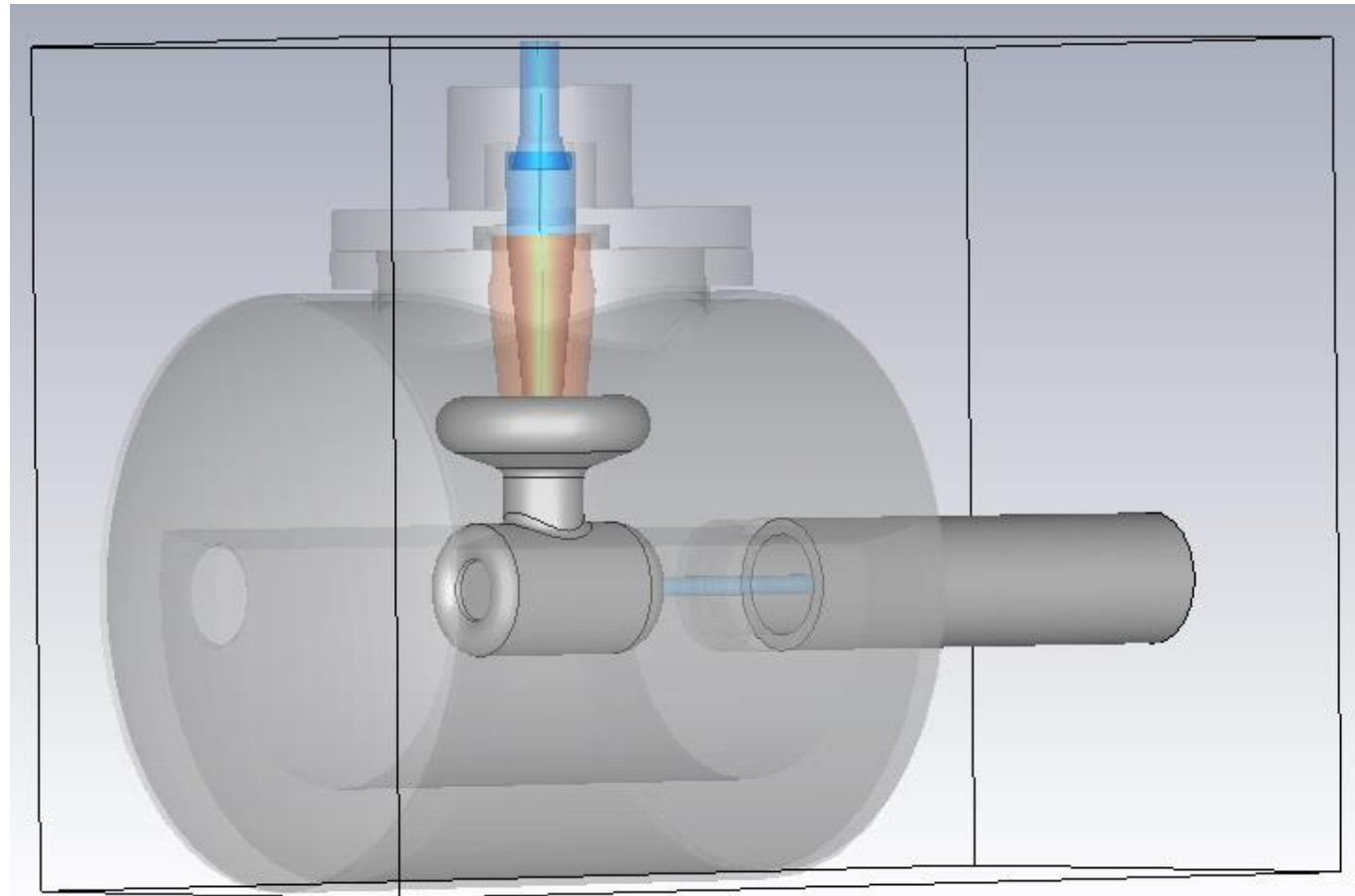
Summary

- CST frame of reference
- Cathode-anode gap
- Files
 - Location and links
- Field maps plots
 - -130 kV
 - -180 kV
- Future steps
- Extra slides

CST frame of reference:

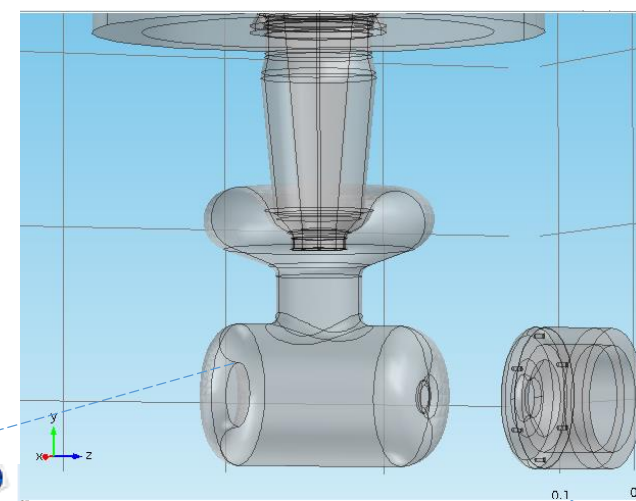
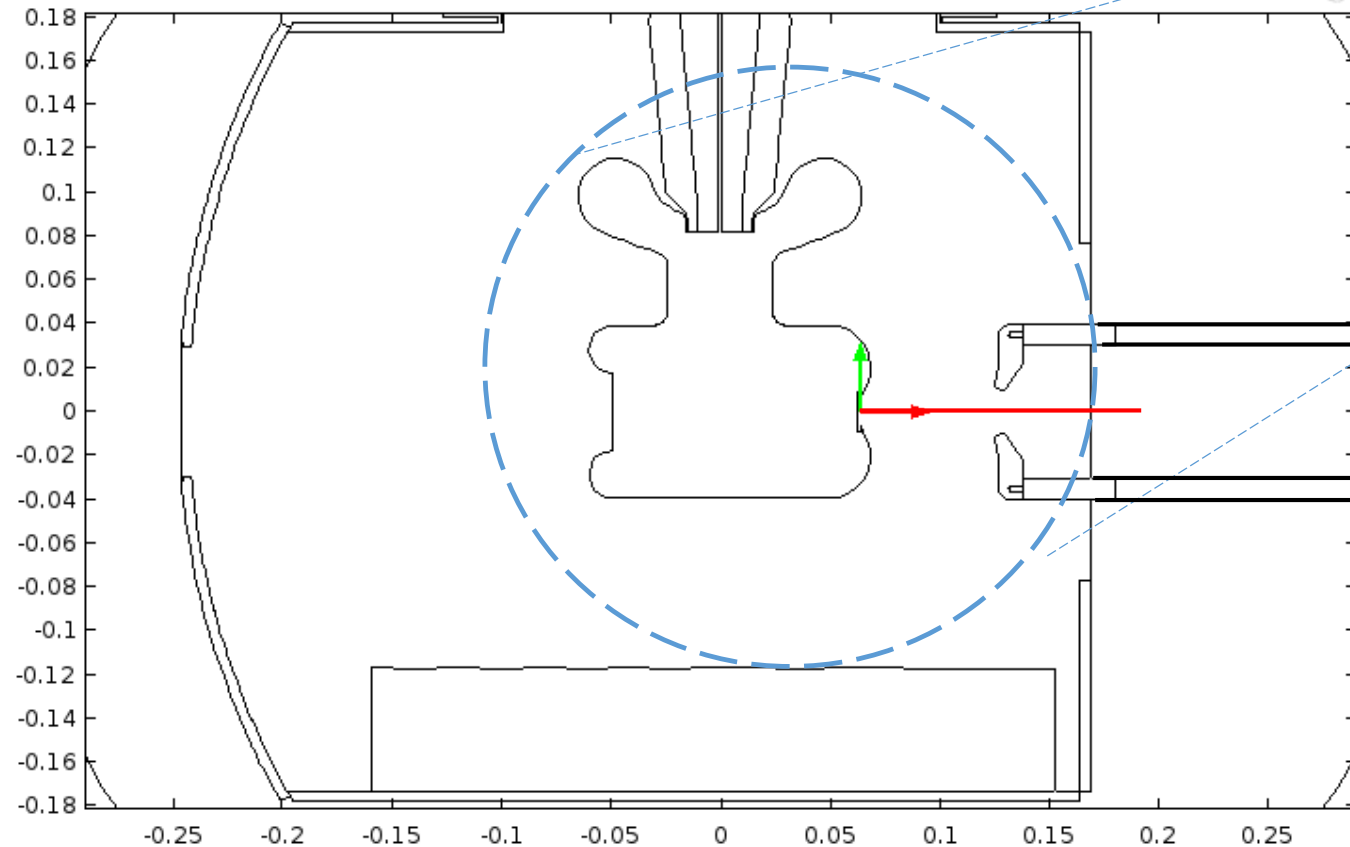


X goes into the page.
On the right side the image is just used as a reference. The dish head plate is “closer” to us, the end of the beam line would be “away” from us.



Cathode-anode gap:

The data for the field map files was taken along the cathode-anode gap. **(The used model actually has a beamline.)** The bottom image shows only a lateral cross section. The red line is shown as reference.



Files:

- The field maps at the cathode-anode gap were produced for the -200 kV new CEBAF gun, **operating at -130 kV and -180 kV**, respectively.
 - The files can be found at Injector group's O:\ drive or clicking the following links:
[O:\inj_group\Gabriel\200 kV gun\Field maps\130 kV E-Field \[2D\] cathode-anode gap 1mm step.txt](O:\inj_group\Gabriel\200 kV gun\Field maps\130 kV E-Field [2D] cathode-anode gap 1mm step.txt)
[O:\inj_group\Gabriel\200 kV gun\Field maps\130 kV E-Field \[3D\] cathode-anode gap 1mm step.txt](O:\inj_group\Gabriel\200 kV gun\Field maps\130 kV E-Field [3D] cathode-anode gap 1mm step.txt)
[O:\inj_group\Gabriel\200 kV gun\Field maps\180 kV E-Field \[2D\] cathode-anode gap 1mm step.txt](O:\inj_group\Gabriel\200 kV gun\Field maps\180 kV E-Field [2D] cathode-anode gap 1mm step.txt)
[O:\inj_group\Gabriel\200 kV gun\Field maps\180 kV E-Field \[3D\] cathode-anode gap 1mm step.txt](O:\inj_group\Gabriel\200 kV gun\Field maps\180 kV E-Field [3D] cathode-anode gap 1mm step.txt)

Field map region:

This was repeated for points on the surface of a square on the photocathode (gray square in the drawing). The data points were taken with a step size of 1mm in the following intervals:

- **For 3D field maps**

$$-6\text{mm} < x < 6\text{mm}$$

$$-6\text{mm} < y < 6\text{mm}$$

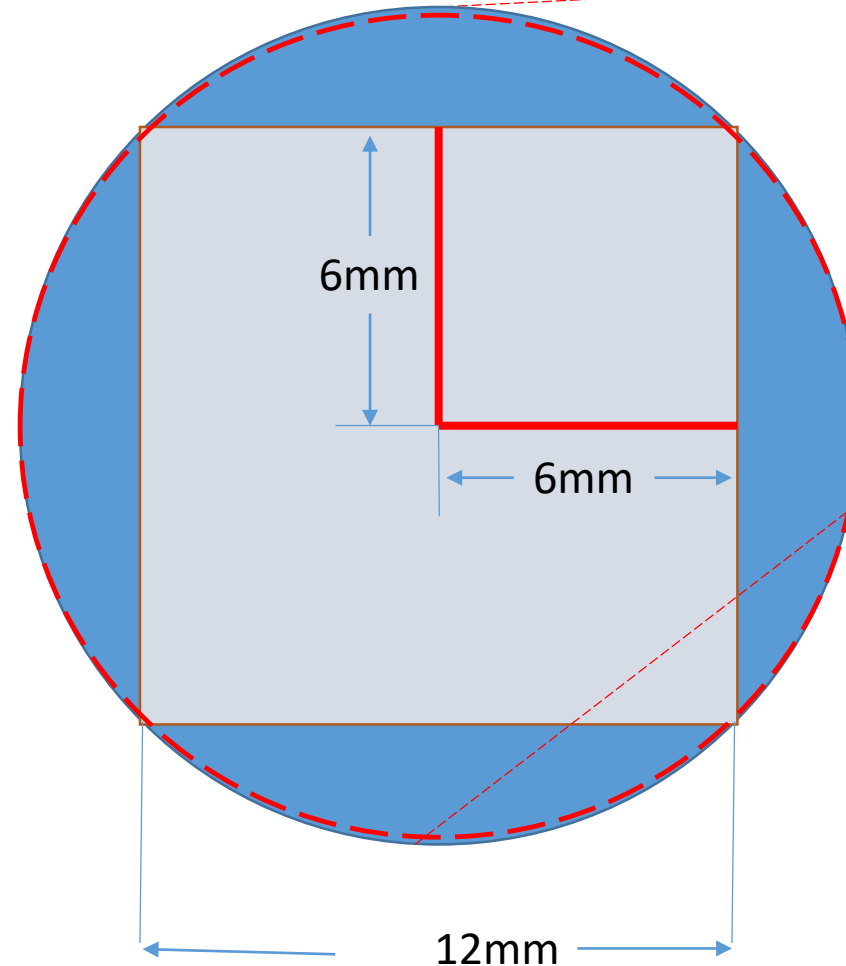
$$64.2\text{mm} < z < 20\text{cm}$$

- **For 2D field maps**

$$x = 0$$

$$-6\text{mm} < y < 6\text{mm}$$

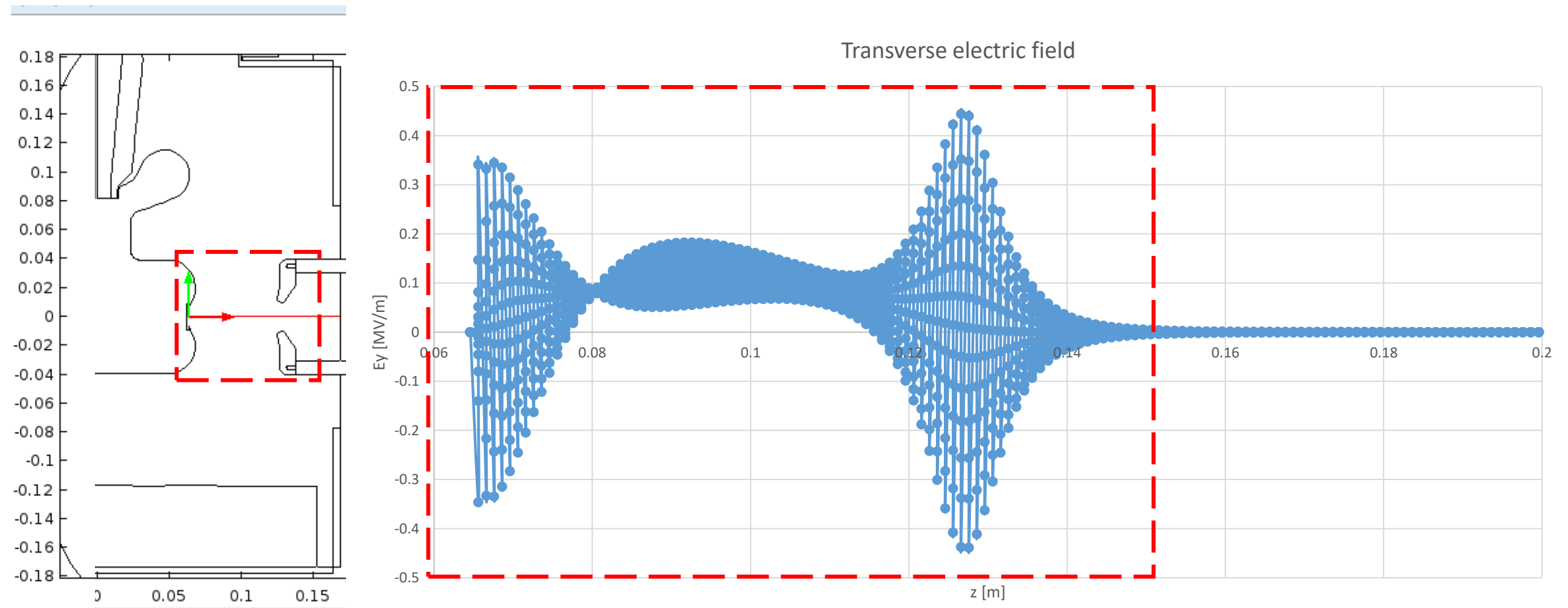
$$64.2\text{mm} < z < 20\text{cm}$$



This was performed for the new CEBAF -200 kV gun model, but the potential was set to -130 kV and -180 kV, respectively.

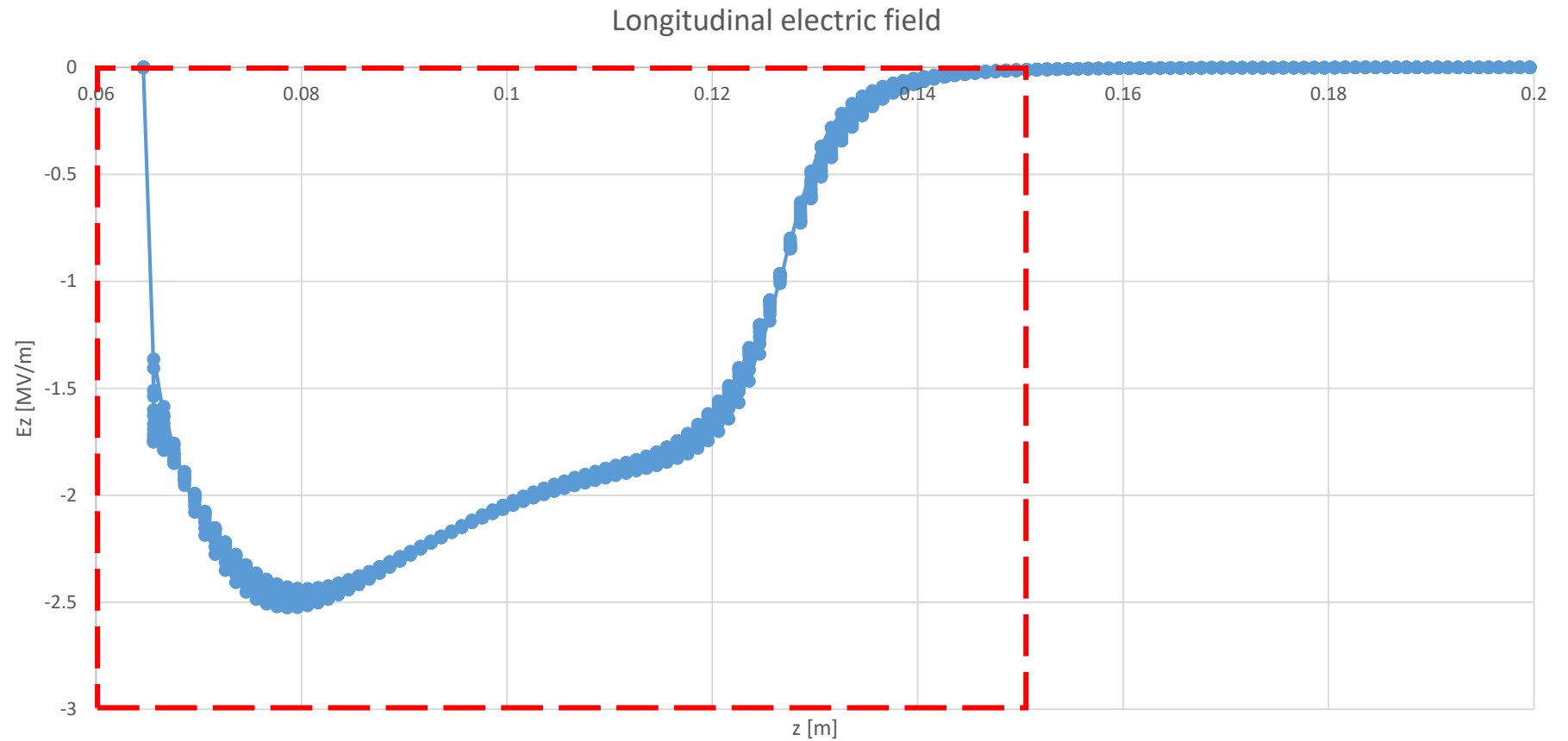
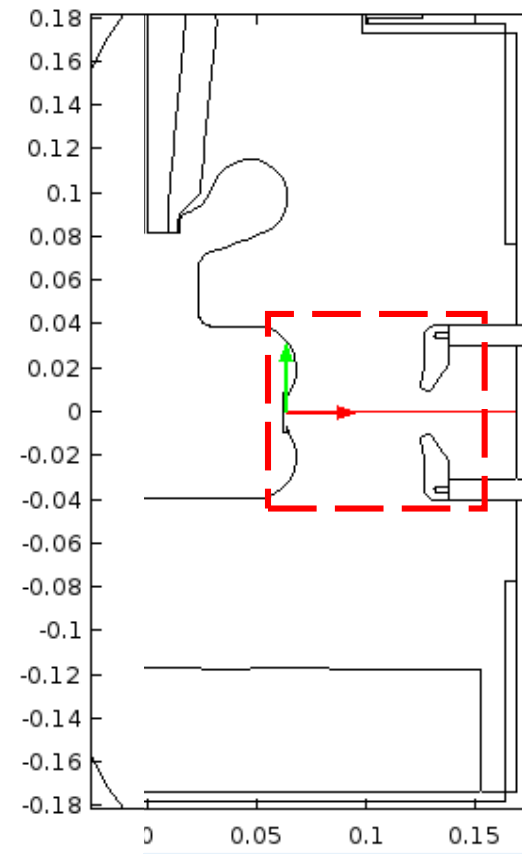
Field map region: -130 kV

- This image shows the electric field E_y component in V/m as a function of position on the z axis.



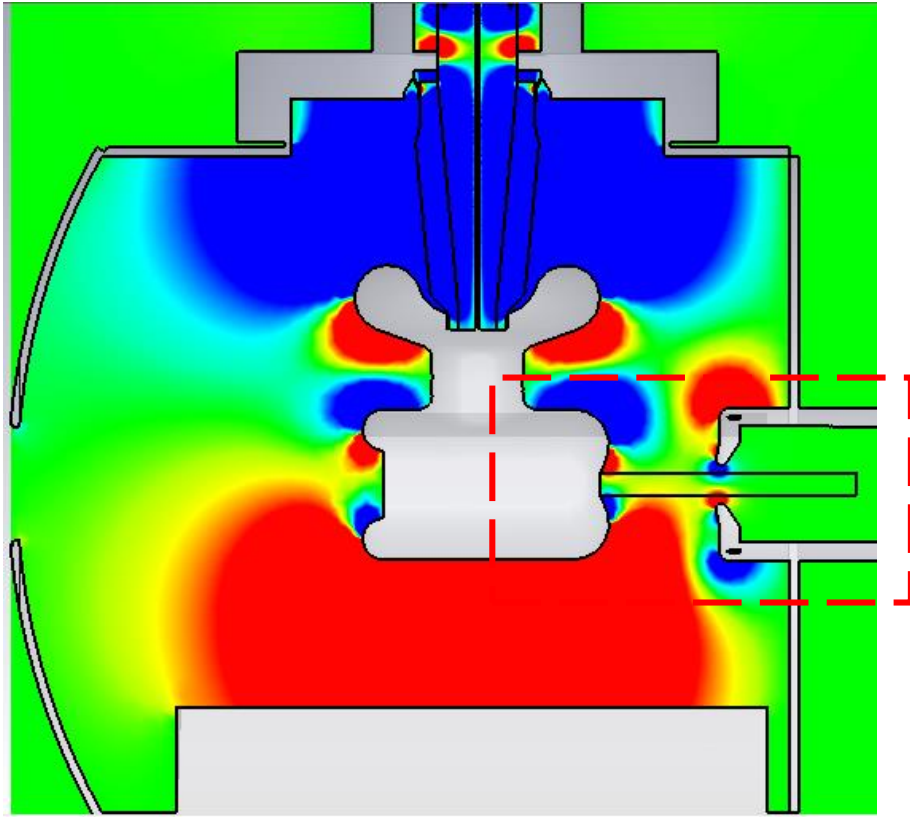
Field map region: -130 kV

- This image shows the electric field E_z component in V/m as a function of position on the z axis.

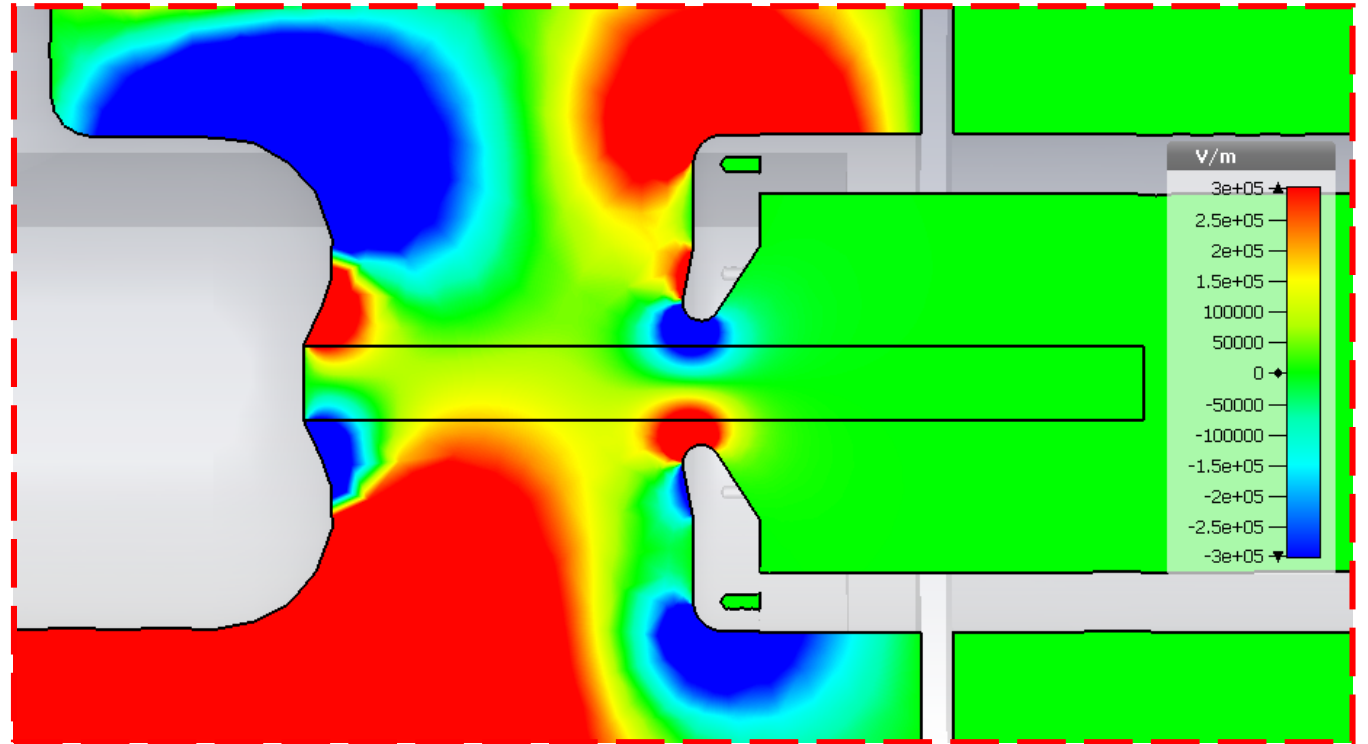


Field map region: -130 kV

- This image shows the magnitude of E_y in V/m as false color.

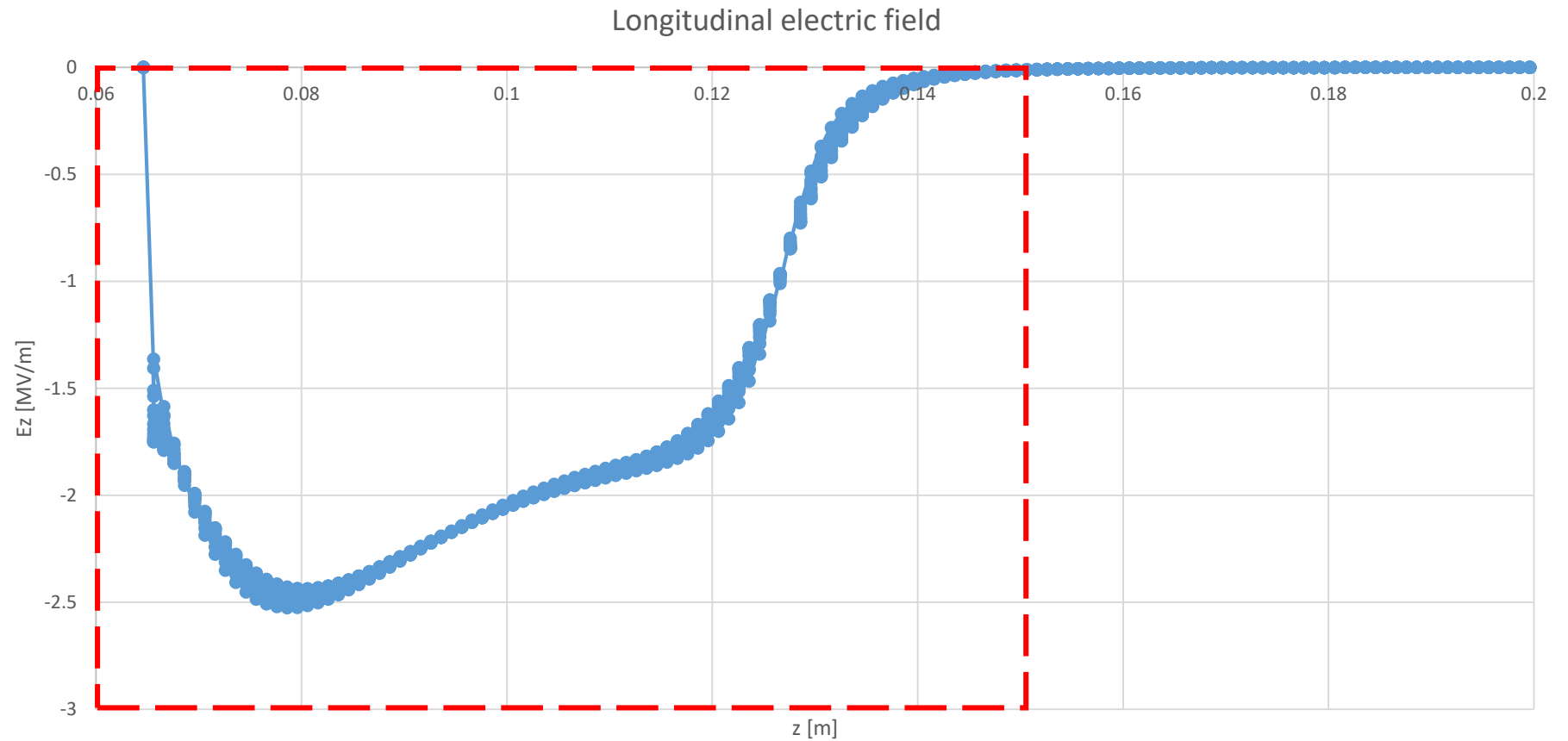
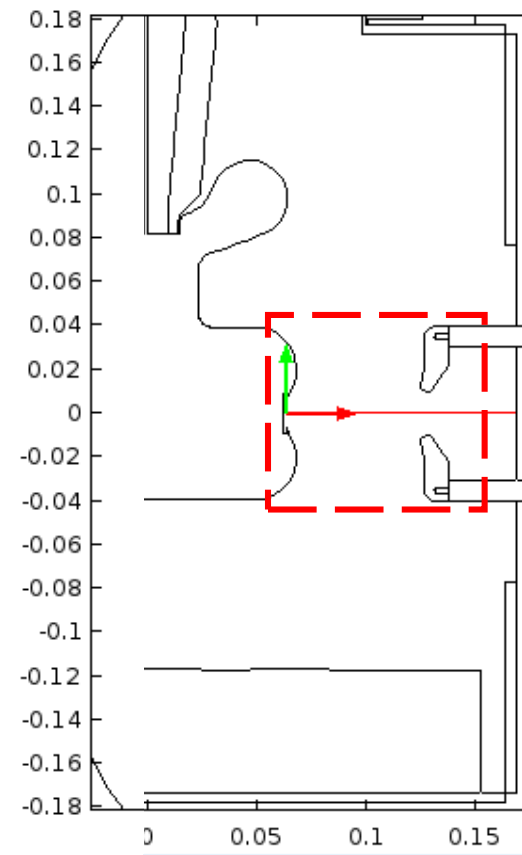


In this close-up we notice the dominance of a “kick” in the middle region. With max values ~ 0.2 MV/m near the middle region.



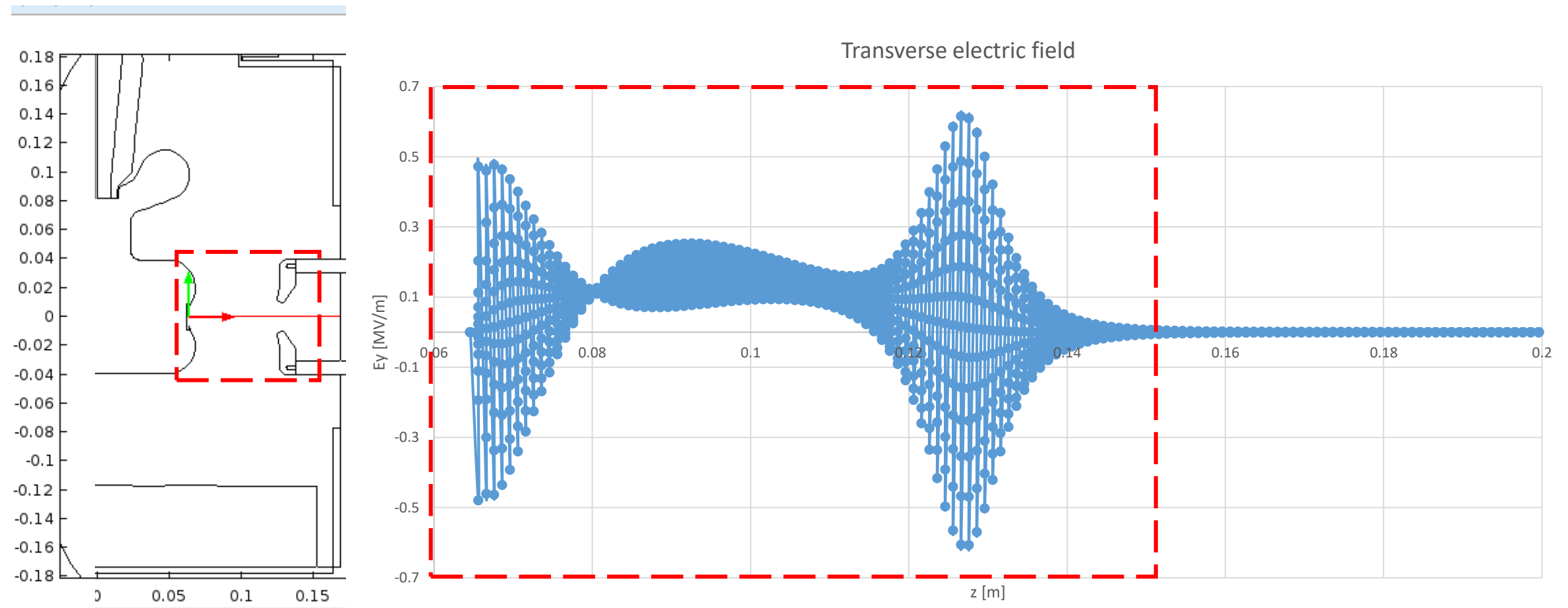
Field map region: -130 kV

- This image shows the electric field E_z component in V/m as a function of position on the z axis.



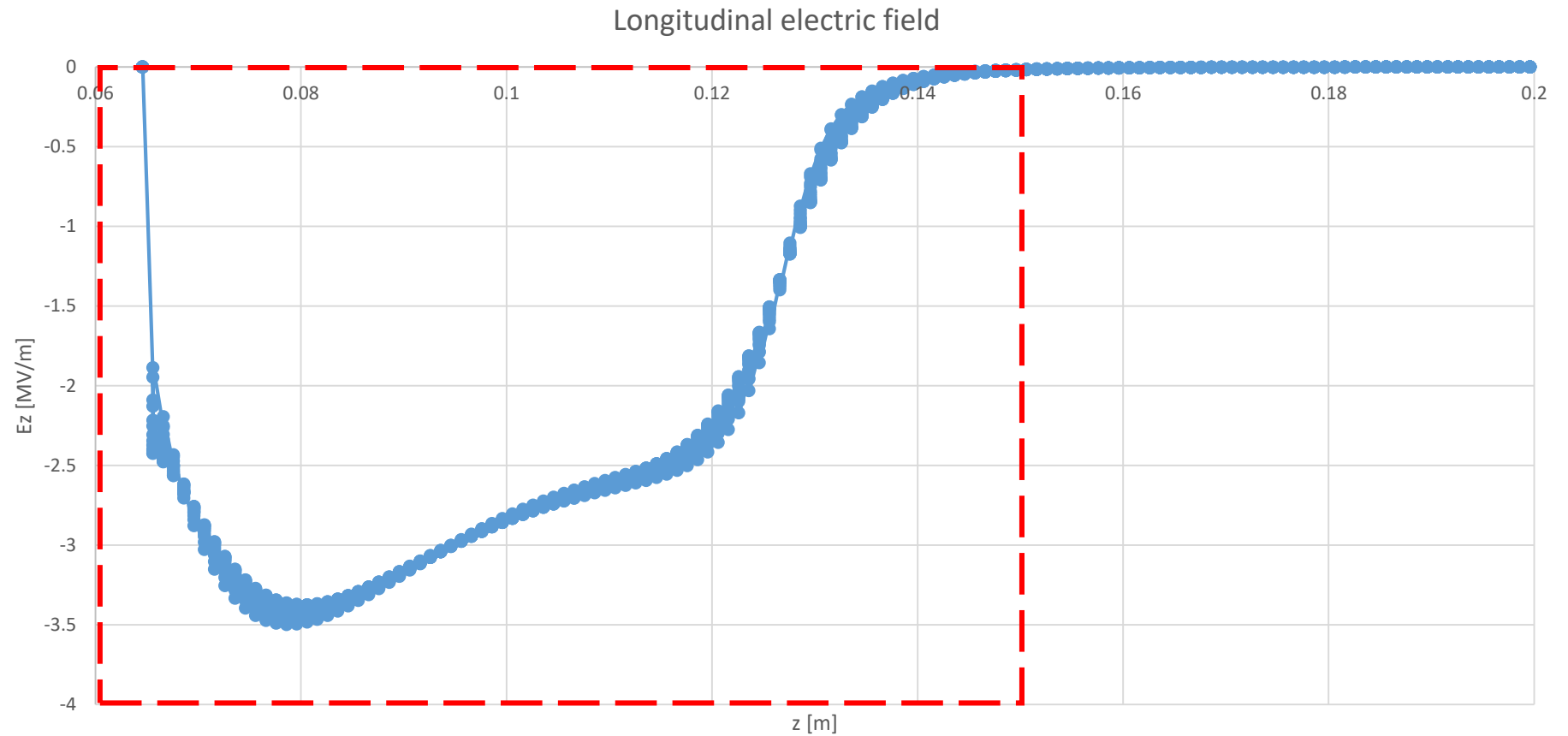
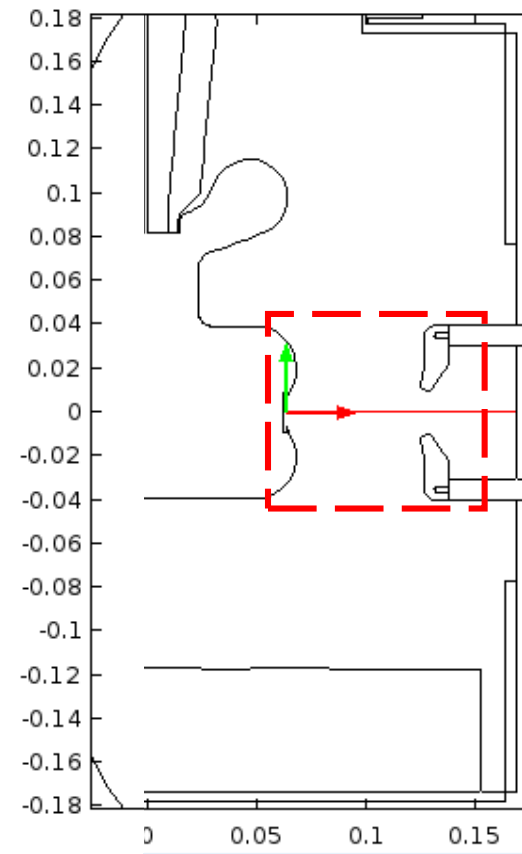
Field map region: -180 kV

- This image shows the electric field E_y component in V/m as a function of position on the z axis.



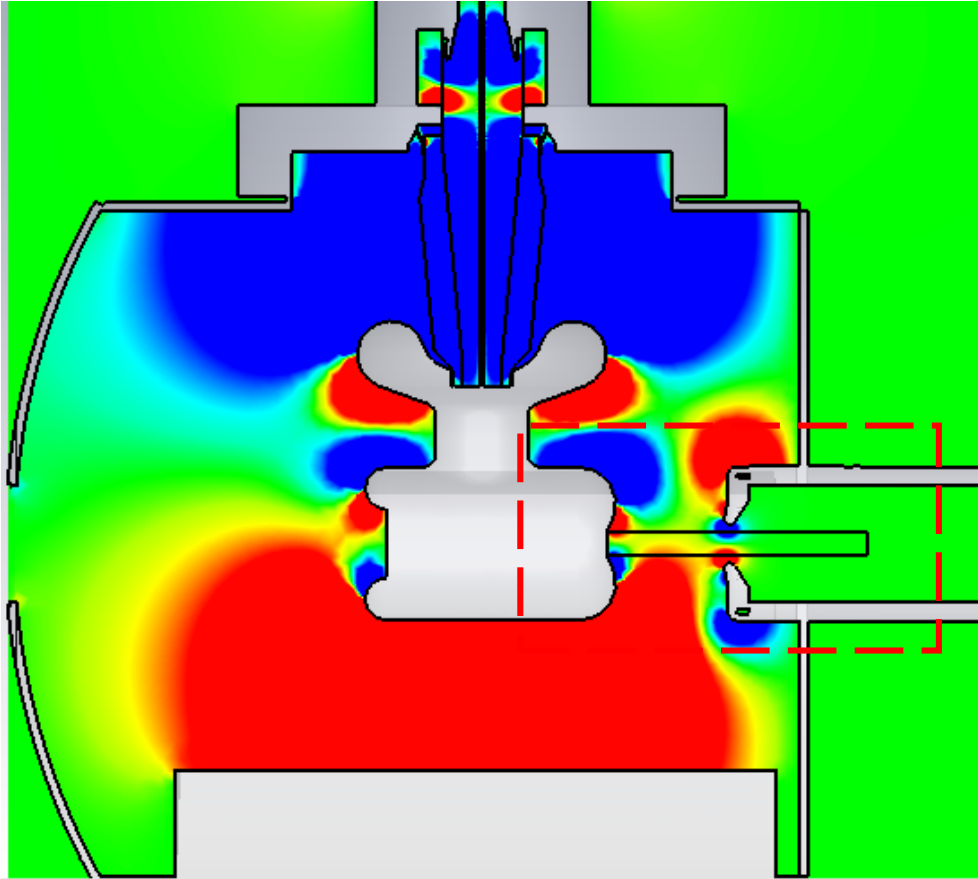
Field map region: -180 kV

- This image shows the electric field E_z component in V/m as a function of position on the z axis.

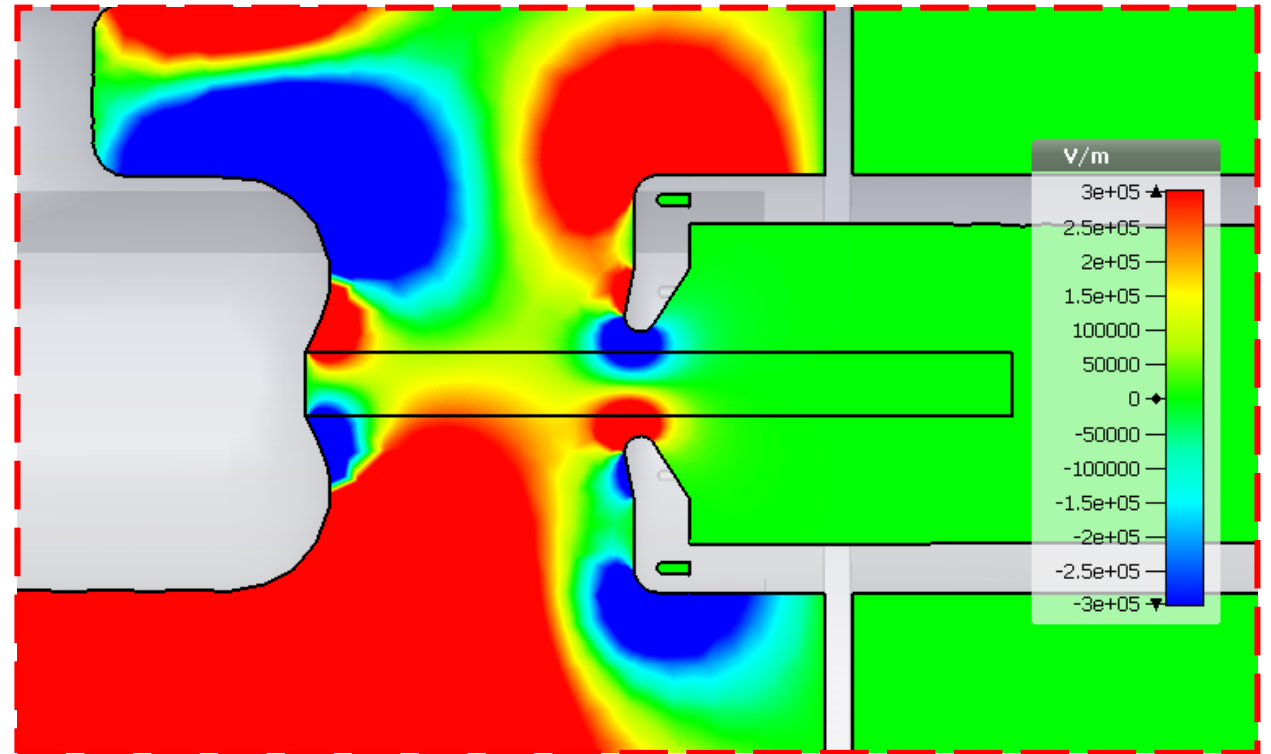


Field map region: -180 kV

- This image shows the magnitude of E_y in V/m as false color.



In this close-up we notice the dominance of a “kick” in the middle region. With max values ~ 0.3 MV/m near the middle region.



Fin.