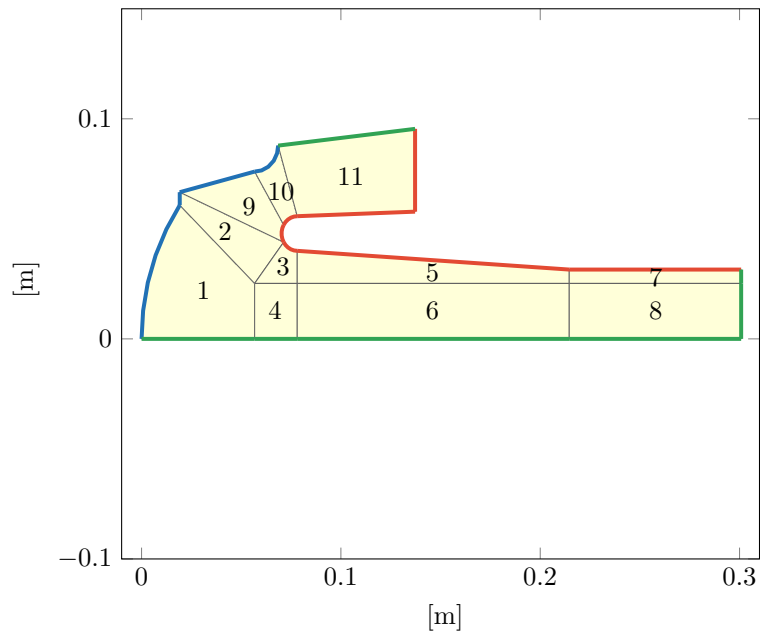


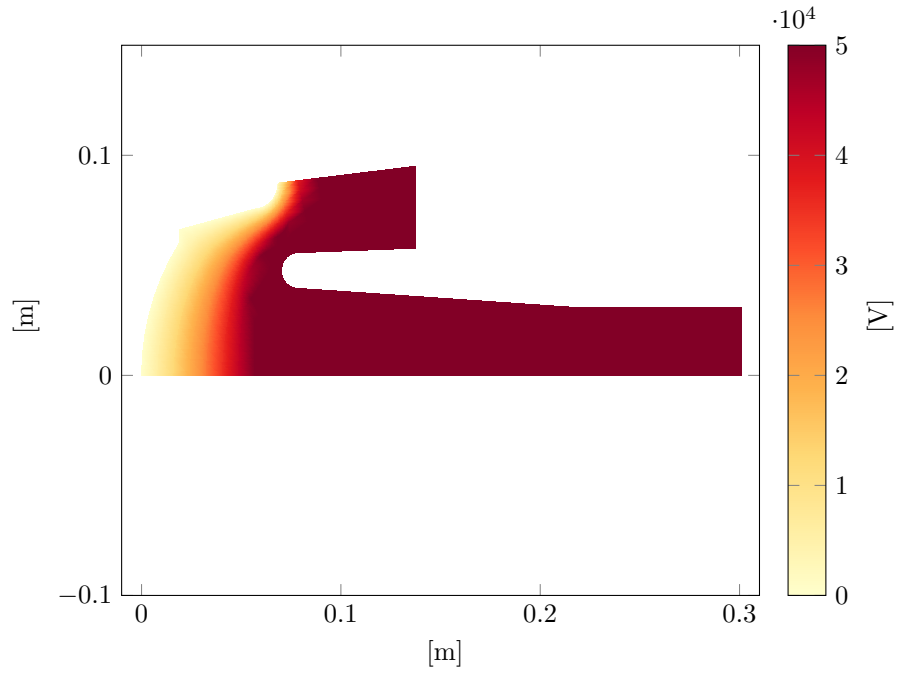
Electrongun

1 Overview

- geometry is unchanged from Artem's version
- all computations use the full beamtube (1.5 m)



- electrostatic potential using $p = 2$ and $nsub = 8$
- absolute value of the electric field using $p = 2$ and $nsub = 8$
- convergence studies for the electrostatic potential and the electric field
- the reference uses $p = 3$ and $nsub = 64$
- the relative error is computed using the maximum field value

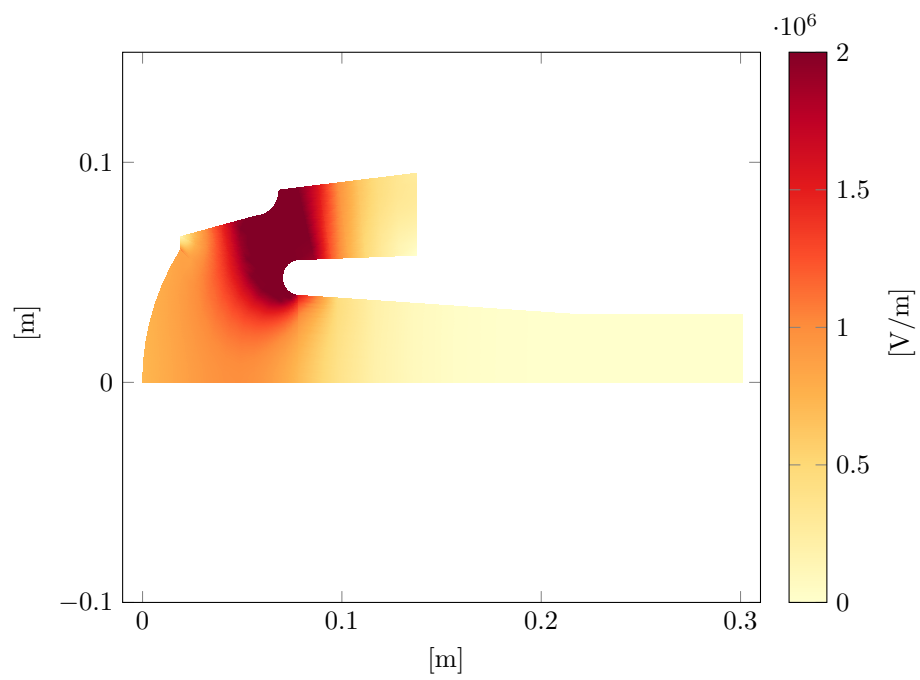


2 Tracking

- new implementation for fieldmap computation: hand over $\Delta_{x,y,z}$ and compute h as the diagonal of the cuboid
- choose $N_{x,y,z}$ such that the desired domain is fully enclosed
- repeat convergence study by simultaneously decreasing Δ by 2^{-n}
- do this for full 3D fieldmap right away (only compute one quadrant and take care of the duplicate entries at the interfaces)
- emission is handled on my side, either uniformly or normally distributed particles
- both types depend on multiple parameters: total charge Q , number of particles N_{prt} , position of probe particles and also bounds for uniform or μ, σ for normal distribution

3 Optimization

- cost function uses outermost beam minimum, distance of beam minima and radial derivatives of minima
- extra constraint to force continuity at (0,0)
- start with straight cathode



- only load the geometry once and manipulate control points (increase number of control points with each optimization cycle)

