

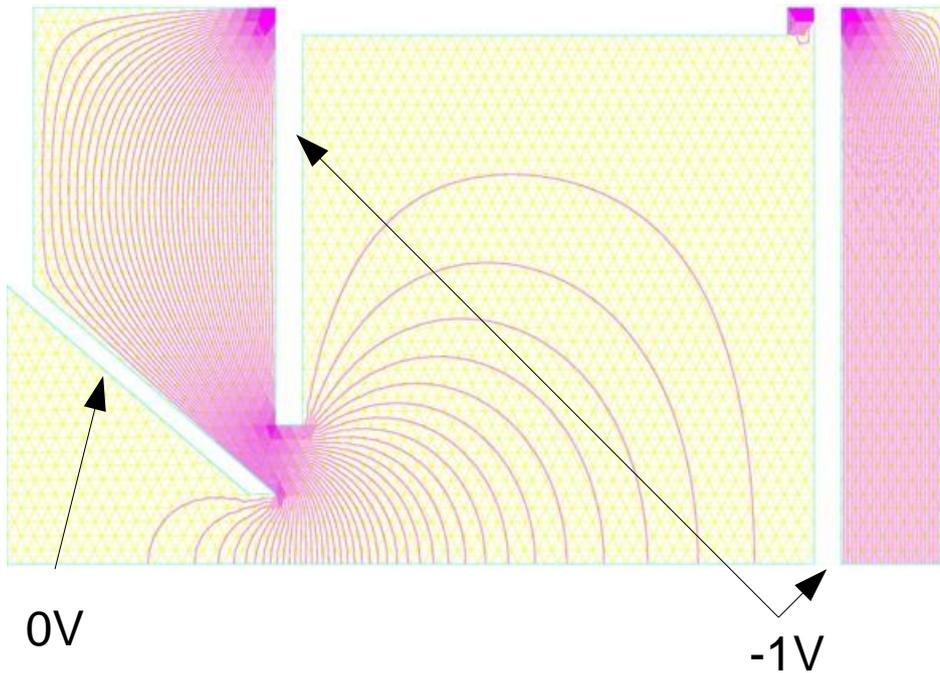
Preliminary RFA Design

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What I am doing

- Start with a known design from
 - “High-resolution retarding field analyzer”, S.D. Johnson et al, J. Vac. Sci, Technol. B 21 (1), Jan/Feb 2003.
 - Modify it for our needs
- Simulate the electron trajectories
 - Verify Johnson's results.
 - Use our guess electron parameters to calculate efficiencies etc.

High Resolution RFA



Above is my calculation with Poisson. Right is Johnson's calculation using Simion.

Dimensions of my sim are:
 hole radius is 0.5cm. Radius of barrel is 2cm and length is 2cm. Is this the approx size?

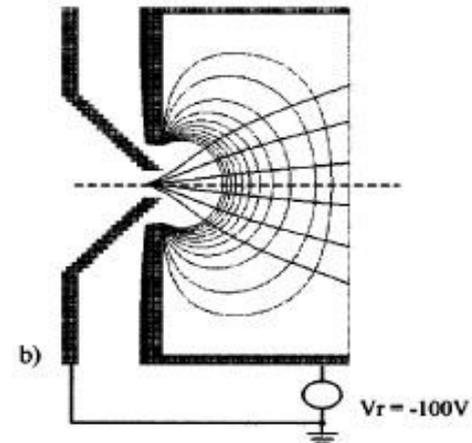
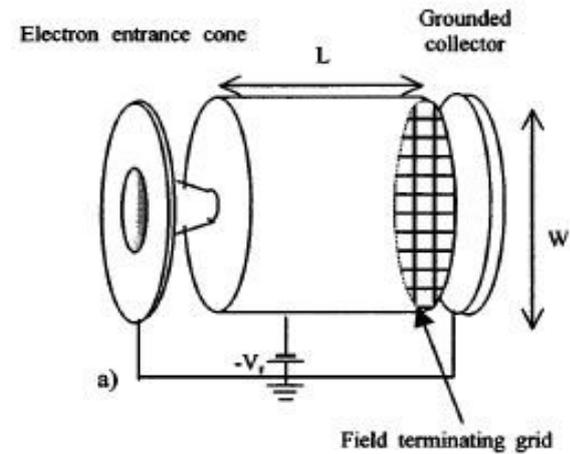
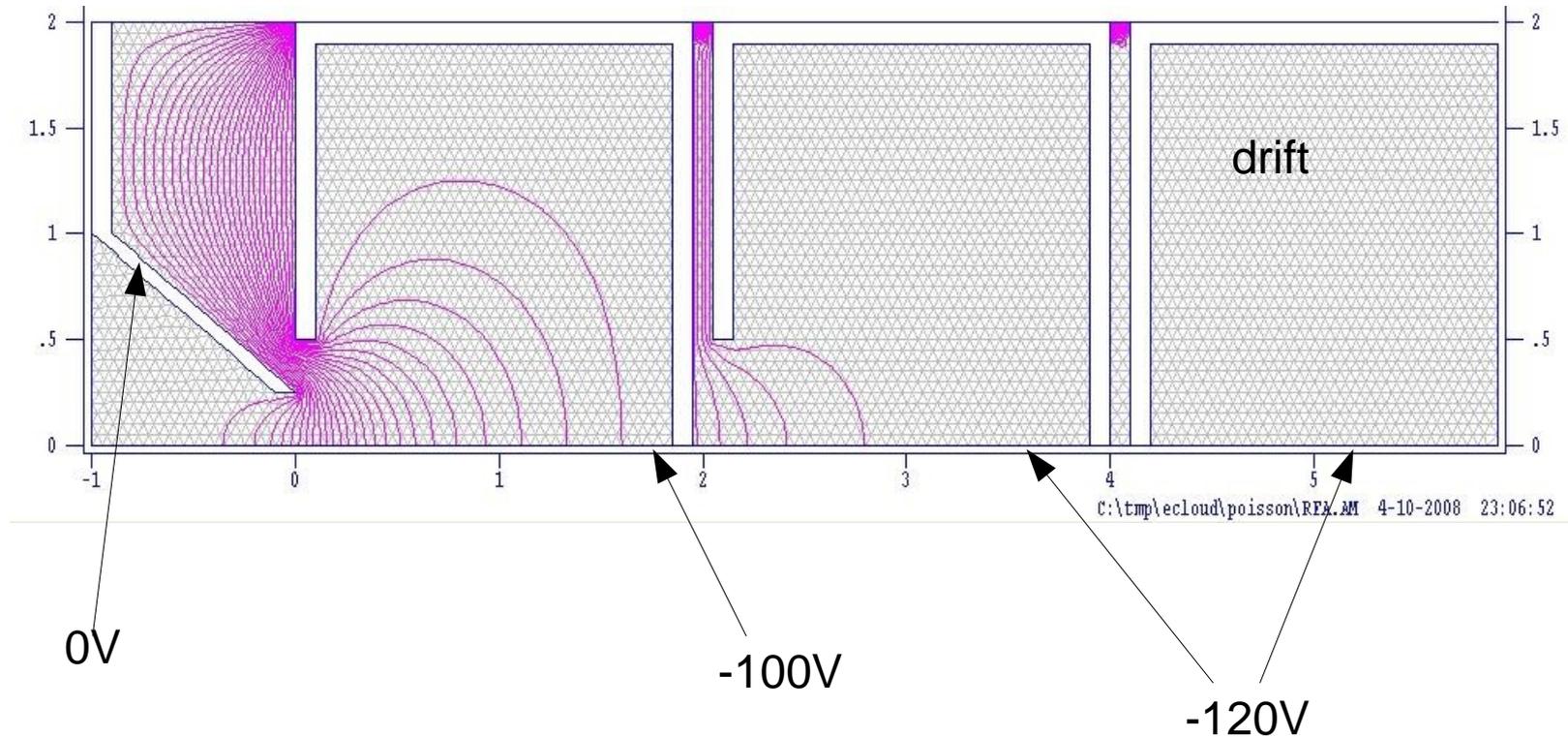


FIG. 1. (a) Schematic diagram of the standard HiRes RFA and (b) simulation results indicating the equipotential surfaces of the retarding field along with three 100 eV electron trajectories with entrance angles of $\pm 5^\circ$, $\pm 15^\circ$, and $\pm 25^\circ$.

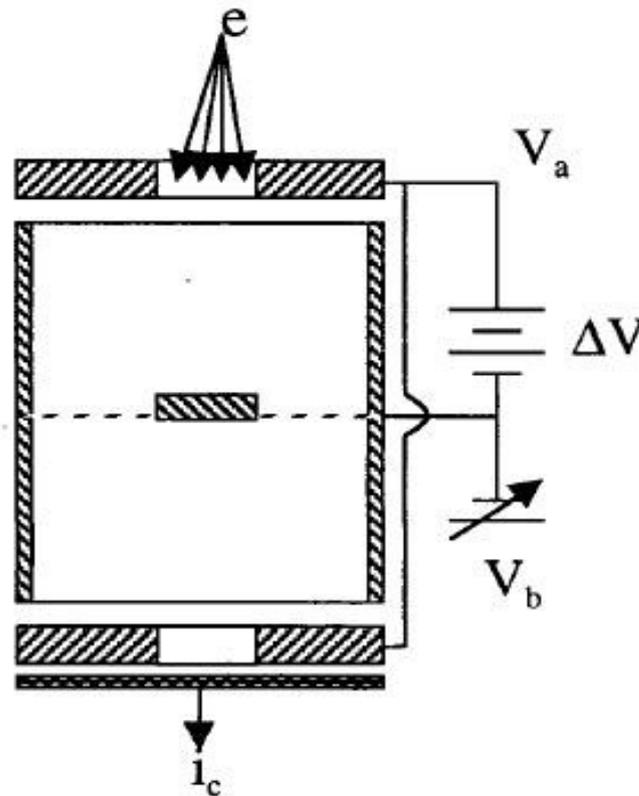
Add DeFocusing Lens Barrel



Length is 6 cm

See Mathematica simulation using fields calculated by Poisson.

Compare with Bessel Box Design



R.A. Rosenberg
et al, "Design and
Implementation of
Simple Electron
Detectors for
Accelerator
Diagnostics",
PAC2001.

Figure 2: Schematic diagram of the Bessel Box analyzer.
(Symbols are described in text.)

Simulations

- Use Simion (3D calculation) to gauge performance of
 - Present RFA in MI.
 - High resolution RFA
 - Bessel Box RFA
 - My design
- Optimise, optimise, optimise ...

Some things to consider

- Is the EMT sensitive to energy of the electron?
- What the relevant parameters for the design?
 - Miguel Furman to supply params?
- Can I get a design done, let's say by August?