Changing Energy for Chopping Tail

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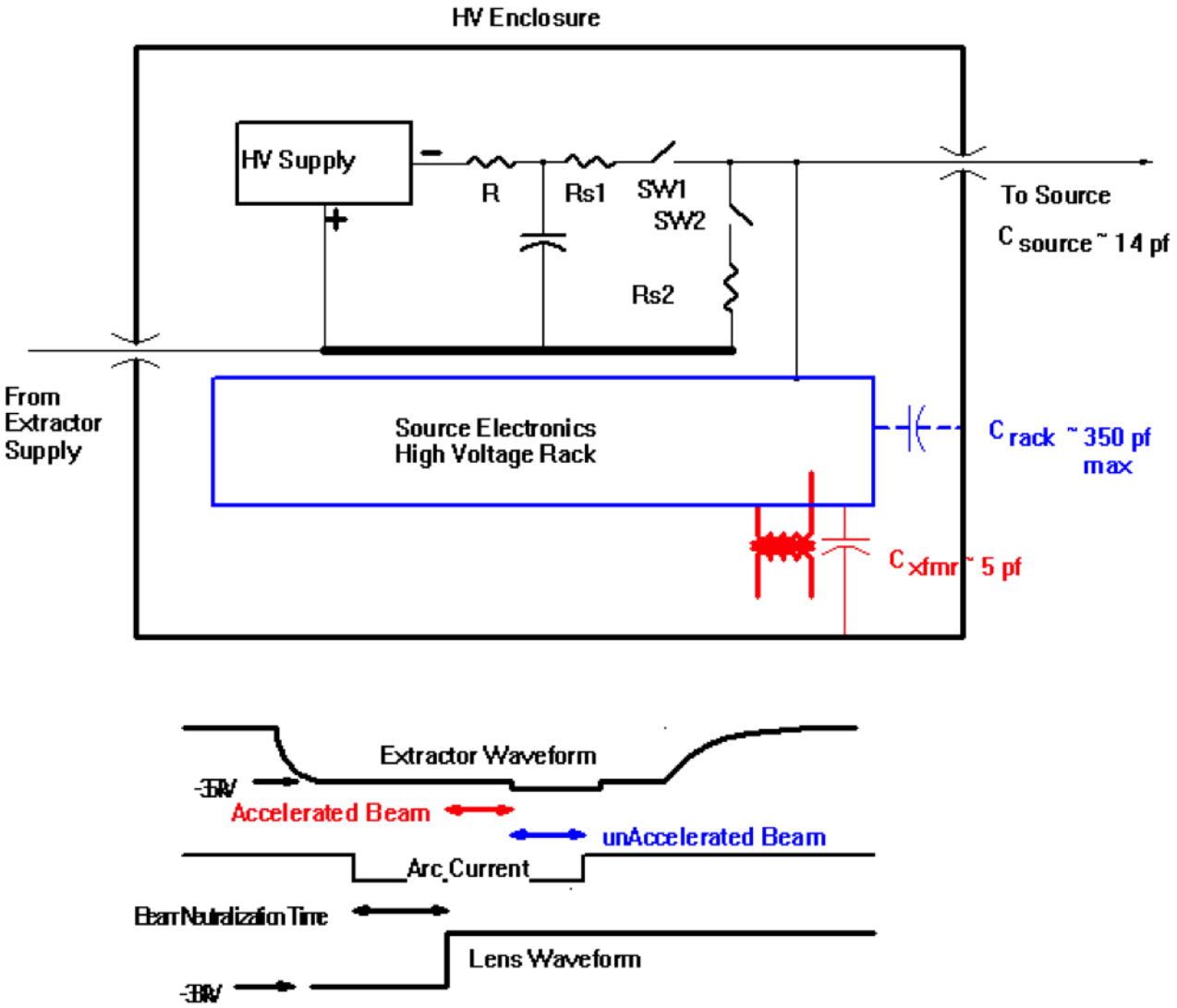
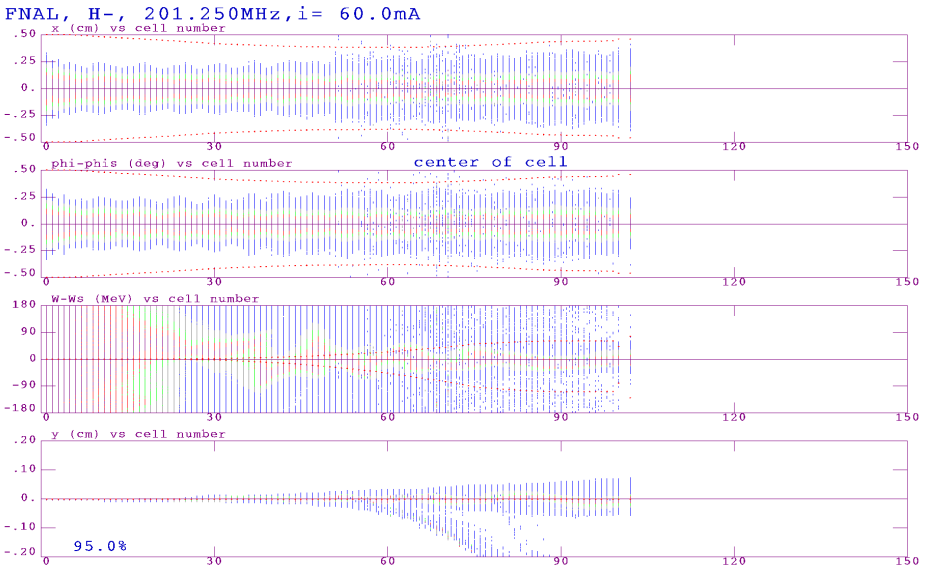
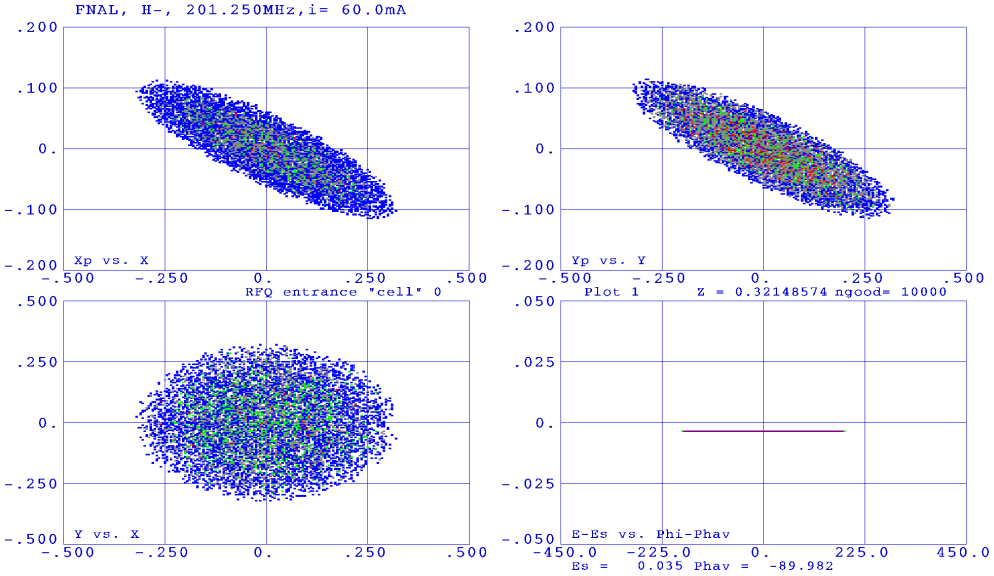
Energy Chopper

- Try to use limited energy acceptance of the RFQ as the tail end chopper
- What voltage change at the source is needed to utilize this?
  - Urban legend has the acceptance of the RFQ at 1% of design energy.
  - Is this true?
- 2 simulations:
  - 31.5keV (3.5kV switch, 10% lower energy)
  - 25keV (28.5% lower energy)

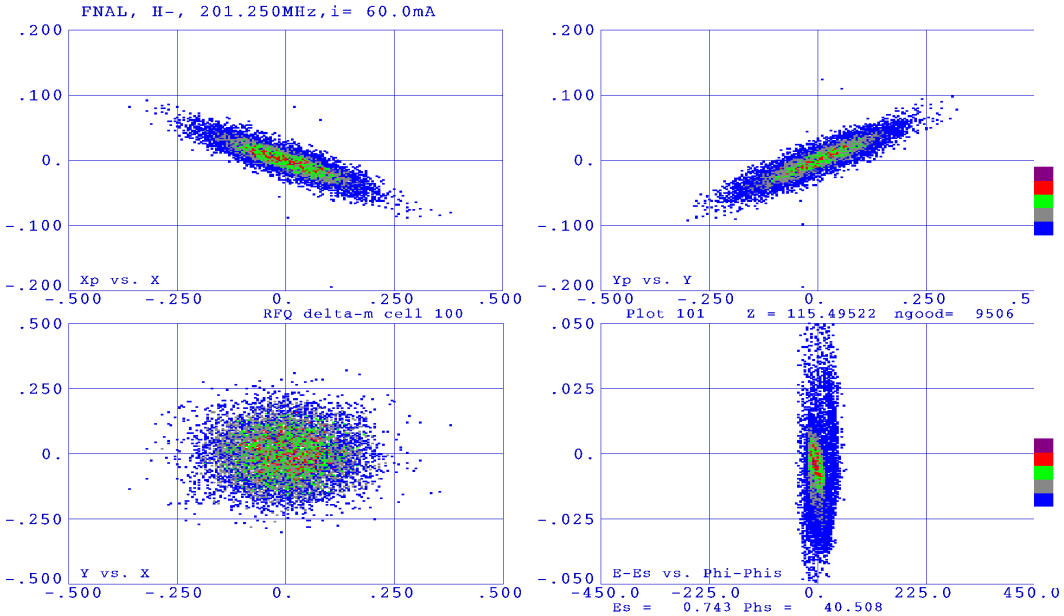

HV Enclosure
HV Supply
R
Rs1
SW1
SW2
Rs2
To Source
C source ~ 14 pf
From
Extractor
Supply
Source Electronics
High Voltage Rack
C rack ~ 350 pf
max
C xfmr ~ 5 pf
Extractor Waveform
-5kV
Accelerated Beam
unAccelerated Beam
Arc Current
Beam Neutralization Time
Lens Waveform
-3kV

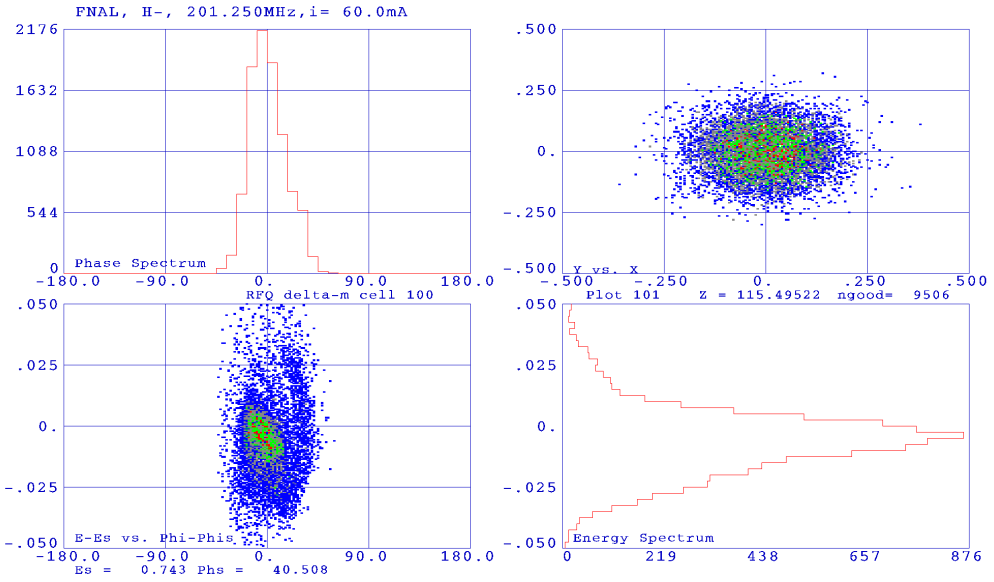
31.5keV (PARMTEQM)



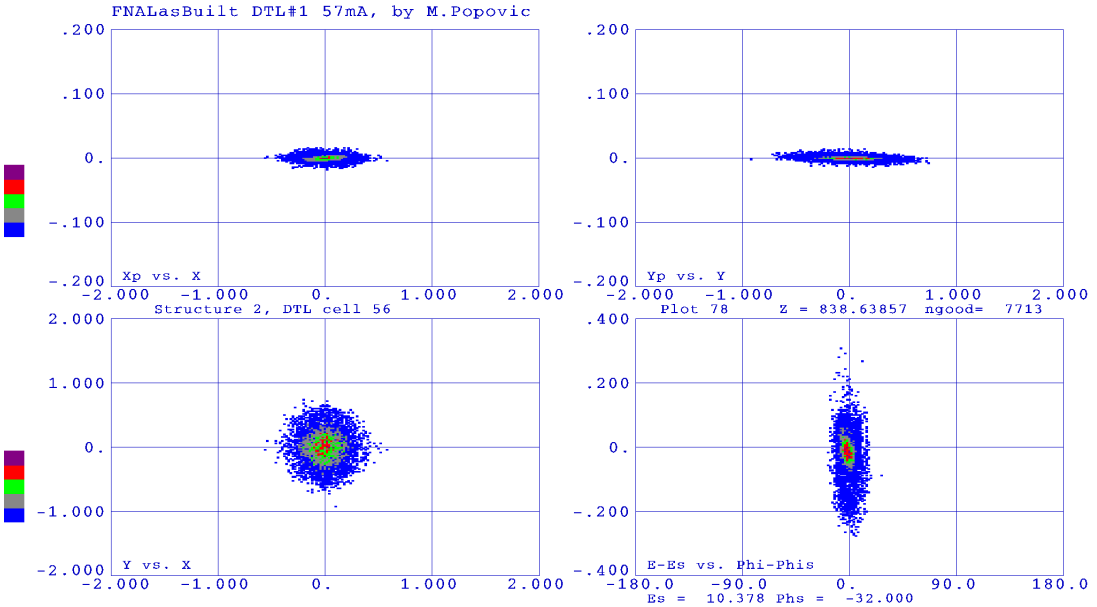


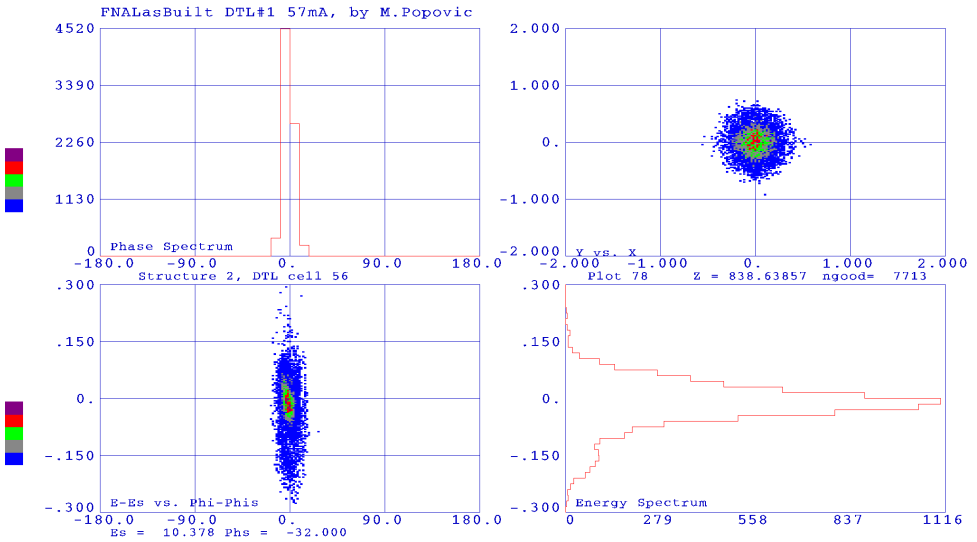
95% at end of RFQ





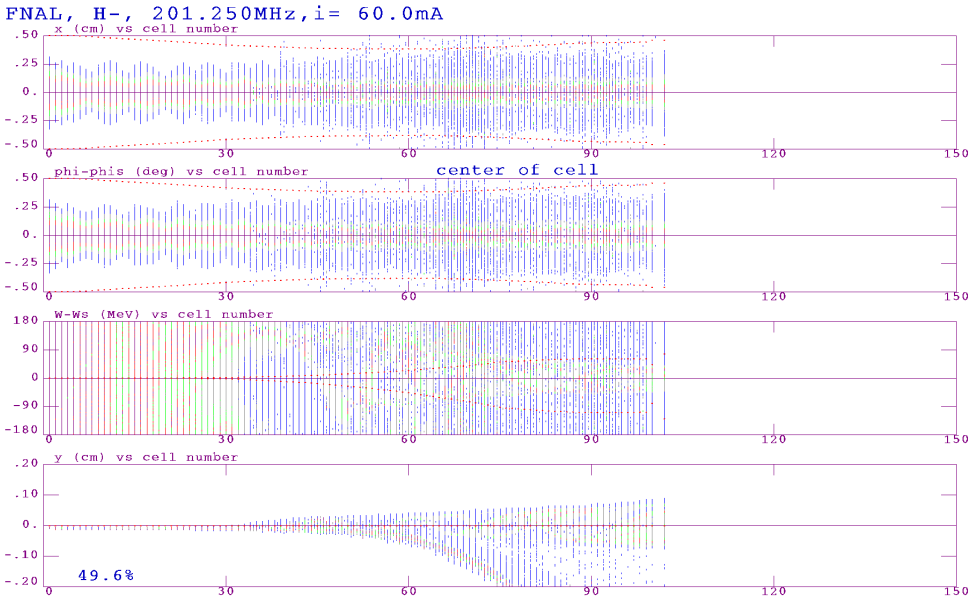
31.5keV (PARMILA)

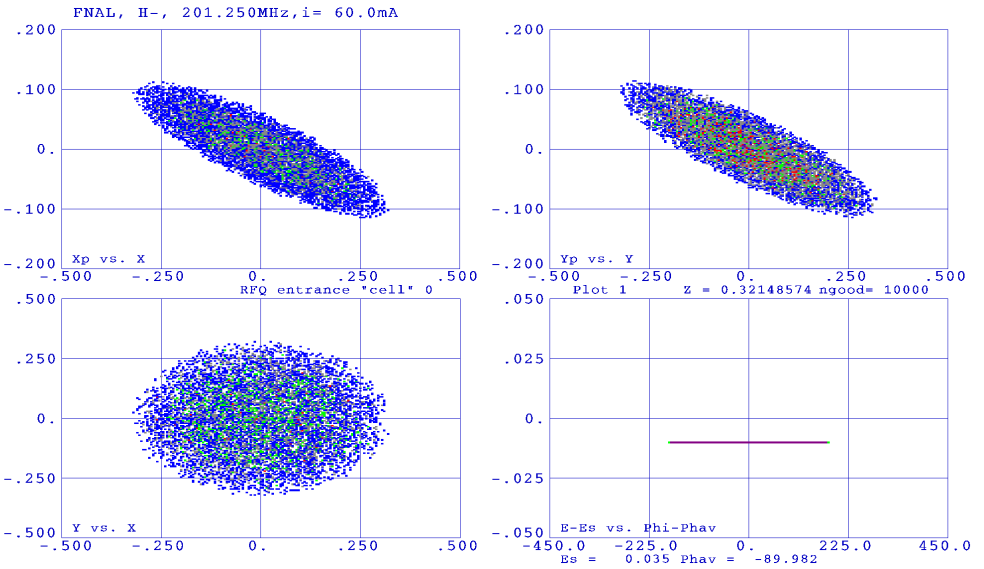




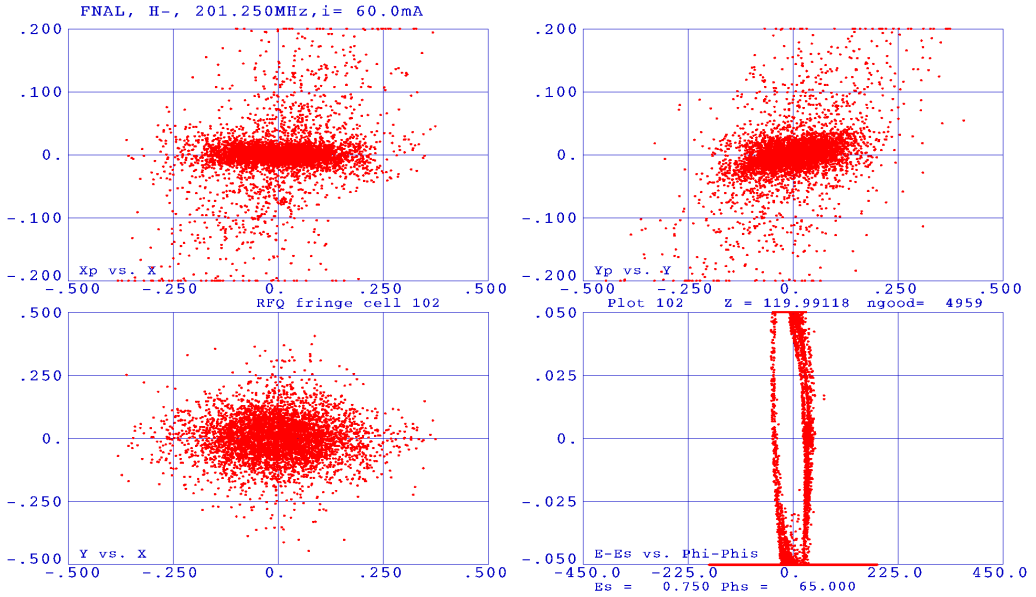
77% of particles will get through Tank 1!

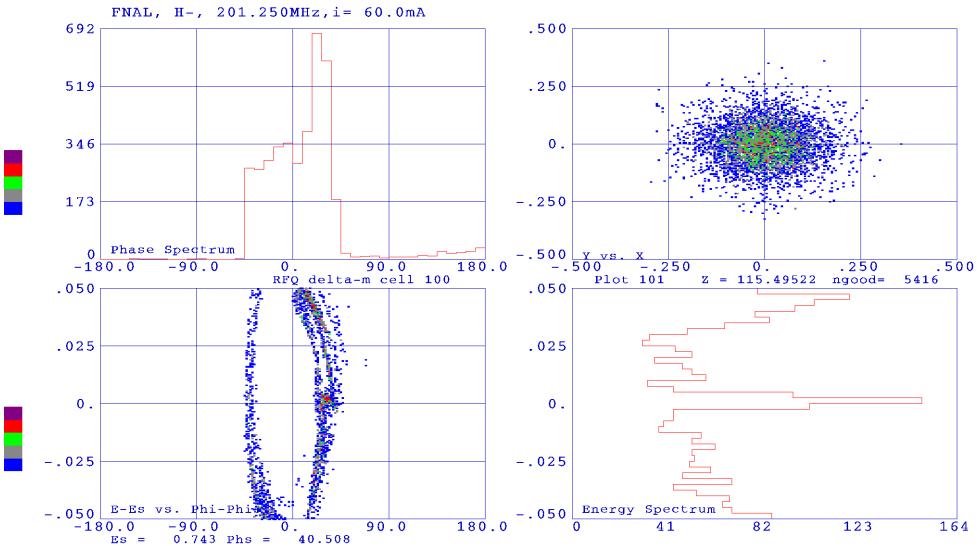
25keV (PARMTEQM)





49.6% at the end of RFQ





25keV (PARMILA)

- Only 1% of particles get through to the end of Tank 1

Conclusion

- 1% acceptance of RFQ is applicable if we want > 99% transmission.
- 10% change in energy is insufficient for chopping.
- At least 28% lower in energy is required for < 1% transmission at the end of Tank 1.