

Flash-box results

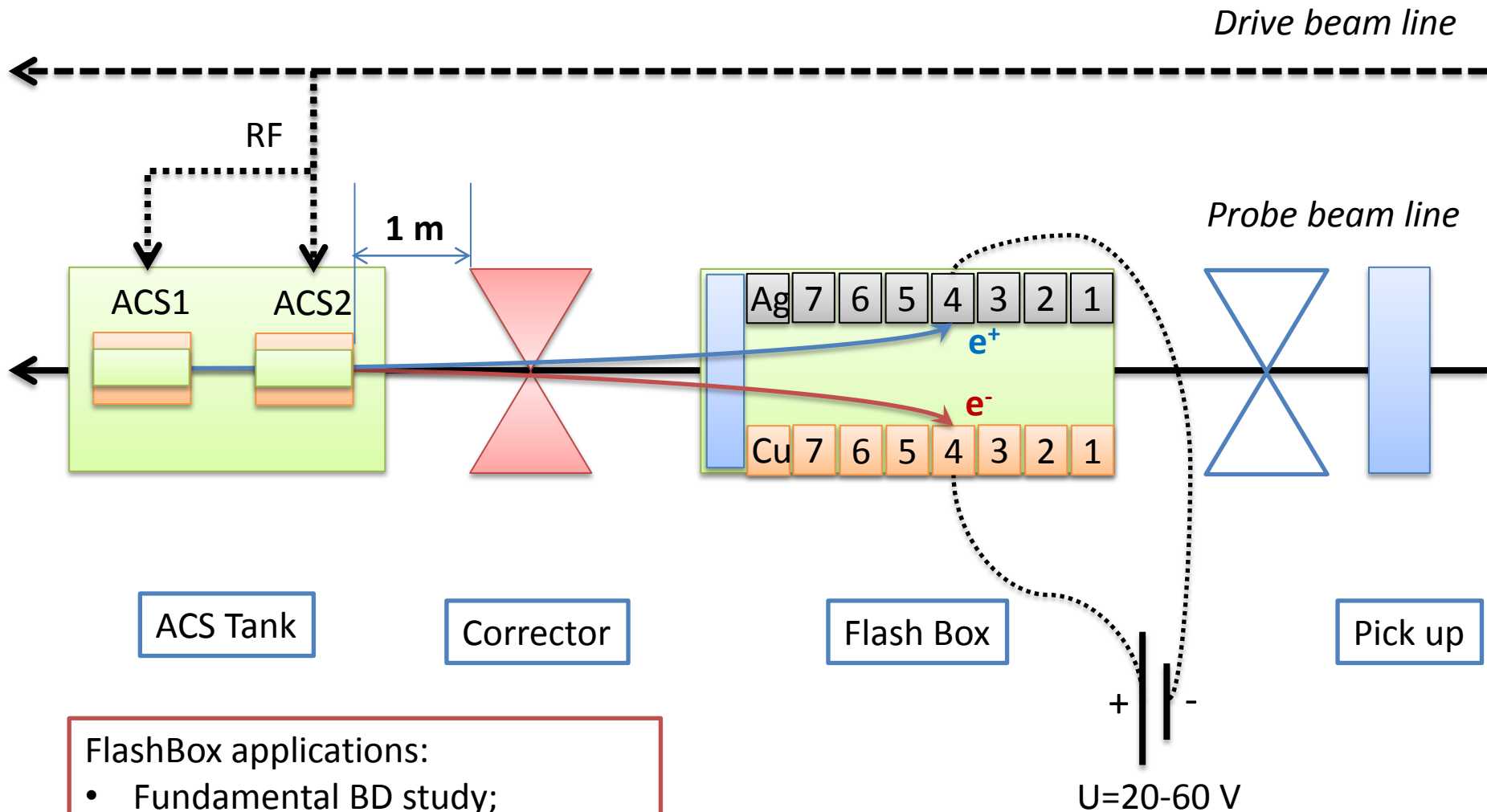
by *Alexey Dubrovskiy*

thanks to *Roger Ruber, Marek Jacewicz*
and *Volker Ziemann*

CTF3 working meeting

October 11, 2012

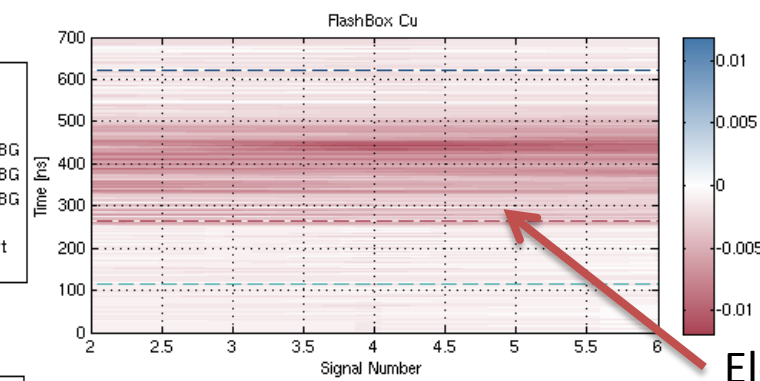
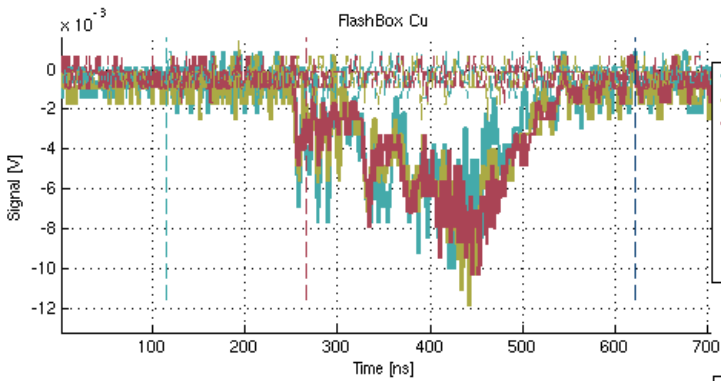
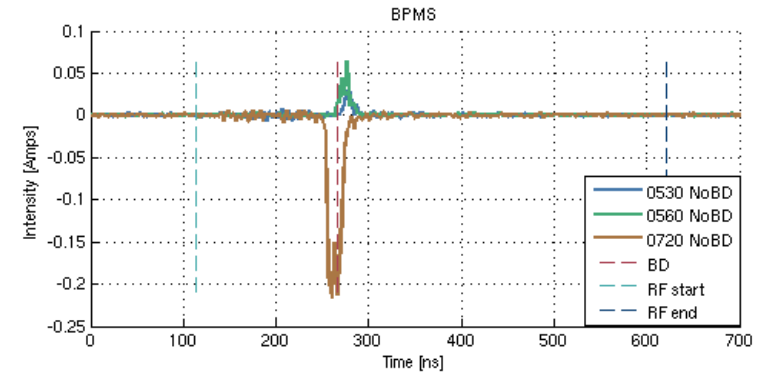
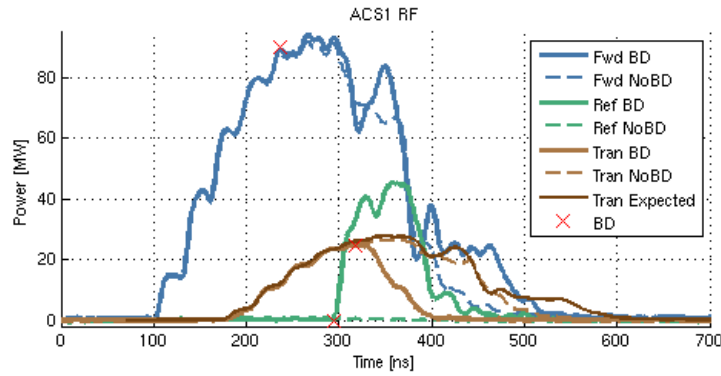
Layout of FlashBox experiment



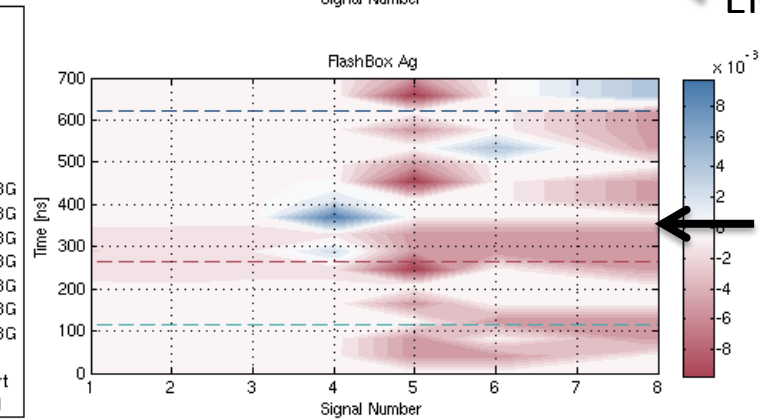
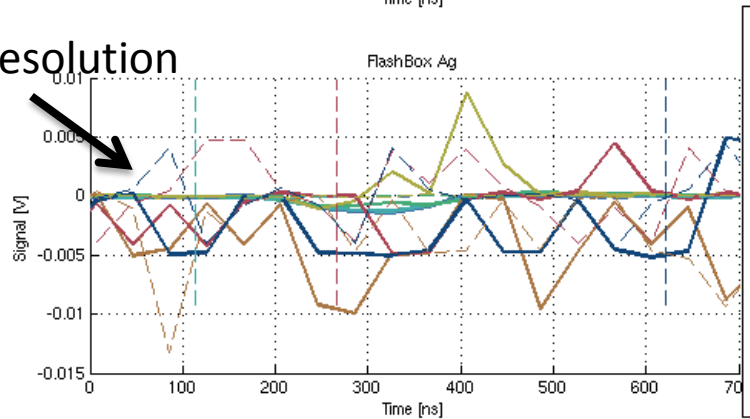
FlashBox applications:

- Fundamental BD study;
- Compact beam spectra analyzer.

Low energy electrons: measurement



Poor resolution

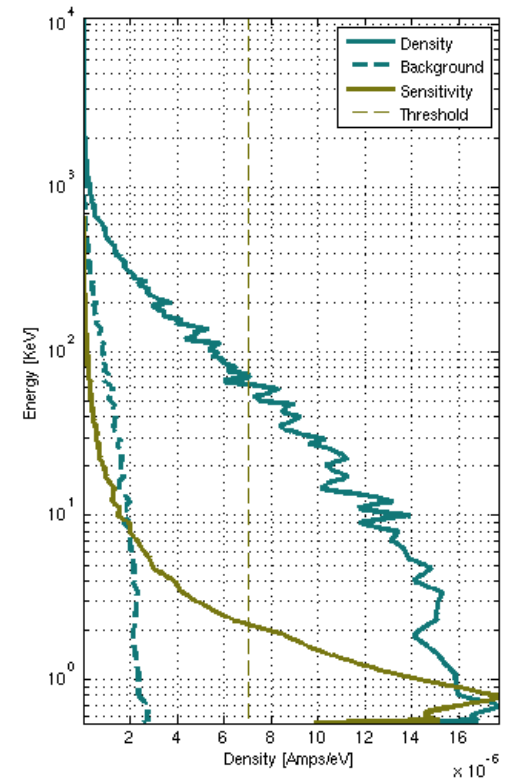
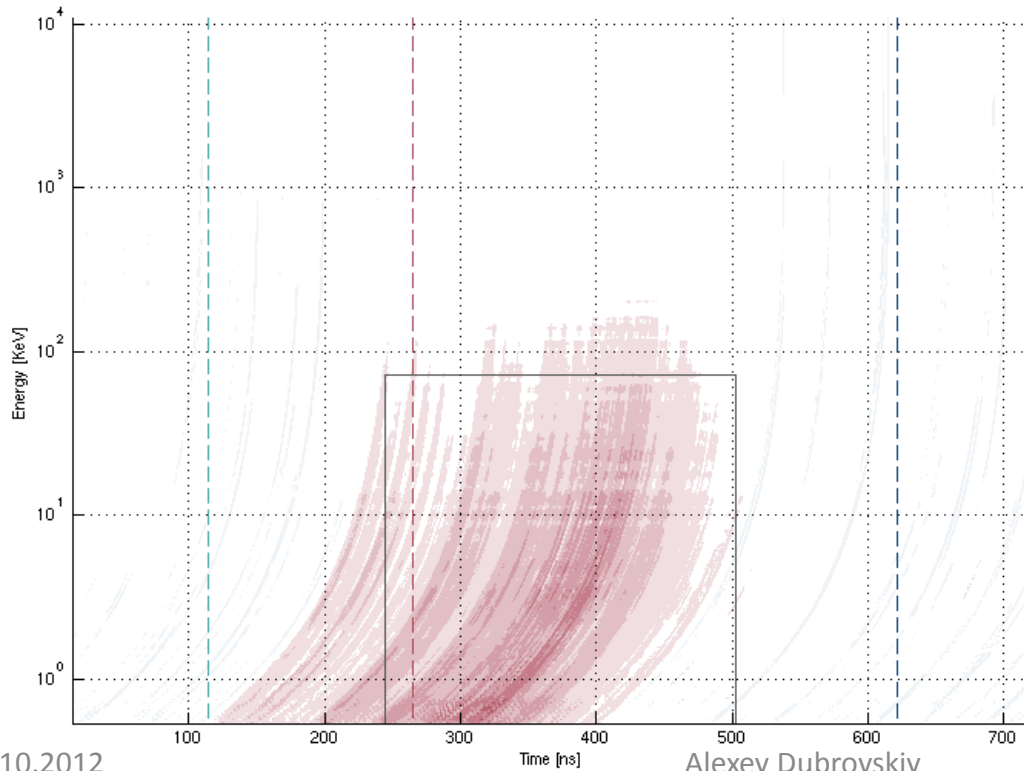
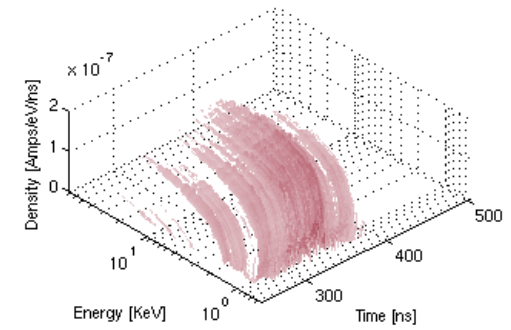
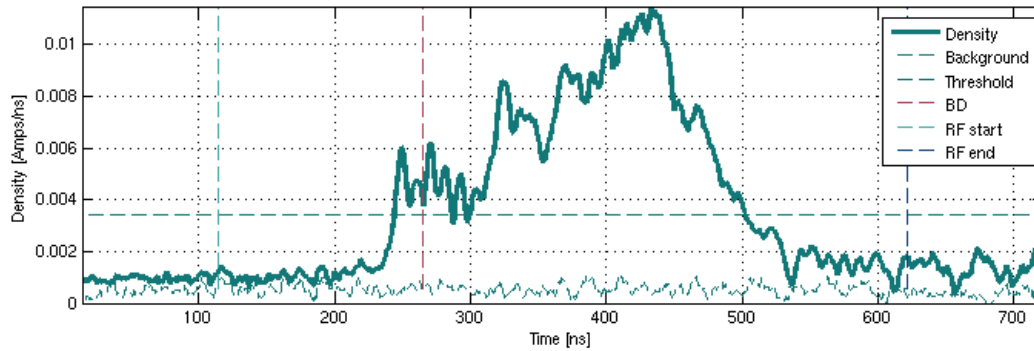


Electrons

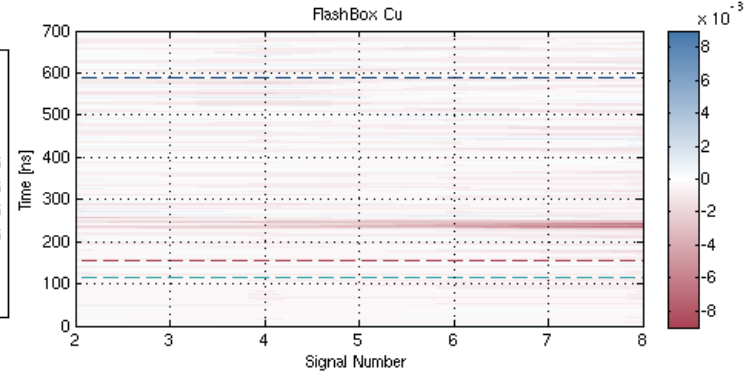
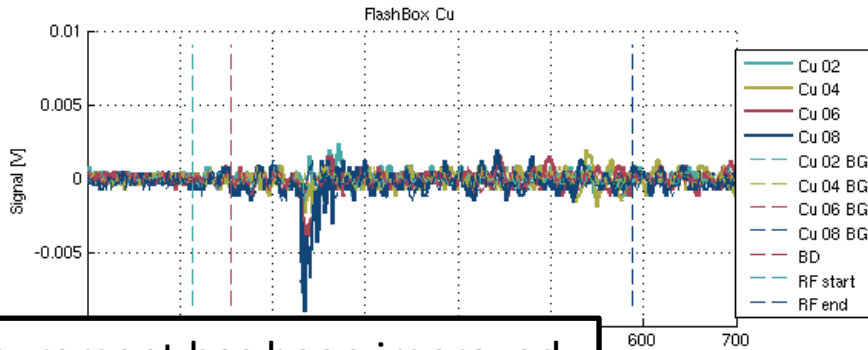
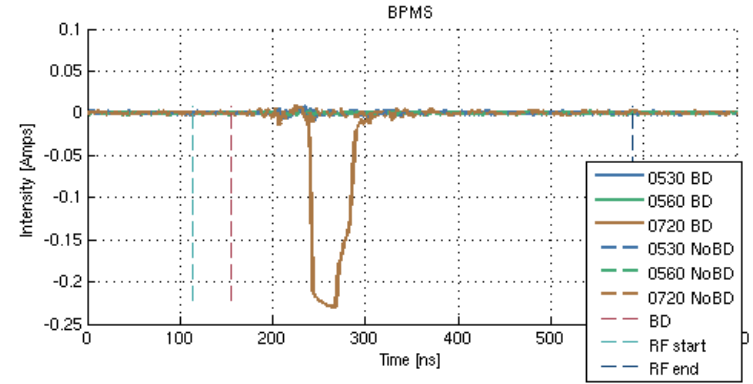
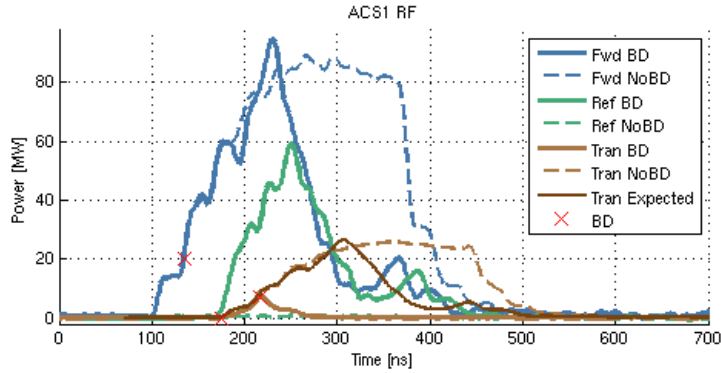
Noise

Low energy electrons: distributions

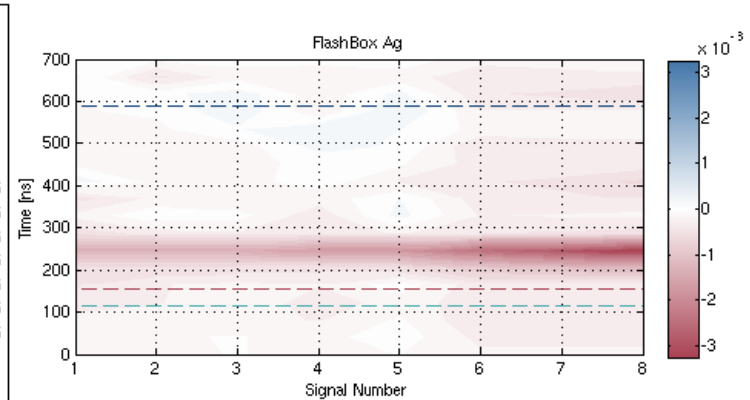
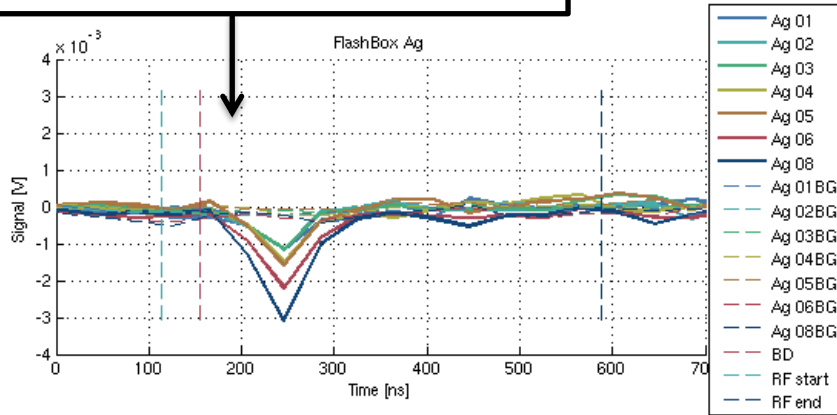
Without channels Cu8, Ag1-8



High energy electrons: measurement

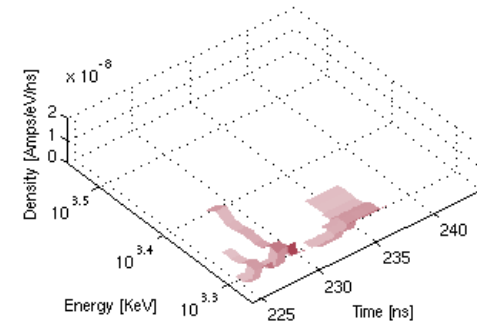
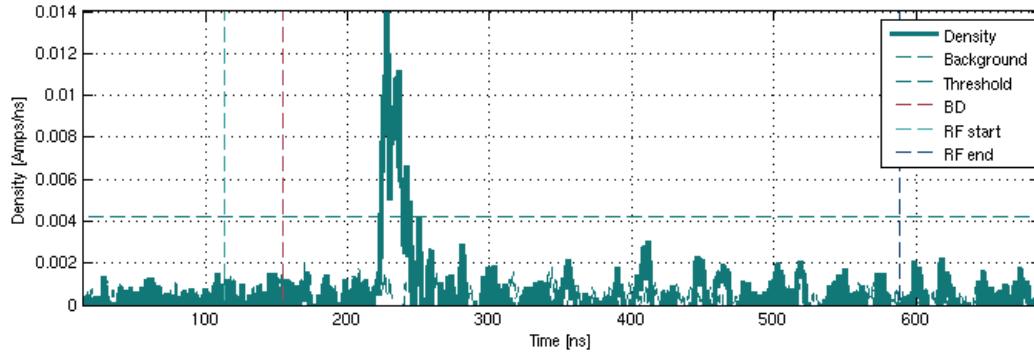


Measurement has been improved



High energy electrons: distributions

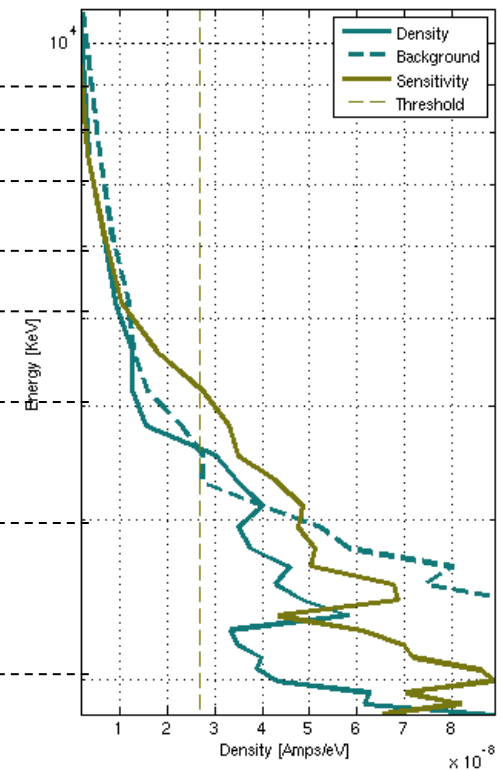
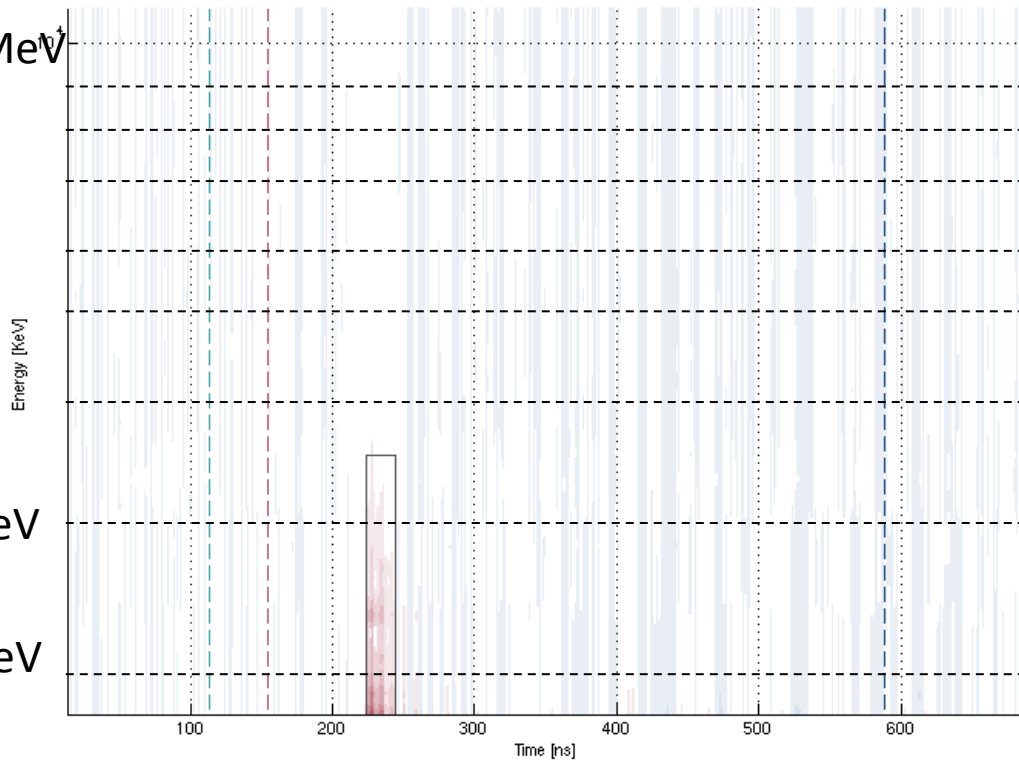
Subtracted background



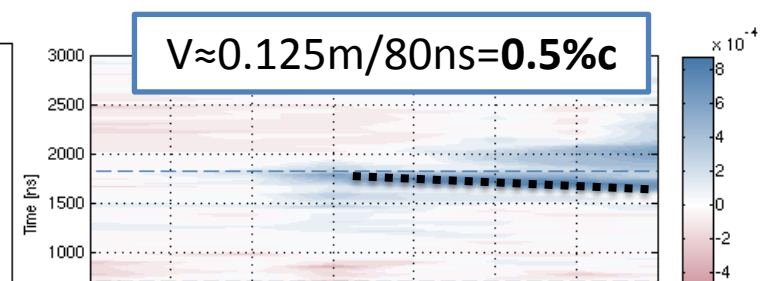
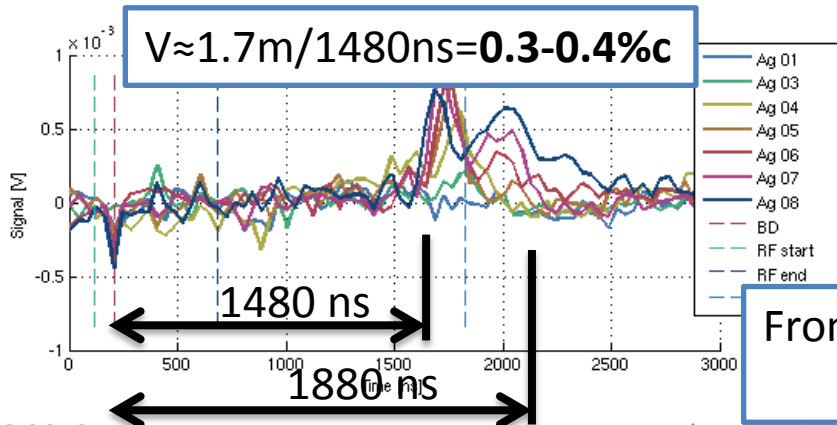
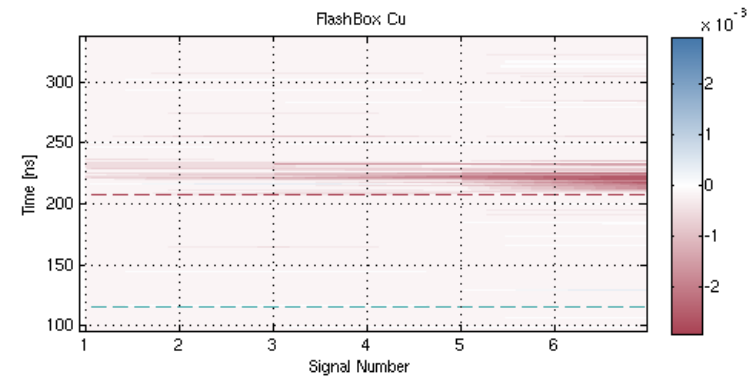
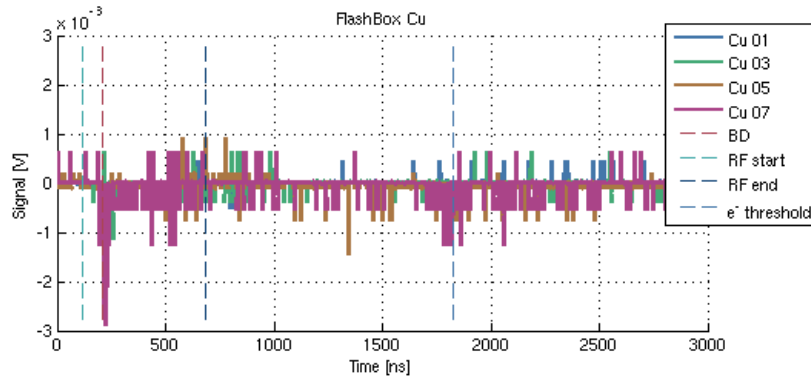
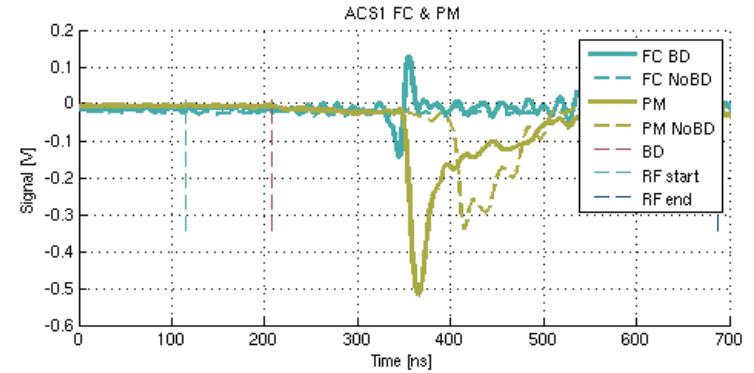
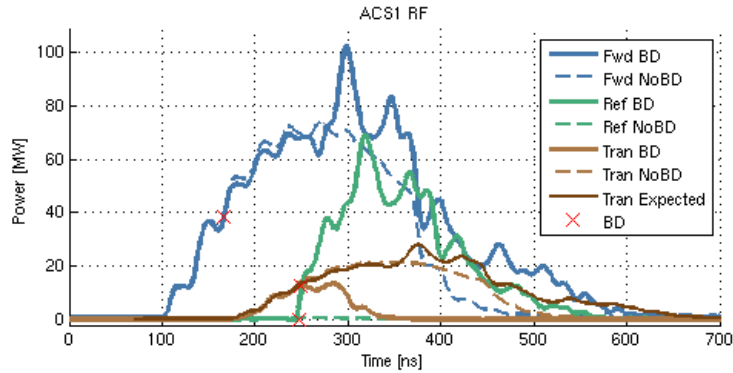
10 MeV

3 MeV

2 MeV

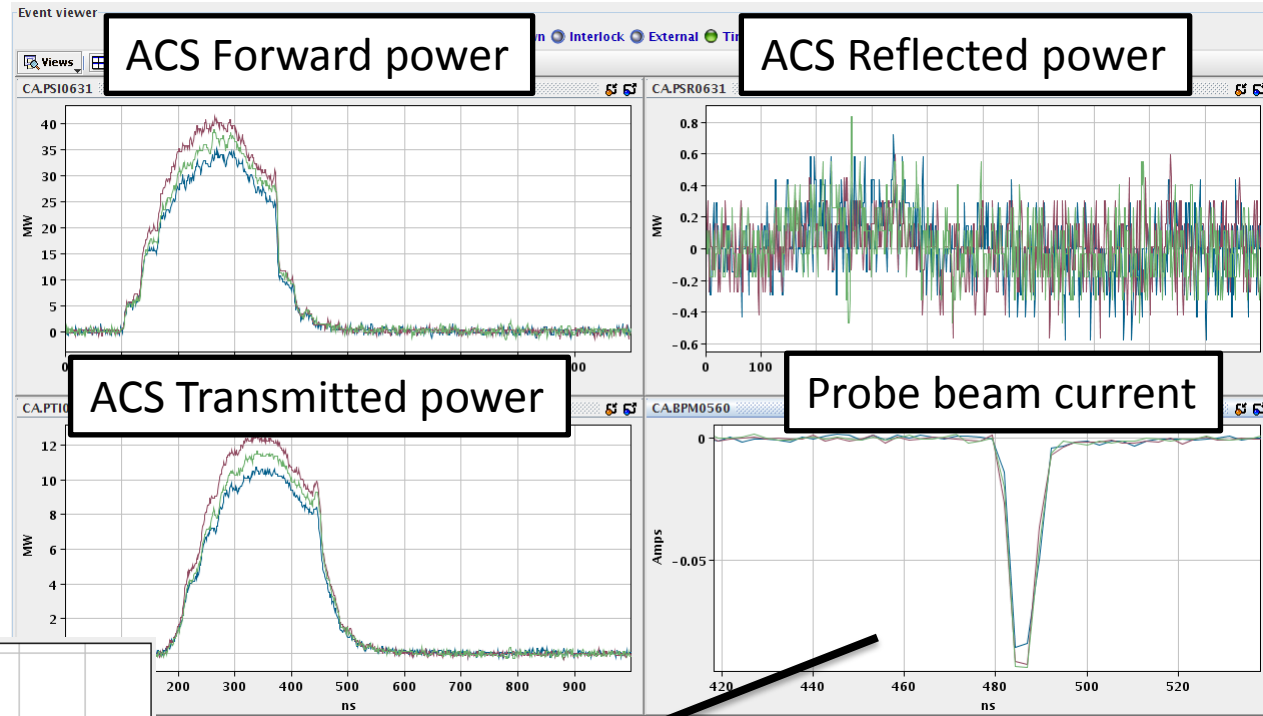


Ions: measurement

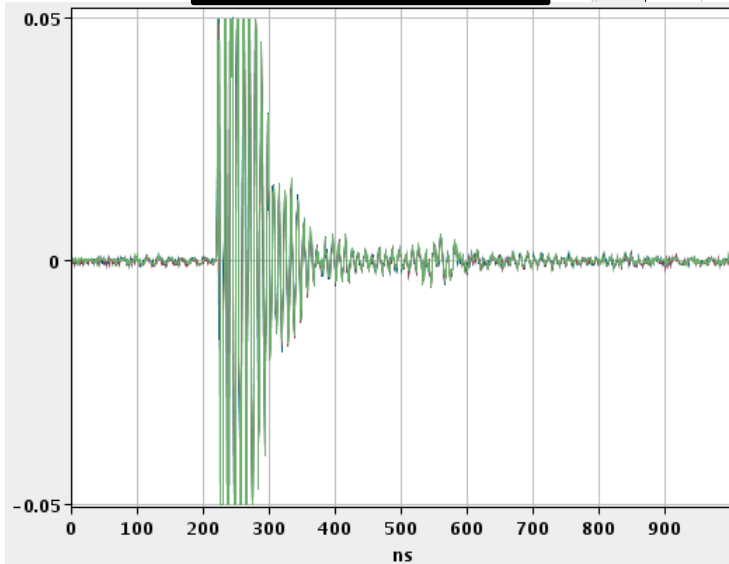


From the magnet: $m/e = 2.1\text{-}4.5 \times 10^3 m_e/e^+$
 $\text{H}_2^1, \text{He}^2, \text{Cu}^{26\text{-}29}$ etc

Obstacles: Probe beam is ON

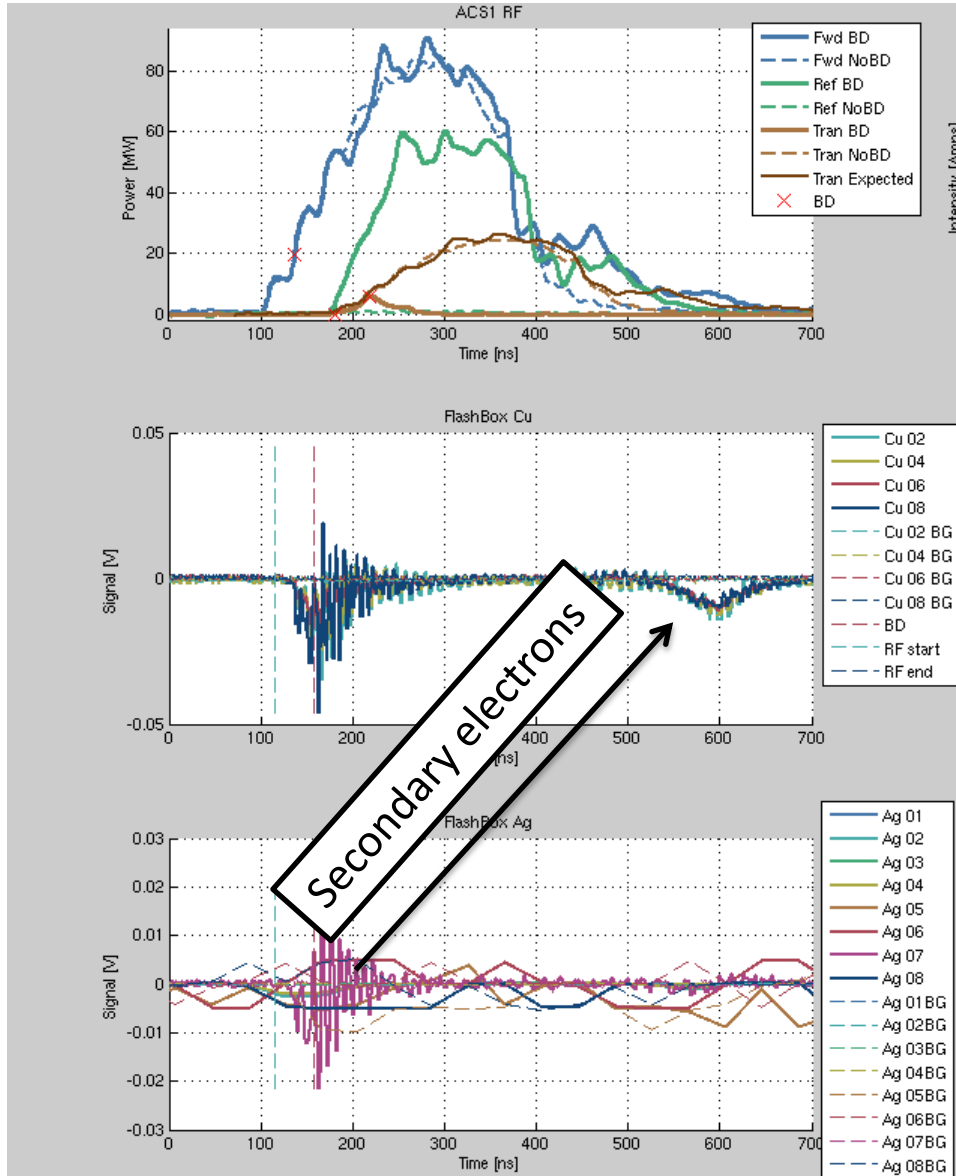


FlashBox signals



The probe beam has a strong influence on the flash box signals

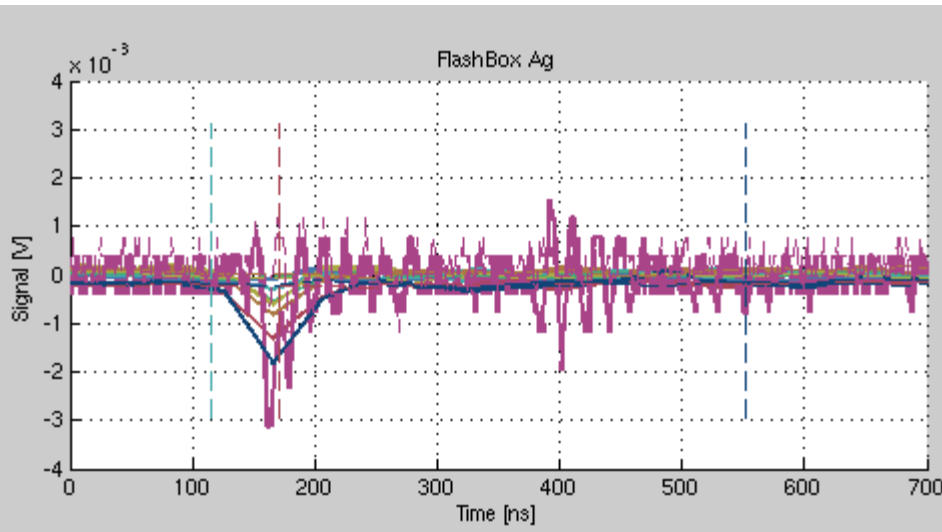
Obstacles: Wrong polarity



Solved!

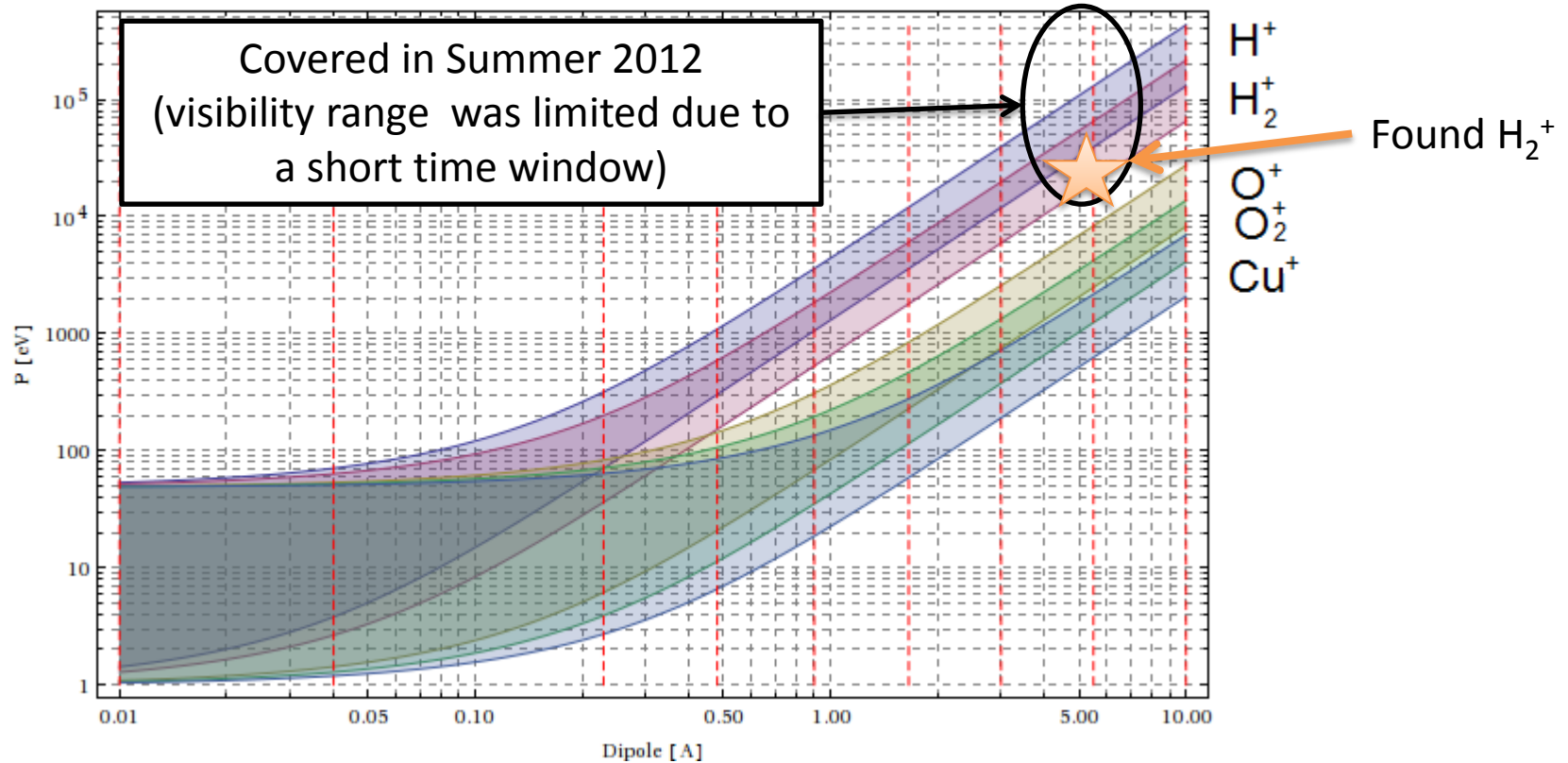
Wrong polarity on the plates was the reason of signals ringing and creating secondary electrons.

Obstacles: Ag signals ringing



Ag signals revealed ringing at a higher sampling frequency. New connection plate might help to rid of it.

Ions: programme



To complete the ion scan it is necessary to apply

9 dipole magnet strengths (red dashed lines on the plot) for the same RF conditions =>
 Needed No Pulses ≈ 9 Dipole sets \times 3 RF power levels \times 50 BDs / 10^{-4} BDR \approx **10^7 pulses**
 \approx 400 days (8 hours a day of operation)

It is essential to have a high BDR of 10^{-2} - 10^{-3} => 2 months can be enough!

1500 BDs are wanted!!!

Summary

- Energy of emitted electrons was measured in the KeV-MeV range.
- H₂ ions were detected with an energy of a few KeV.
- Acquisition system has been improved.
- The FlashBox experiment programme has been worked out.
- **Currently the ion scan is completed by only 0.67%.**
 - **The more BDs the more results!**