

SEDINE Status

Ali DASTGHEIBI FARD
CNRS

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Laboratoire Souterrain de Modane

Contents

- SEDINE History
- Gas system
- ^{55}Fe source
- SENSORS
- Discussion

NEWS-G_LSM (SEDINE)



Fabrication

January-Jun 2012

Radiopure copper

Electron beam welding

60 cm diameter

HPGe Gamma spectrometry

NOSV Copper ($\mu\text{Bq/Kg}$) :

- . ^{226}Ra < 16
- . ^{228}Th < 12
- . ^{40}K < 110
- . ^{60}Co < 18



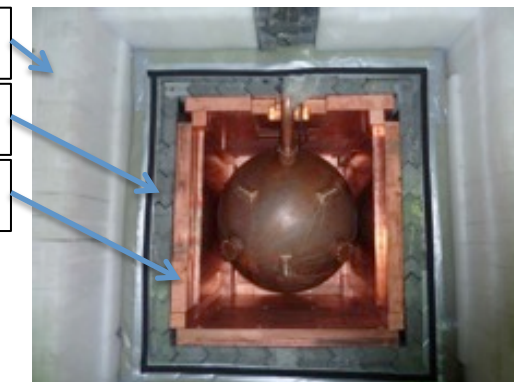
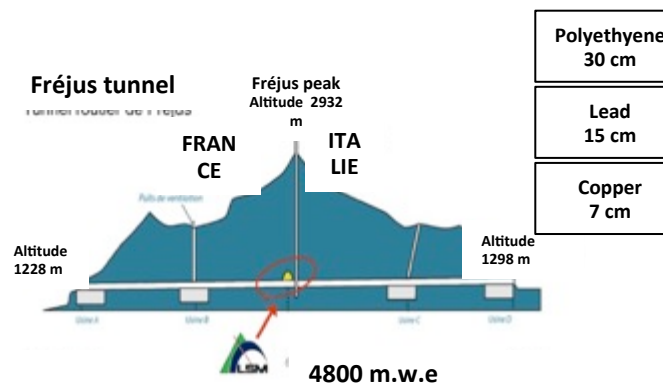
Installation

Jun-July 2012 @ LSM



Acquisition & Setup

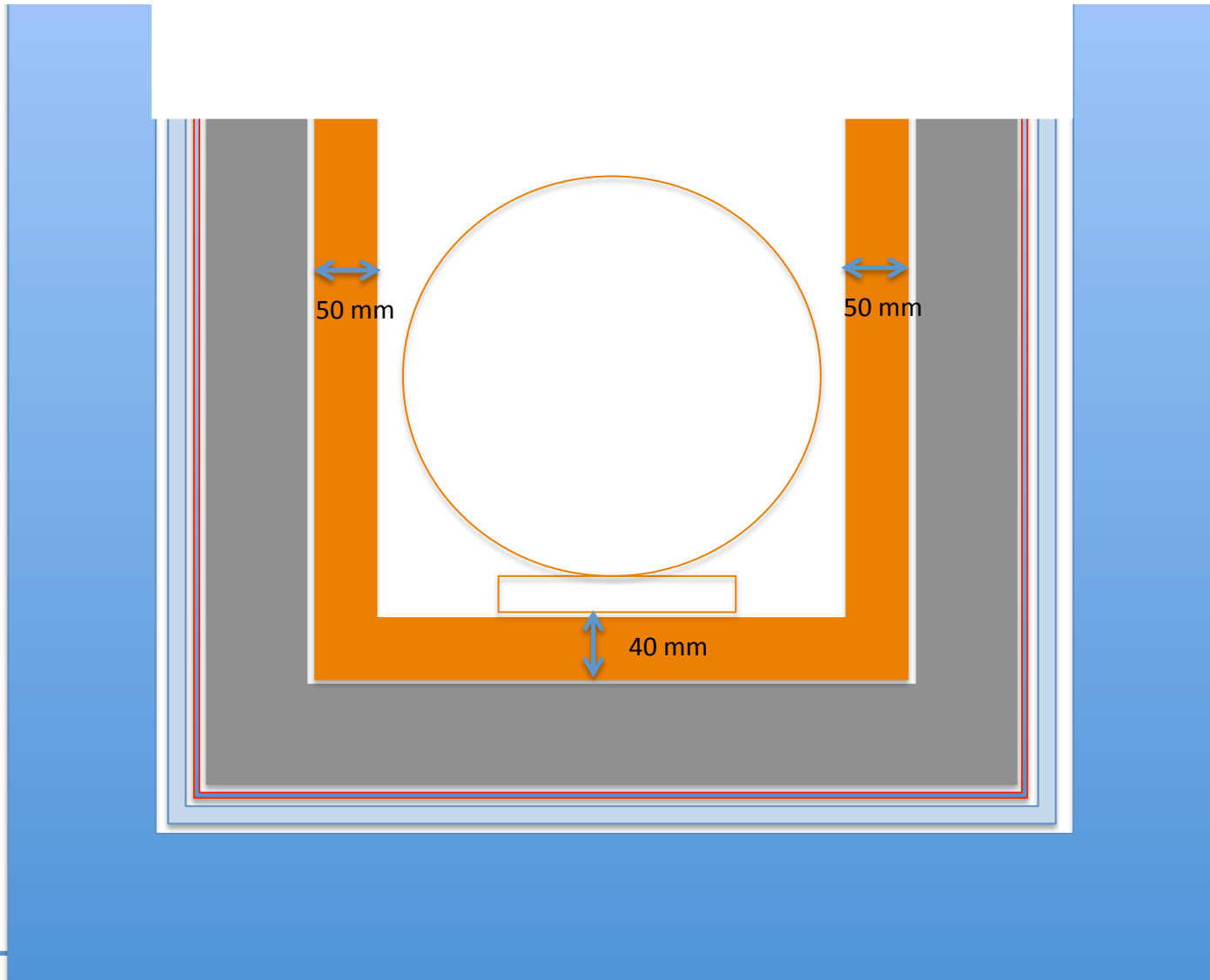
SEDINE at its shielding with top part open



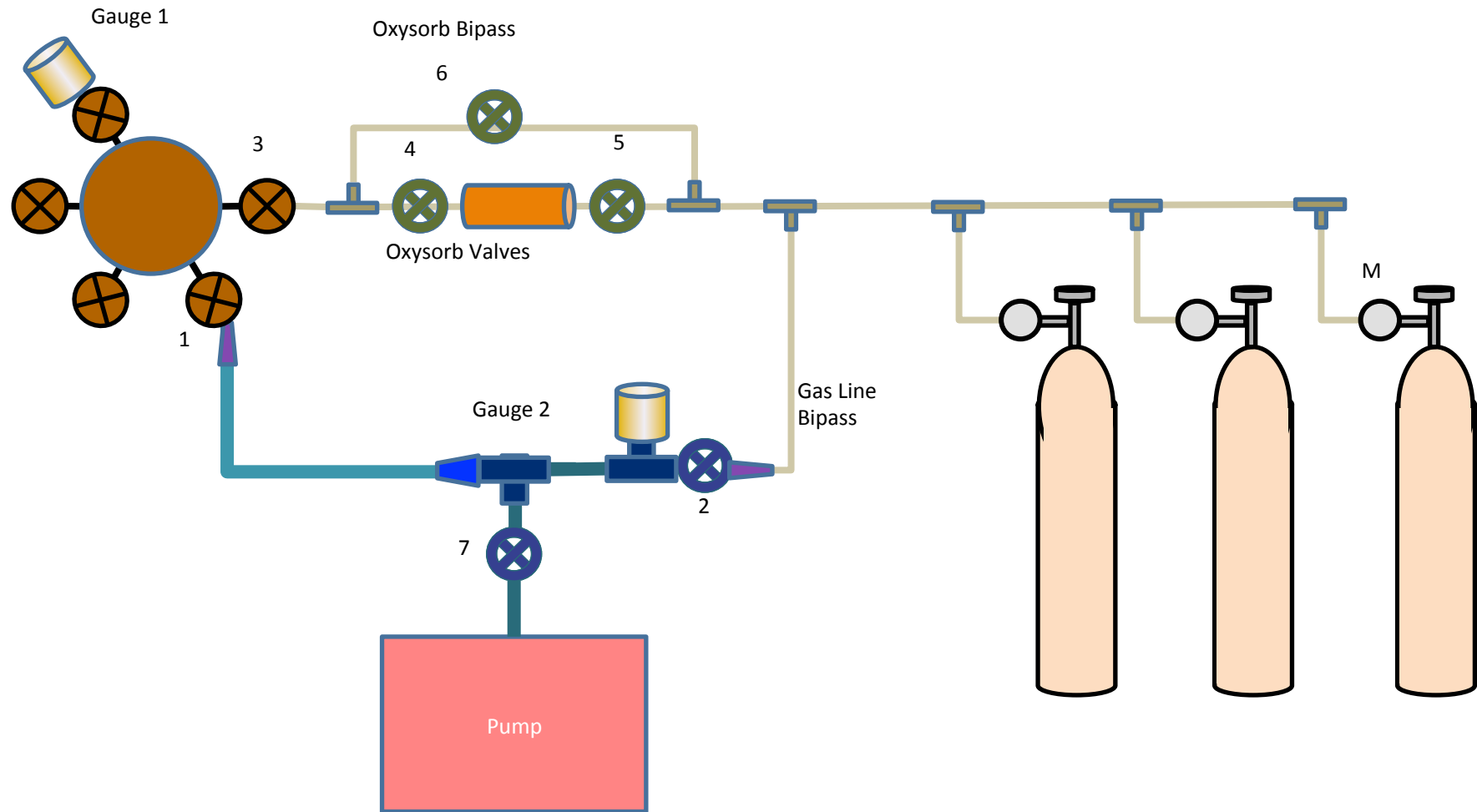
- Polyethylene
30 cm
- Lead
15 cm
- Copper
7 cm

SEDINE Shielding layers from outside :

- 1) Polyethylene 300 mm
- 2) Iron support 50mm
- 3) Polyethylene anti-radon tent 1.5 mm
- 4) Lead 150 mm
- 5) copper 50 mm
- 6) Sphere Cu_thickness (6 mm)



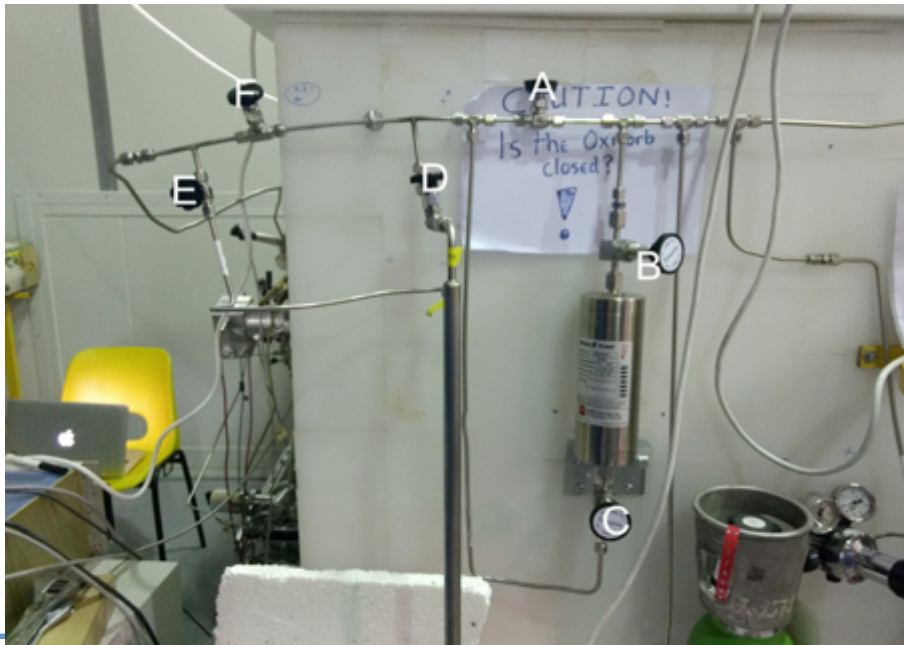
Gas System



Gas System

Gas filling (one shot)

- Using only Oxisorb®
- Using Getter
- Using Getter + Radon trap
- Using Getter + Radon trap + cooling



Gas System results

Oxisorb[®]

Advantage:

-> Attachment better gas quality

Inconvenient:

-> Gas injection very long, 1 mbar/2-3min => more than 10h-15h due of very volume of Oxisorb[®]

-> Radon increase by factor 10-20

Getter

Advantage:

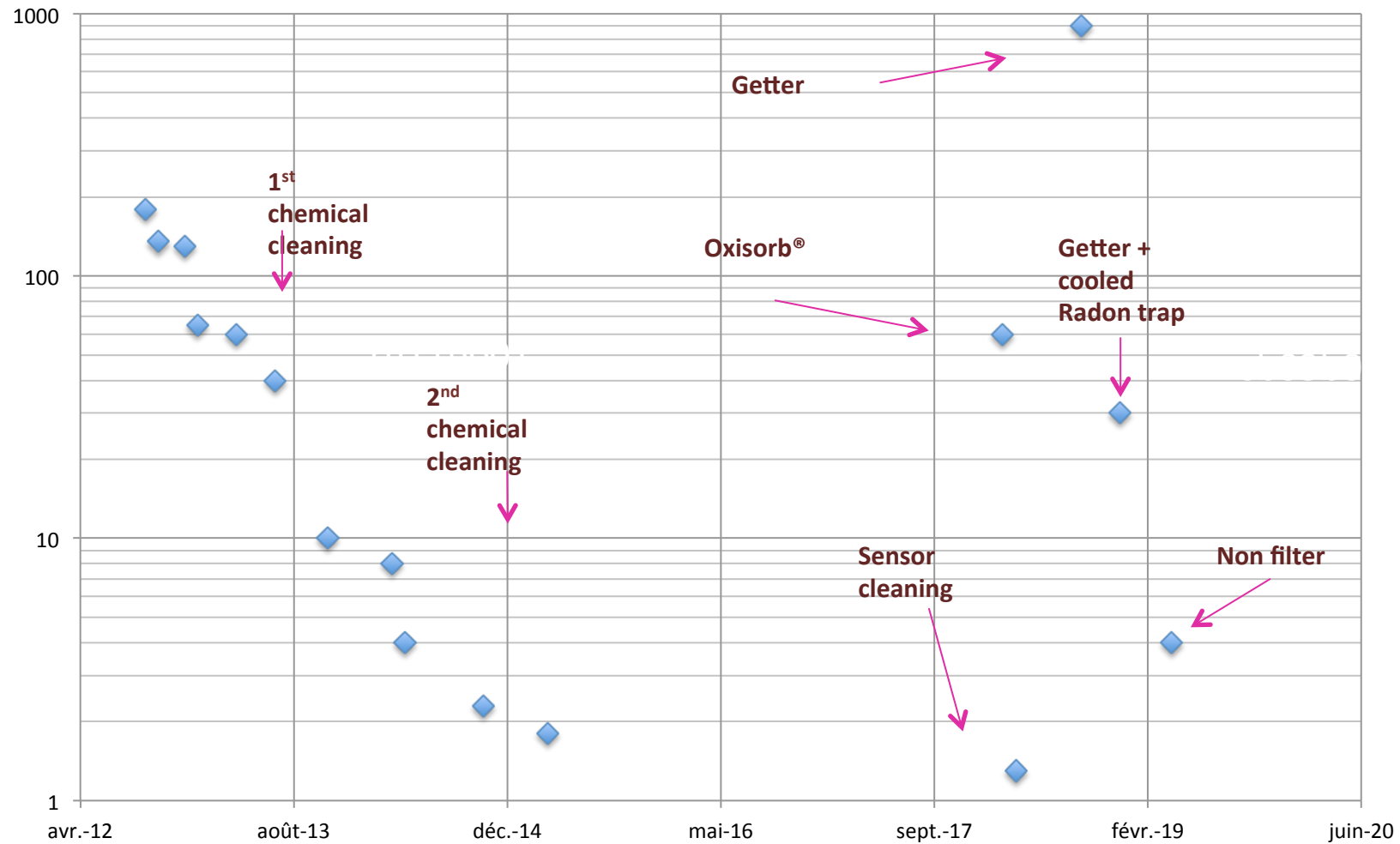
-> Attachment less attachment even compare to Oxisorb[®].

Inconvenient:

-> Radon increase by factor 200 (factor 10 compare to the Oxisorb[®])

Using radon trap: less radon but, penning effect (trap also CH₄ which is not mastered)

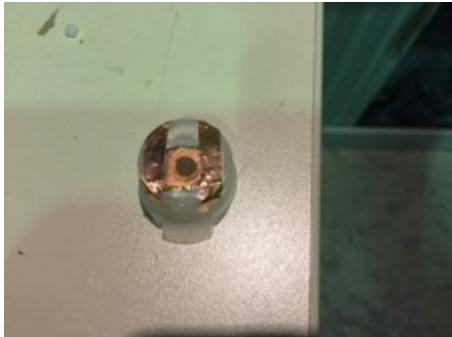
Radon History



^{55}Fe

^{55}Fe installed on source Al support

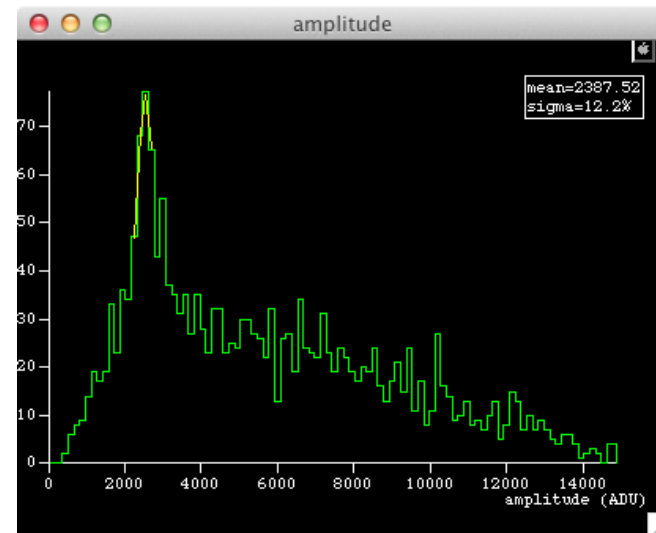
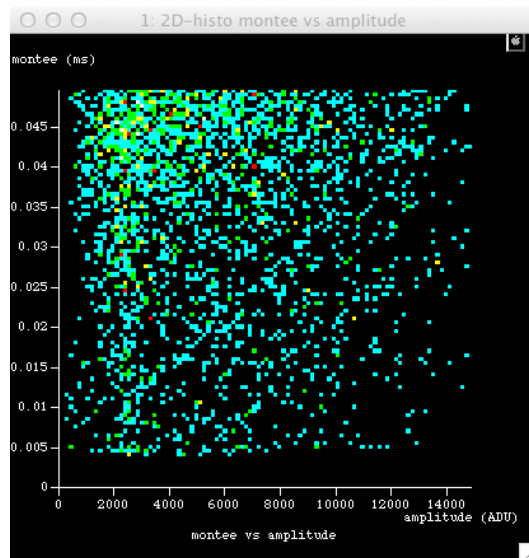
- Deposited point like source
- Activity : ≈ 100 Bq
- Al Thickness: a few μm (in the center)



^{55}Fe results

Run conditions

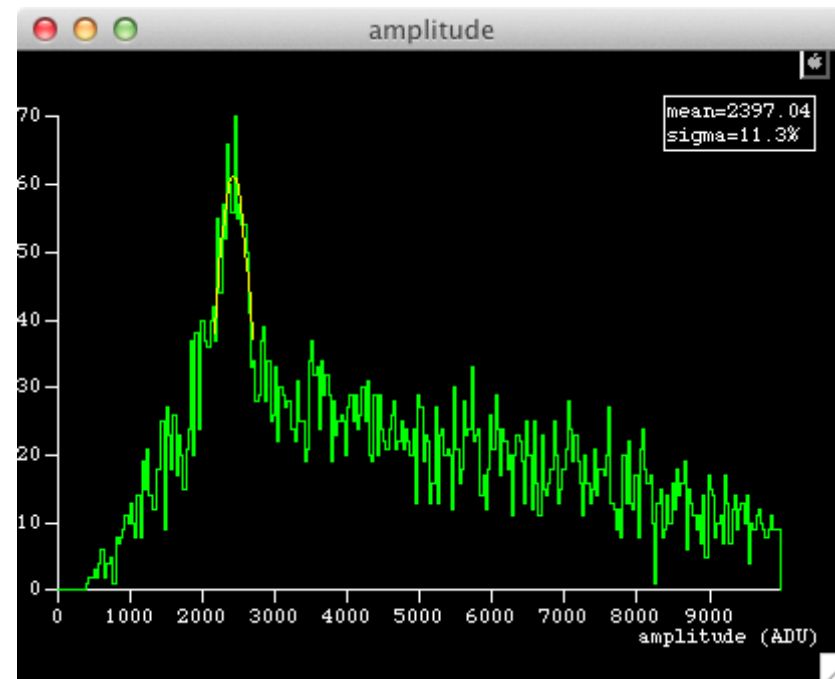
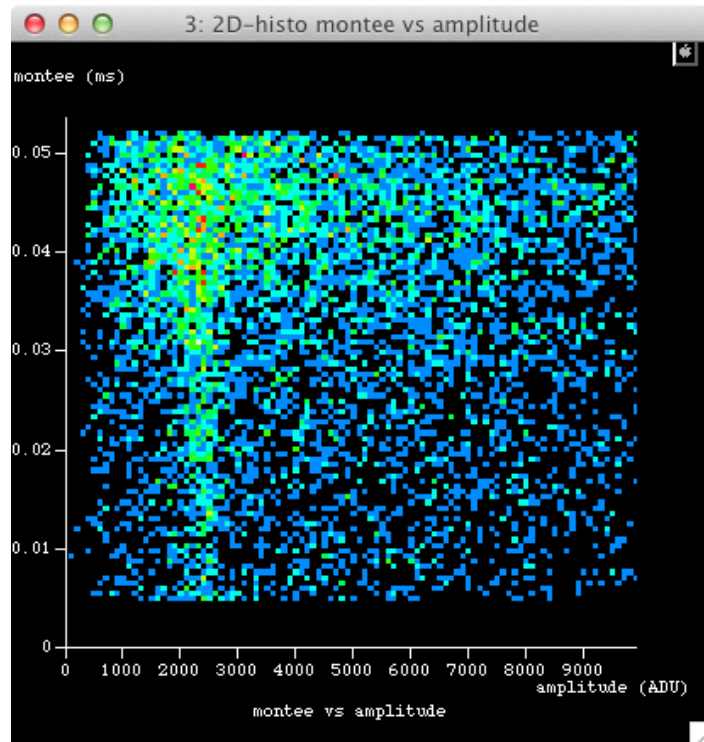
- tb28b005
- 500 mbar Ne + 6% CH₄
- HV=1450V HVumbrella=0



^{55}Fe results

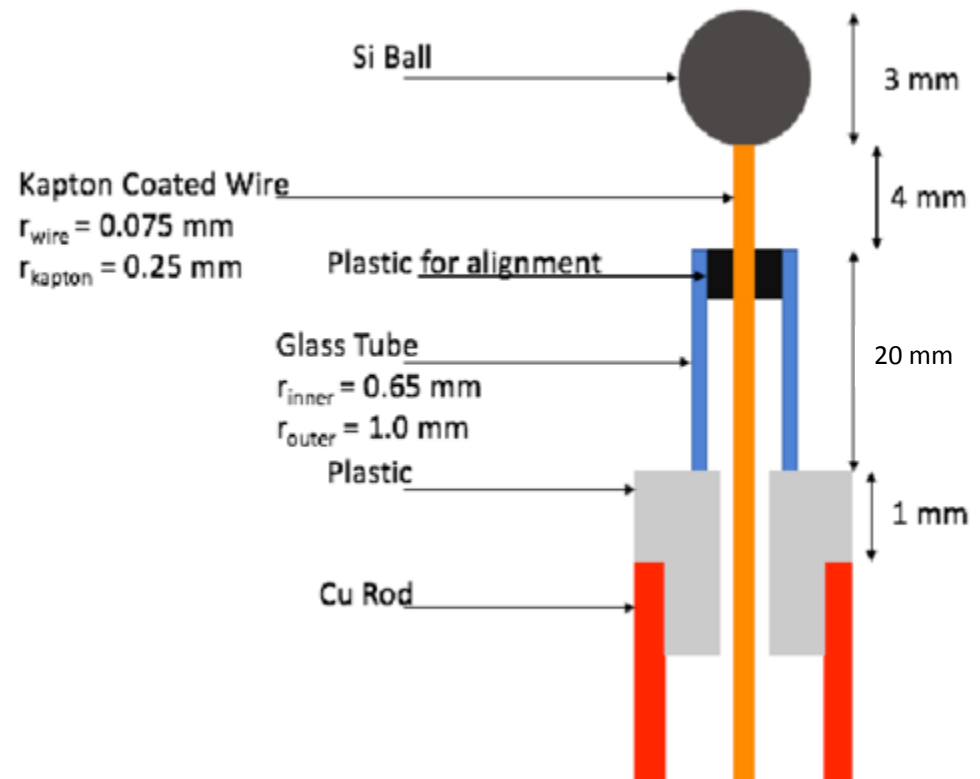
Run conditions

- tb28b006
- 500 mbar Ne + 6% CH₄
- HV=1450V HVumbrella=0



Conclusion from comparison tb28b005 and tb28b006
Peak (copper and non Fe55!!!!) 7176 ADU

SEDINE Sensors



SEDINE Sensors



Single ball



Achinos 11 bass

Discussion

- Installation of new gas system, adding Oxysorb to the pipe line, better vacuum, less attachment but more Radon
- Calibration with
 - ^{55}Fe ,

What will be done

- Take an Alpha run under same conditions as it was before electropolishing/electroplating
- Changing sensor with Achinos (next weeks)
- Test the new gas mixture based on Ne & He
- Use Methane in SEDINDE ??

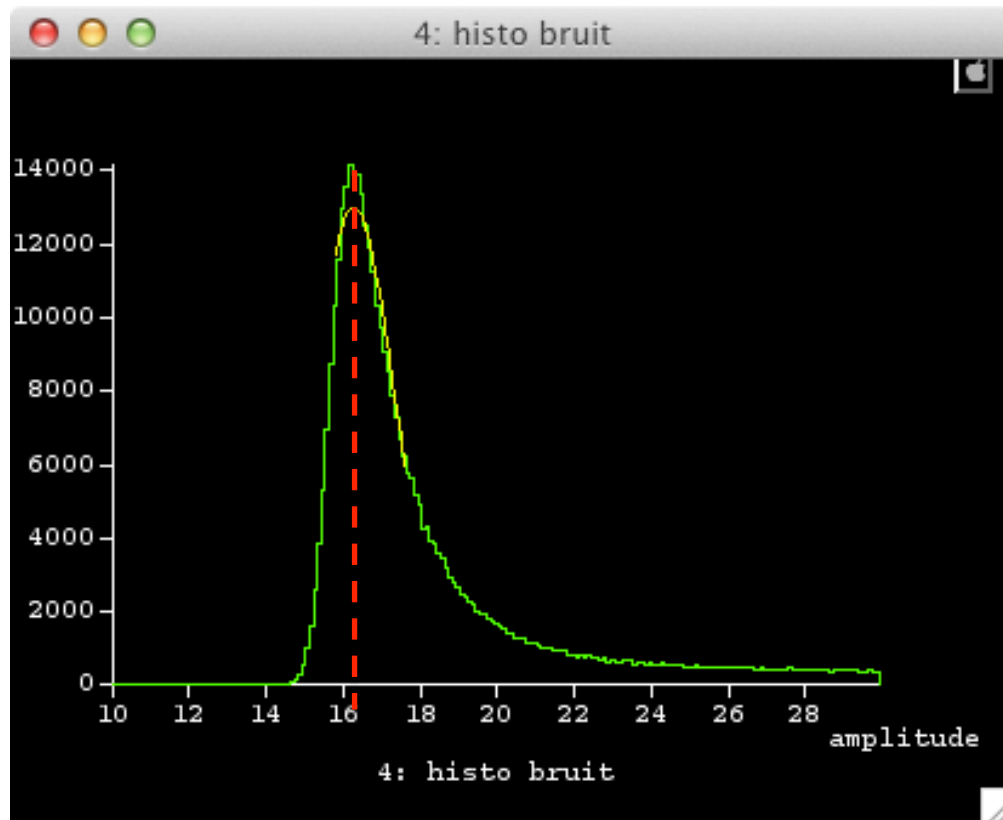
Backup

SEDINE Electronic noise

- **Reducing Electronic noise: better grounding**

Sc13b000

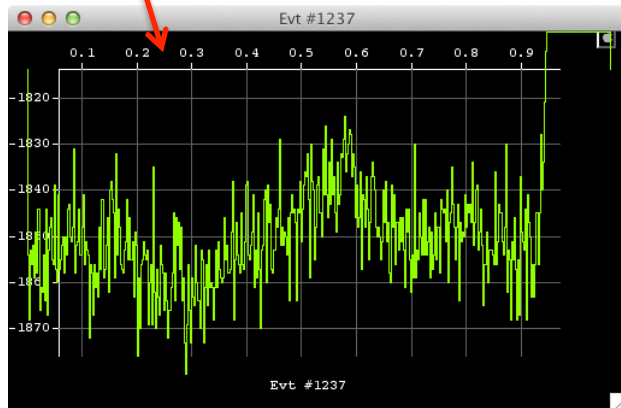
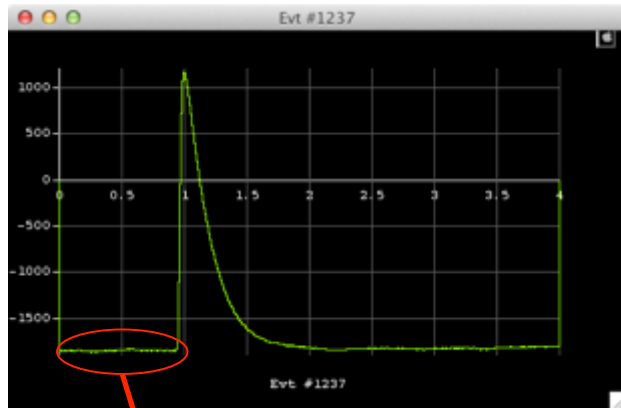
P= 1bar of 700 mbar Ne 300 mbar He+10%CH4



Reduce threshold < 100 ADU

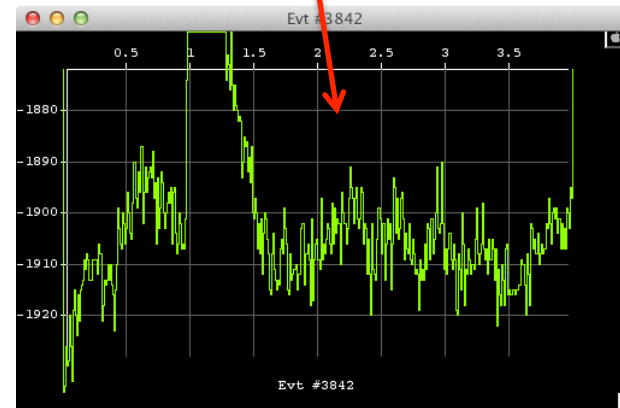
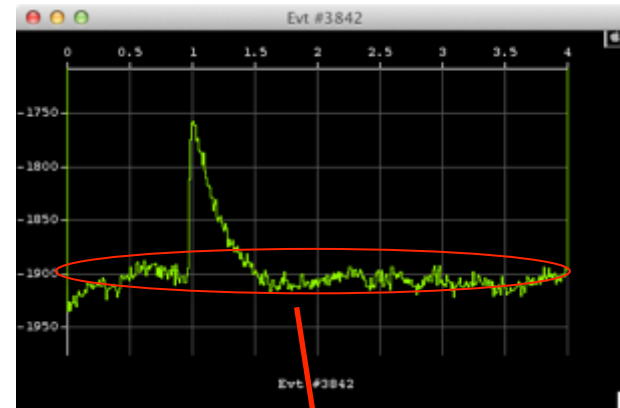
SEDINE Electronic noise

Amplitude ≈ 2600 ADU



HF ≈ 13 ADU
LF ≈ 40 ADU

Amplitude ≈ 200 ADU



HF < 10 ADU
LF < 30 ADU