

Update on Phase I detectors

Stefan Schönert

on behalf of TG1

GERDA general meeting

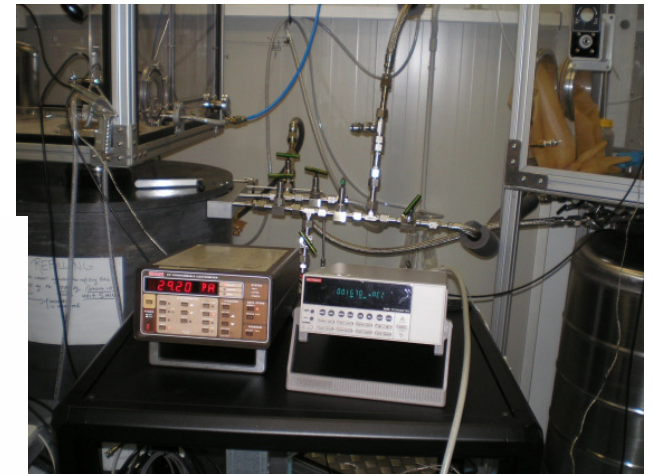
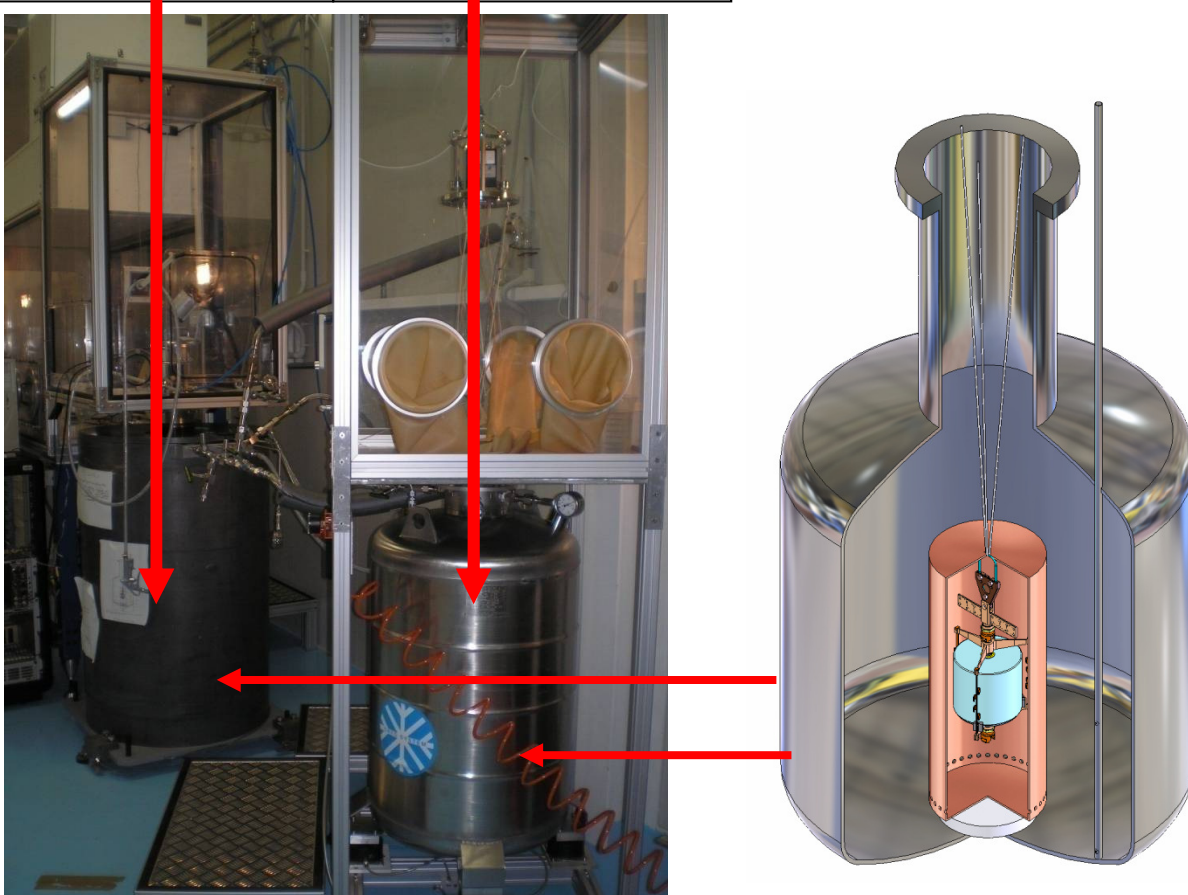
LNGS, June 9-11, 2008

Outline

- Prototype long-term tests in GDL
- Phase I detector docu on GERDA wiki
- Status of LArGe cyrostat / assembly
- Upcoming activities

Long-term prototype tests in GDL

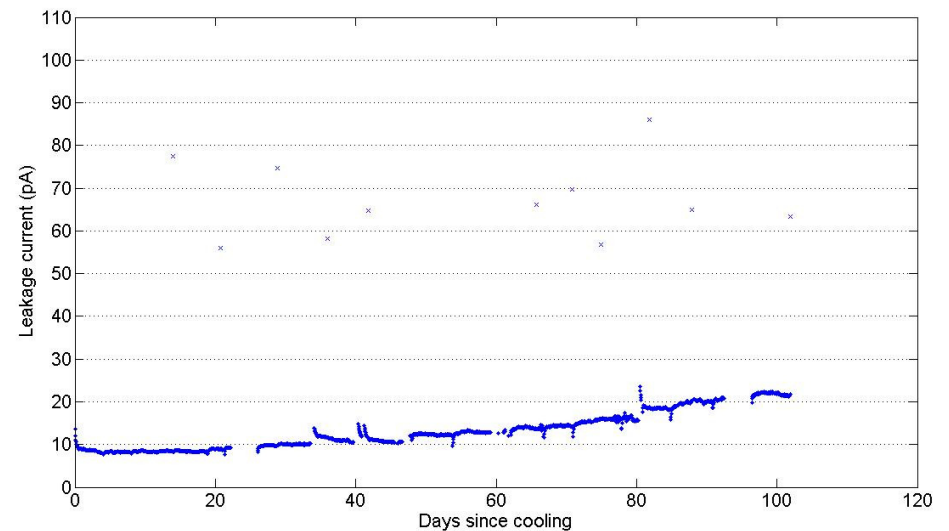
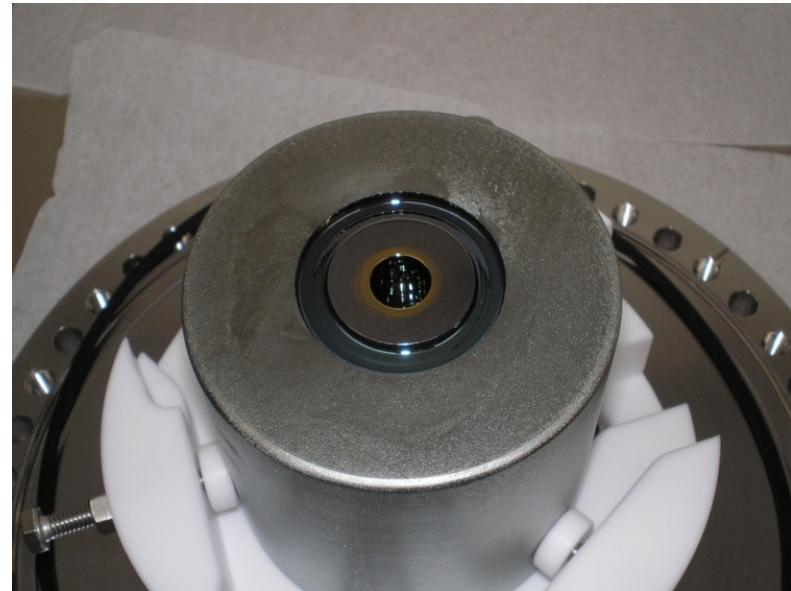
GTFP41042A Passiv. layer in groove only bench 1	GTF41044A No passiv. Layer bench 2
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- Biased at +4000 V
- Continuous monitoring of current
- weekly calibration with Co-60 source

GTF P41042A

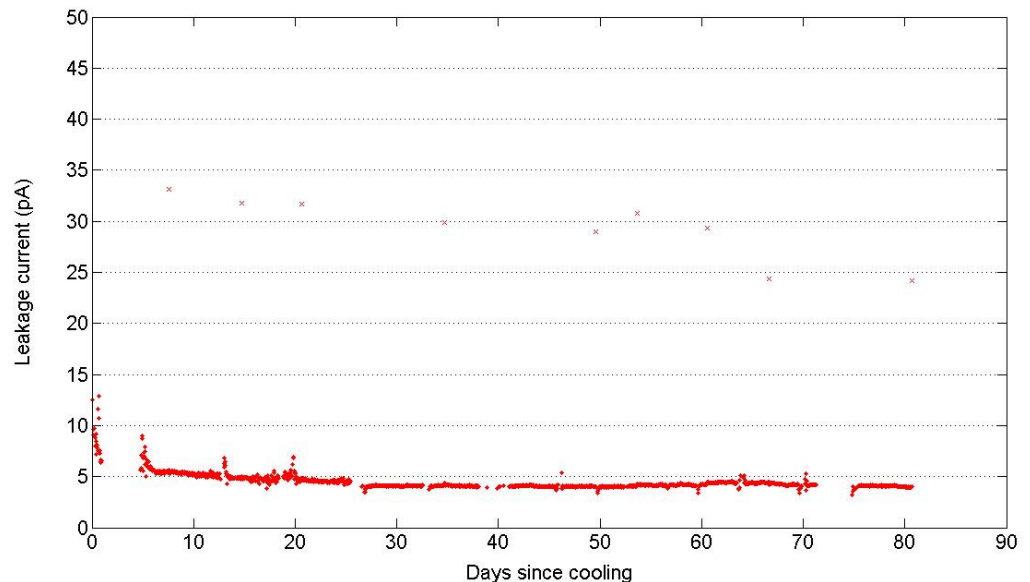
- Refurbished October 2007 by Canberra Semiconductor N.V.
 - Passivation layer just inside the groove
- Mass: 2467 g
- Full depletion voltage: 1500 V
- Cooled down in 2nd test best December 8, 2007
- Moved to bench 1 Feb. 28
- Applied bias voltage for LC test: 4000 V



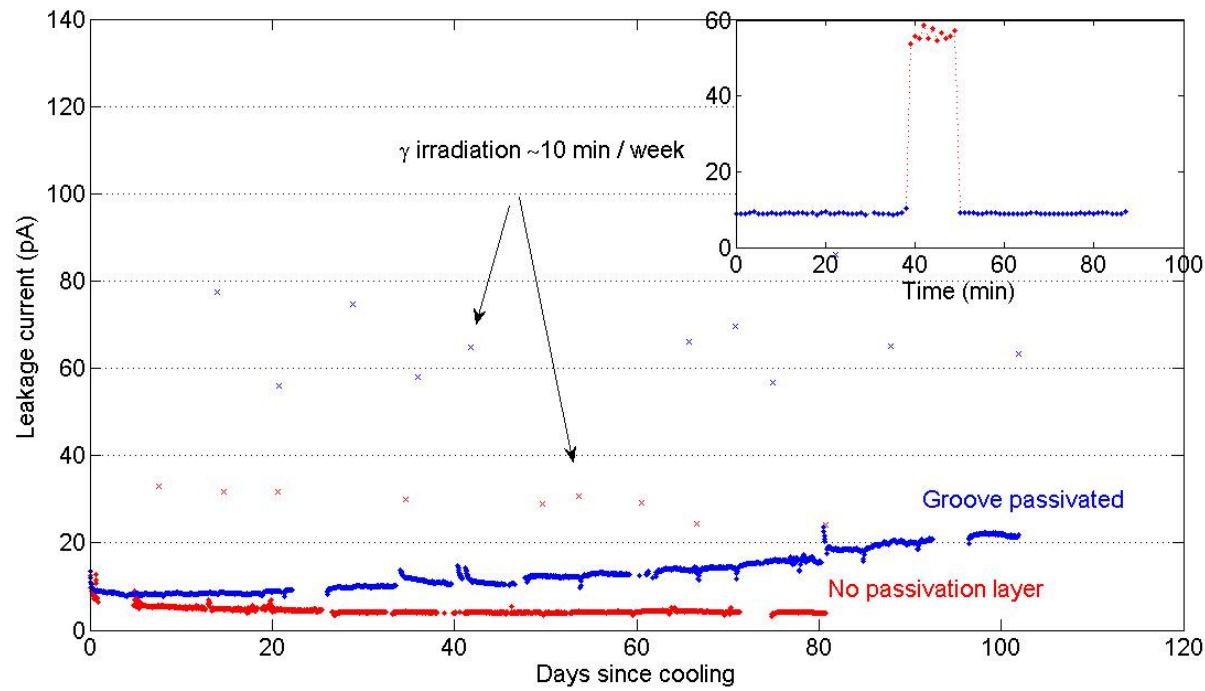
GTF P41044A

- Refurbished October 2007 by Canberra Semiconductor N.V.
 - No passivation layer
- Mass: 2465 g
- Full depletion voltage: 2500 V
- Cooled down in 1st test best February 10, 2008
- Moved to bench 2 on March 20
- # of thermal cycled carried out: 4
- 2 more cycles planned

Handled only under N₂ atmosphere



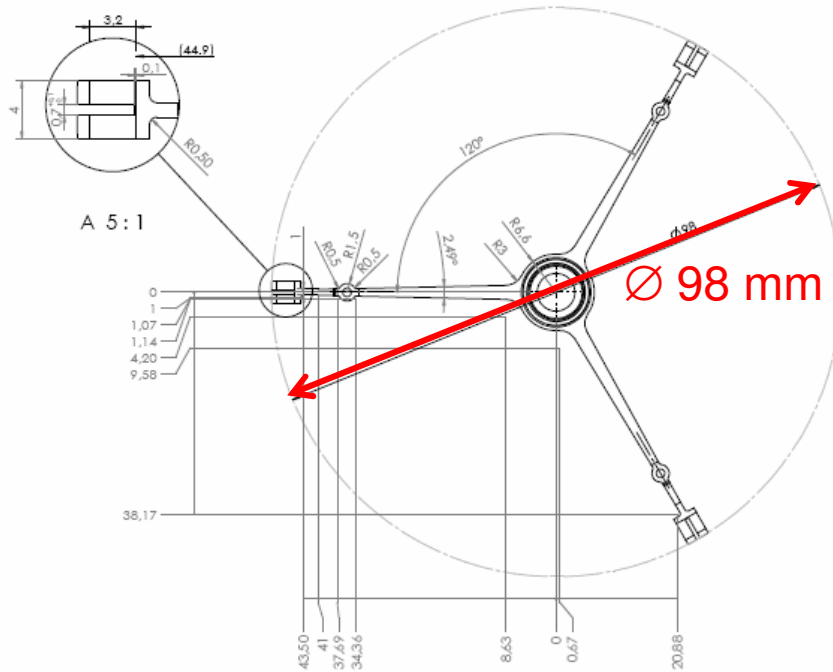
Reprocessing with or w/o passivation layer?



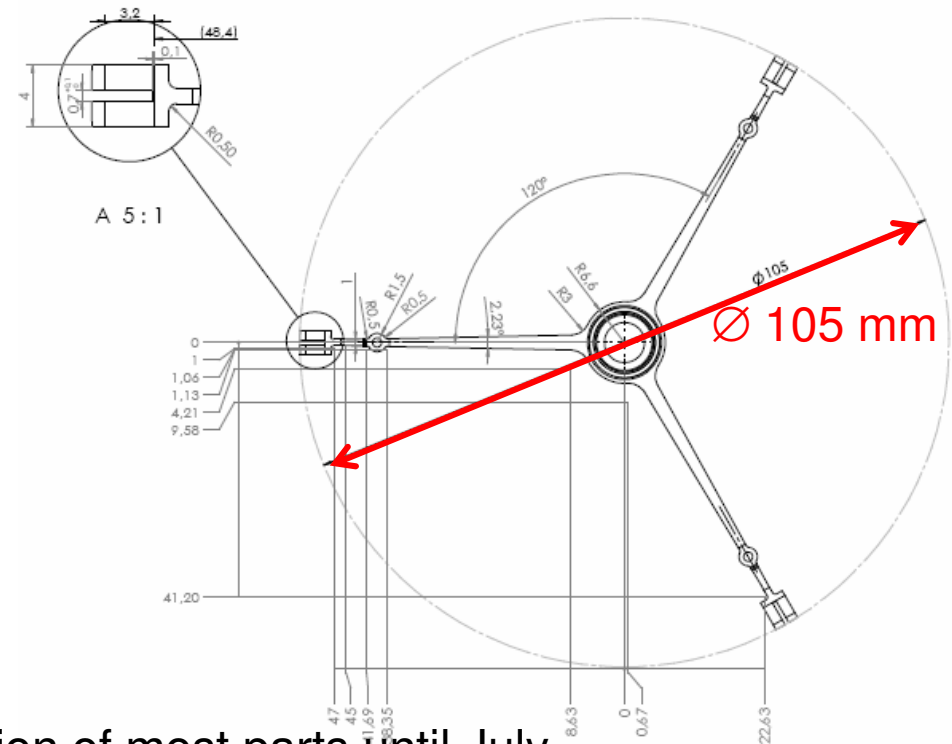
- Completion of processing of (most) of detectors prior to July 11 (summer break at Canberra & Hades)
- default technical solution:
 - passivation in groove only
 - Currently revisiting default (\Rightarrow no passivation \Rightarrow handling under N₂ atmosphere); N.B. in case of failure: passivation in groove could as well be applied at a later time

Production of phase I detector holder

For enriched (ANG,RG) detectors



For non-enriched (GTF) detectors



- Production started in Mai; completion of most parts until July
- Copper material retrieved from underground LLL only during work time
- Accounting of exposure above ground for each part

GERDA wiki: Phase I detector summary data



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Detector data summary

Enriched detectors

- [ANG1 \(89002\)](#)
- [ANG2 \(P40496A\)](#)
- [ANG3 \(P40270A\)](#)
- [ANG4 \(P40368A\)](#)
- [ANG5 \(P40239A\)](#)
- [RG1 \(28005-S\)](#)
- [RG2 \(28006-S\)](#)
- [RG3 \(28007-S\)](#)

Dead layer: [Dead layer summary](#), [GSTR-07-15](#)
Isotopic constitution: [Isotopic constitution summary](#), [GeO2 constitution of HDM detectors](#), [GeO2 constitution of IGEX detectors](#)
Exposure history before GERDA: [Exposure summary](#), [Reference for IGEX detectors](#)

Non-enriched detectors

- [GTF P41032A](#)
- [GTF P41042A](#)
- [GTF P41044A](#)
- [GTF P41045A](#)
- [GTF P41110A](#)
- [GTF P41112A](#)

R&D detectors

- [BEGe](#)

[return to TG1](#)





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ANG 1 (89002)

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- 1 [Before refurbishment](#)
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- 4 [Low-mass holder](#)

(Same structure for each detector)

Before refurbishment

1. [Data sheet](#)
2. [Cryostat dimensions](#)
3. [Diode dimensions](#)
4. [Opening and dimension measurement](#)



After refurbishment

1. [Diode dimensions](#)
2. [I-V curve](#)

Exposure

1. [Exposure summary](#)

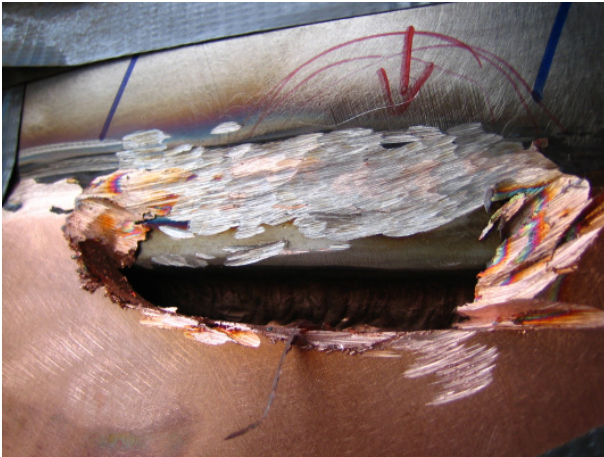
Low-mass holder

1. [Chinese Hat](#)
2. [Star 1](#)
3. [Star 2](#)

return to [TG1](#) [Detector Data Summary](#)

LArGe cryostat construction

February '08



- Cryostat cool shield / neck repaired successfully (March 08)

- He leak tested

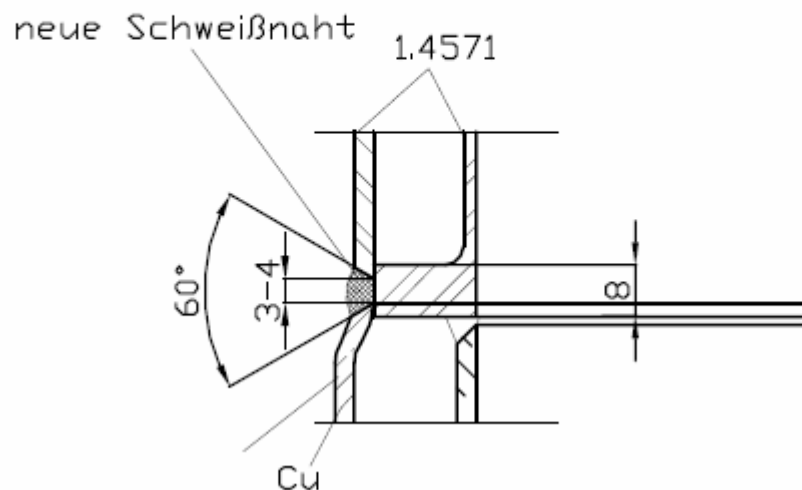
- LN cool-down of neck and shield



- He-leak test

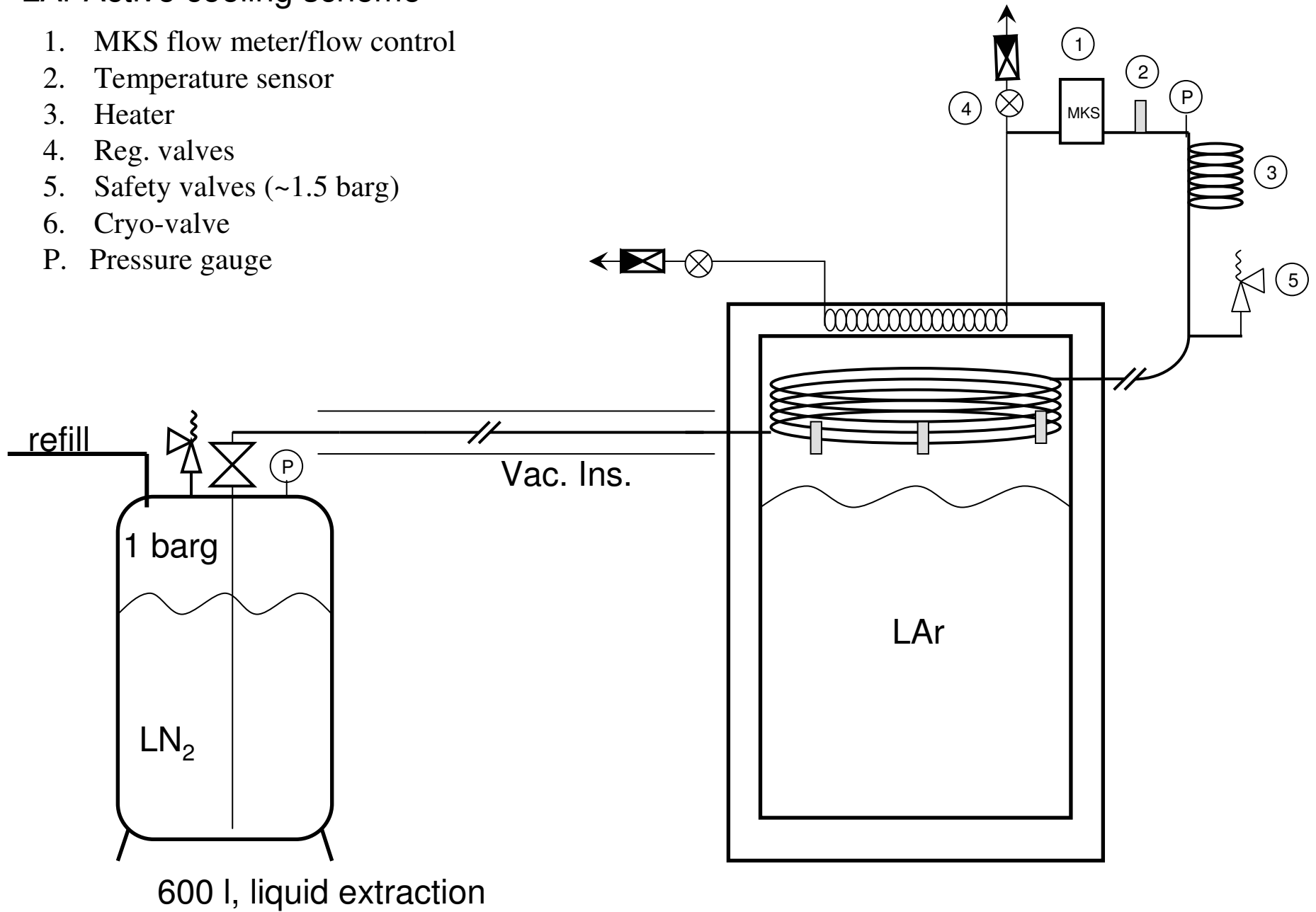
- ongoing: mounting of reflector shield

- completion: June/July



LAr Active cooling scheme

- 1. MKS flow meter/flow control
- 2. Temperature sensor
- 3. Heater
- 4. Reg. valves
- 5. Safety valves (~1.5 barg)
- 6. Cryo-valve
- P. Pressure gauge



Upcoming activities

- June: TG1/TG3 integration in GDL
- July/August: testing of processed detectors in GDL
 - Clean up; change argon,
 - I/V curve
 - Counting characteristics dependent on HV/
Energy resolution
 - Effective mass (efficiency)
- September: Mounting of LArGe in GDL