

Status of the AGATA cryostats

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AGATA-detectors at GSI

After several warm-ups without pumping and/without applied HV + LV
the detector group & CTT
repaired and delivered

23 detectors for the GSI campaign in Feb. 2014

ATC1: A008, B001, C003

ATC2: A003, B003, C005

ATC3: A002, B010, C001

ATC4: A007, B007, C007

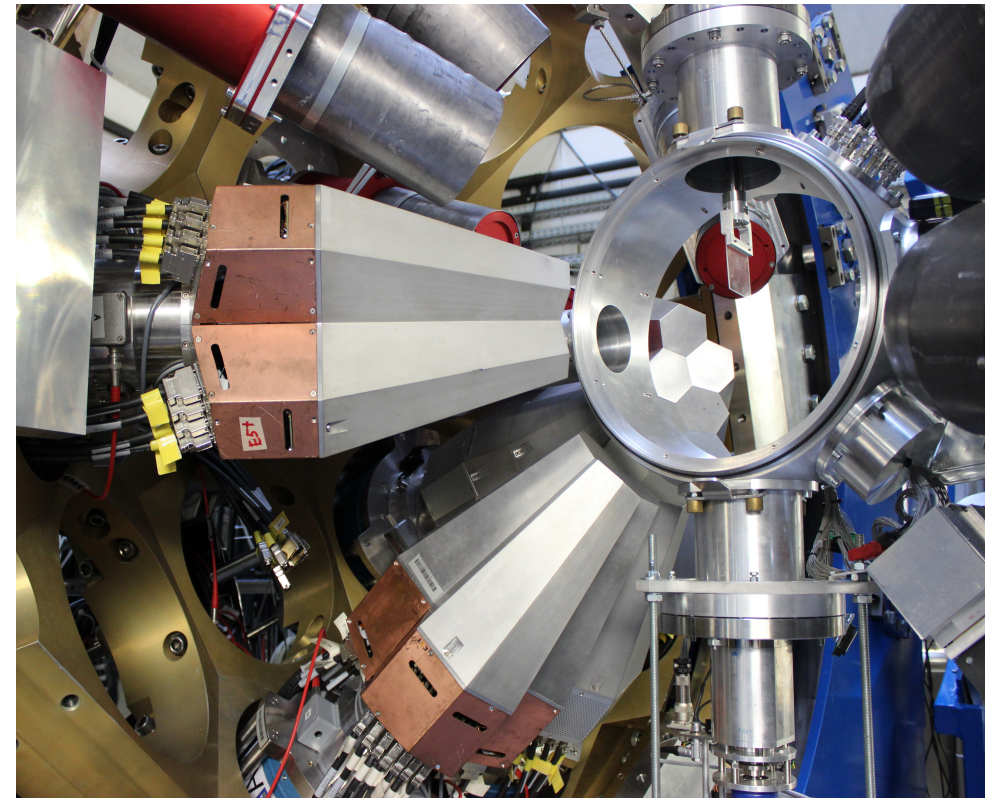
ATC5: A004, B002, C005

ATC6: A001, B004, -

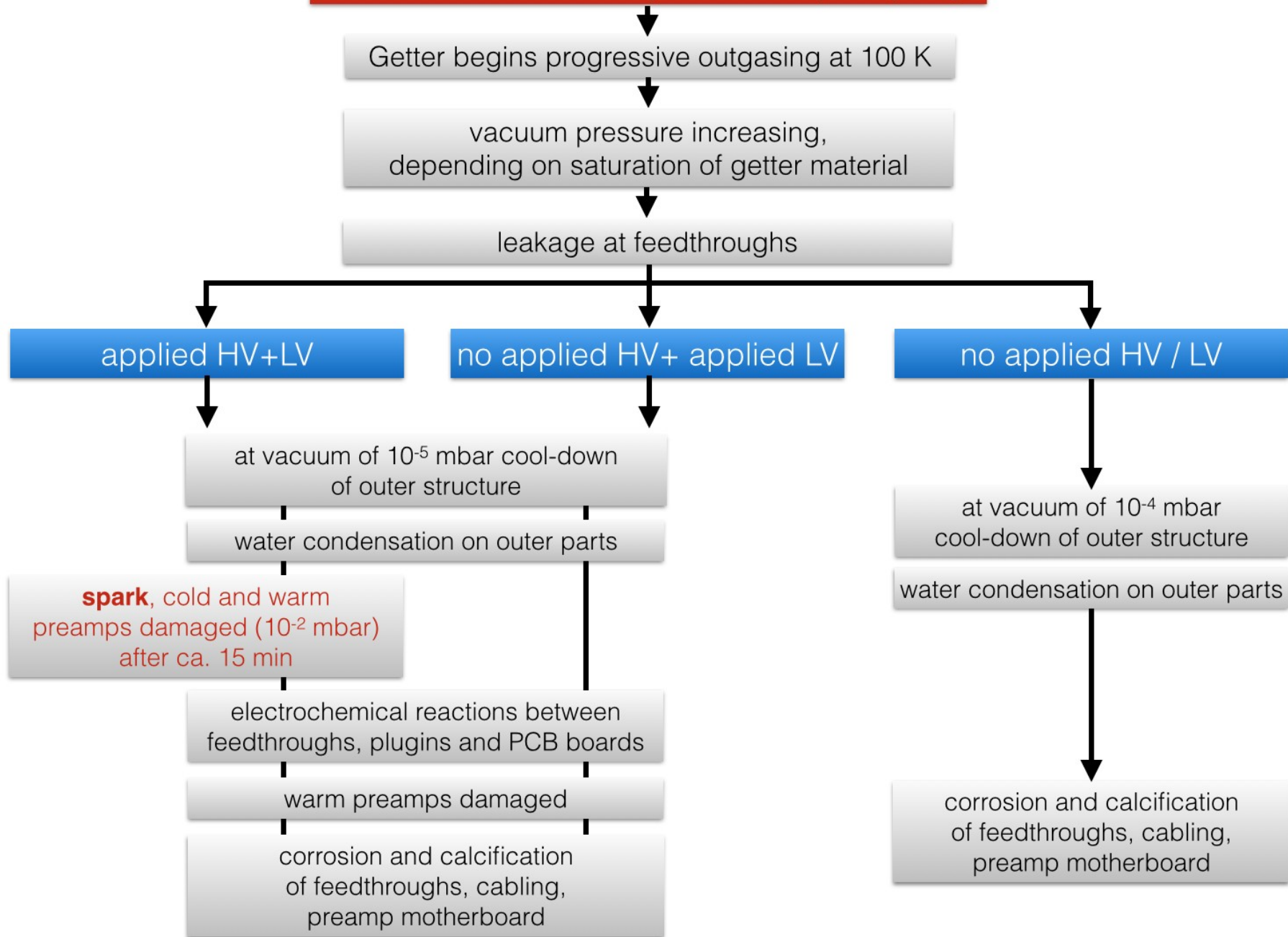
ADC1: B008, C006

ADC2: B012, C010

ADC3: B011, C008



Accidental warm-up without pumping

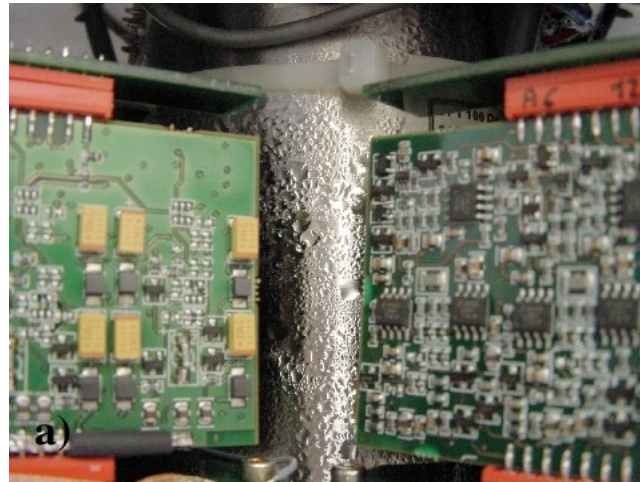


Water condensation due to warm-up without pumping

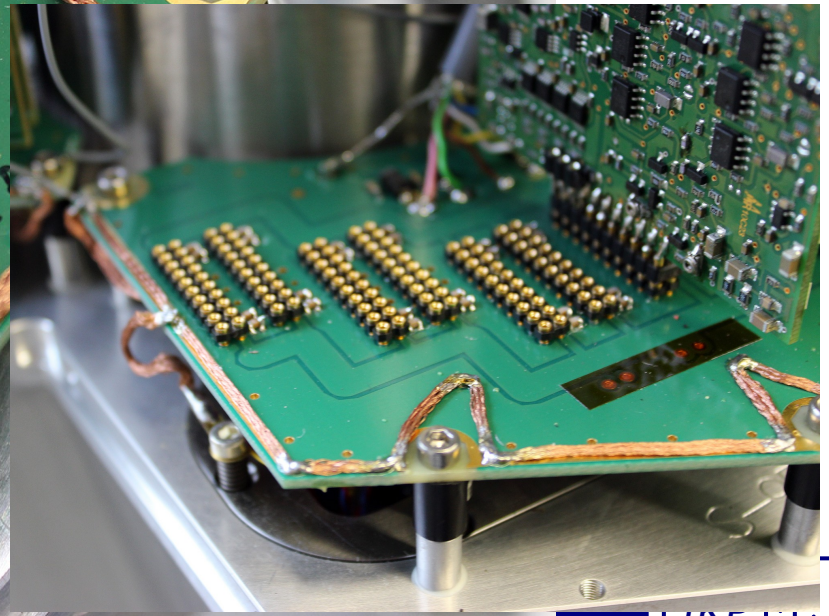
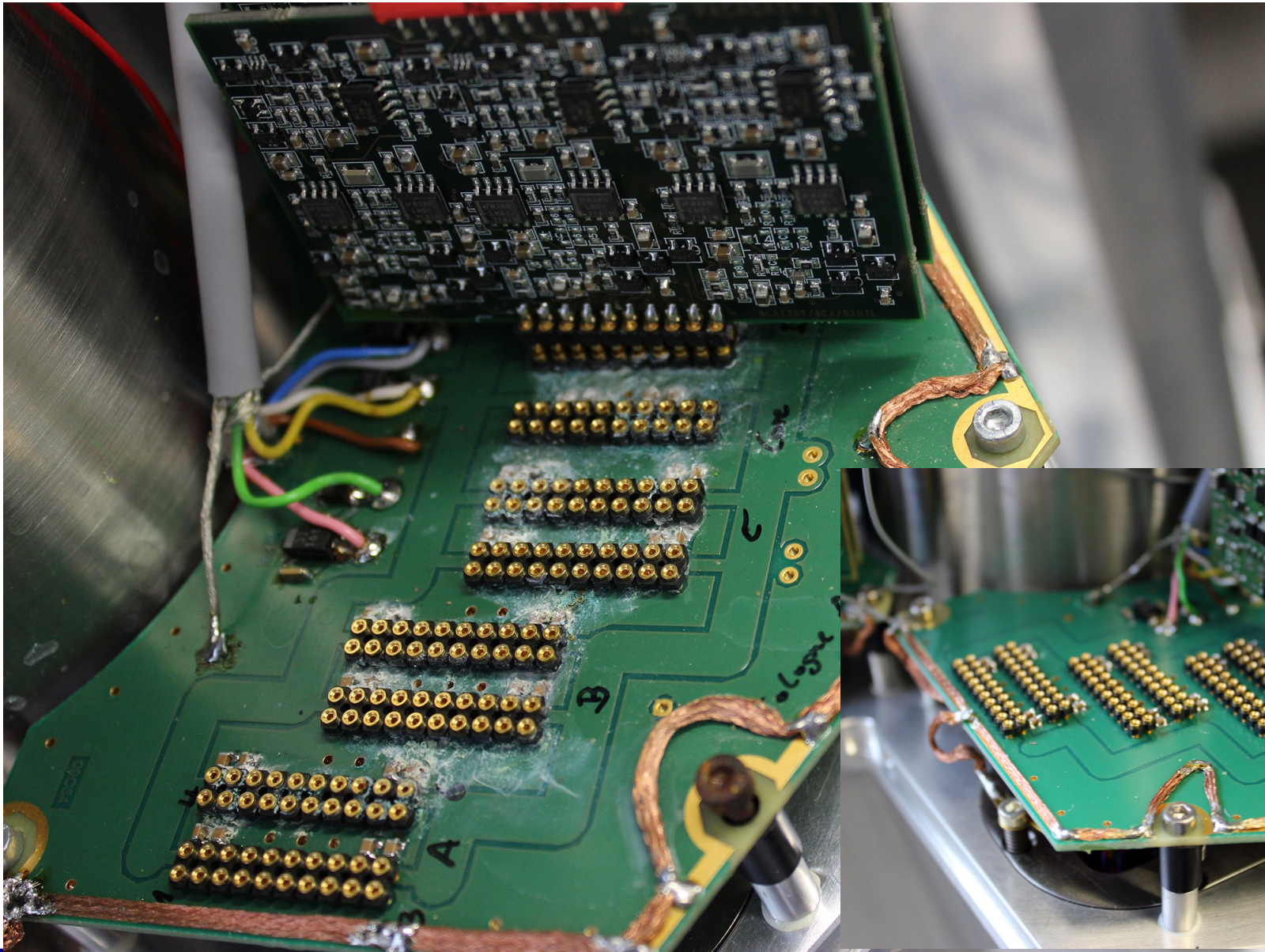
Accidental warm-ups are
not foreseen for
AGATA-detectors!

They are not part of
the detector specification!

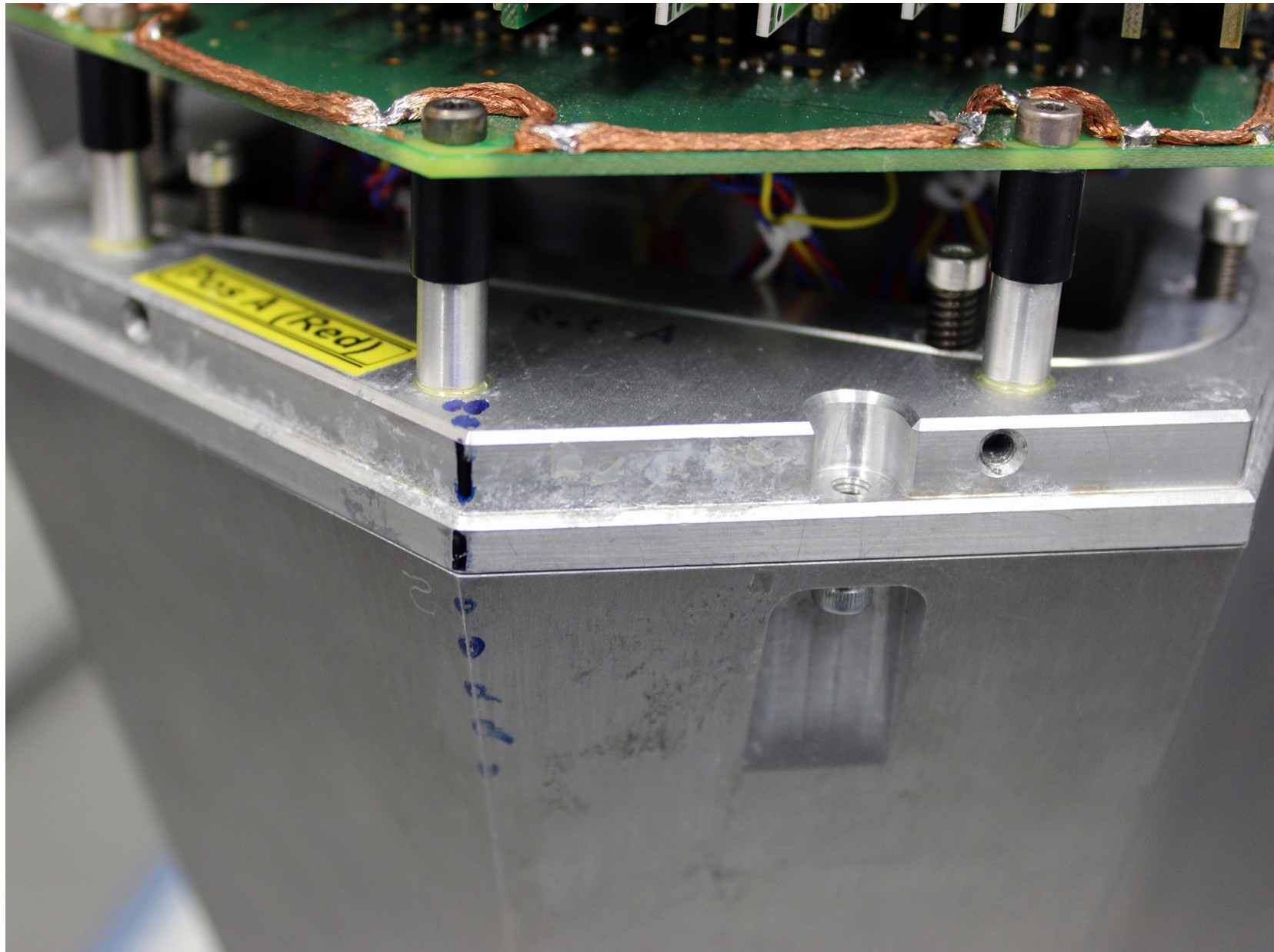
GRETINA and
GAMMASPHERE
never had an
accidental warm-up.



Corrosion and calcification of the motherboard for warm preamplifiers



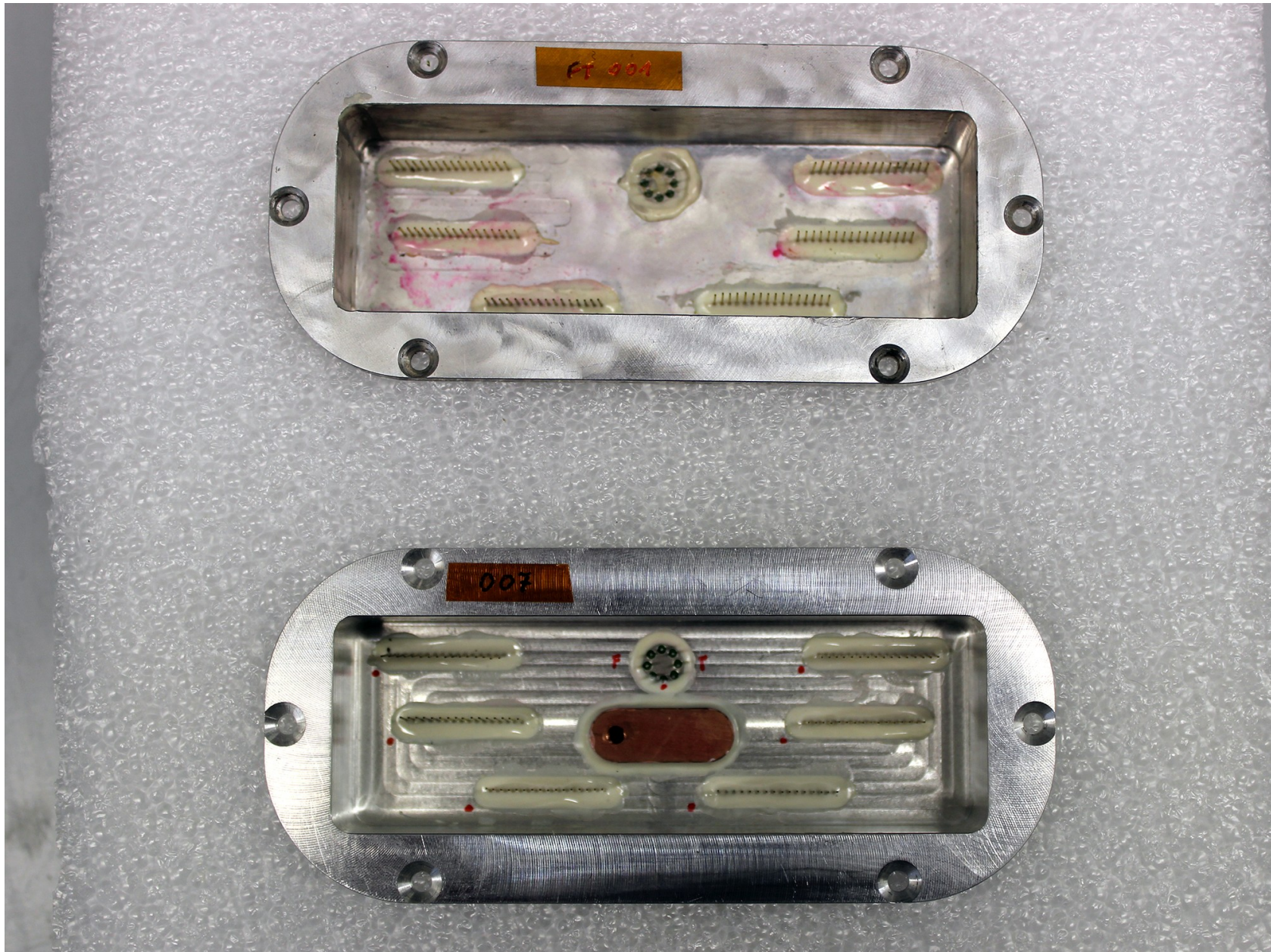
Calcification of the endcap



Corrosion and calcification of the preamplifier housing



Corrosion and calcification of the feedthroughs



Even the low voltage power supply is affected from humidity

The cryostats are not specified to run at high humidity.

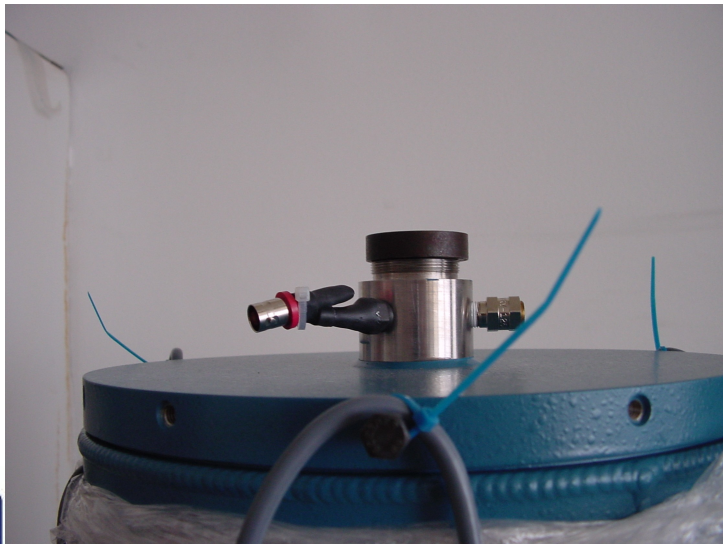
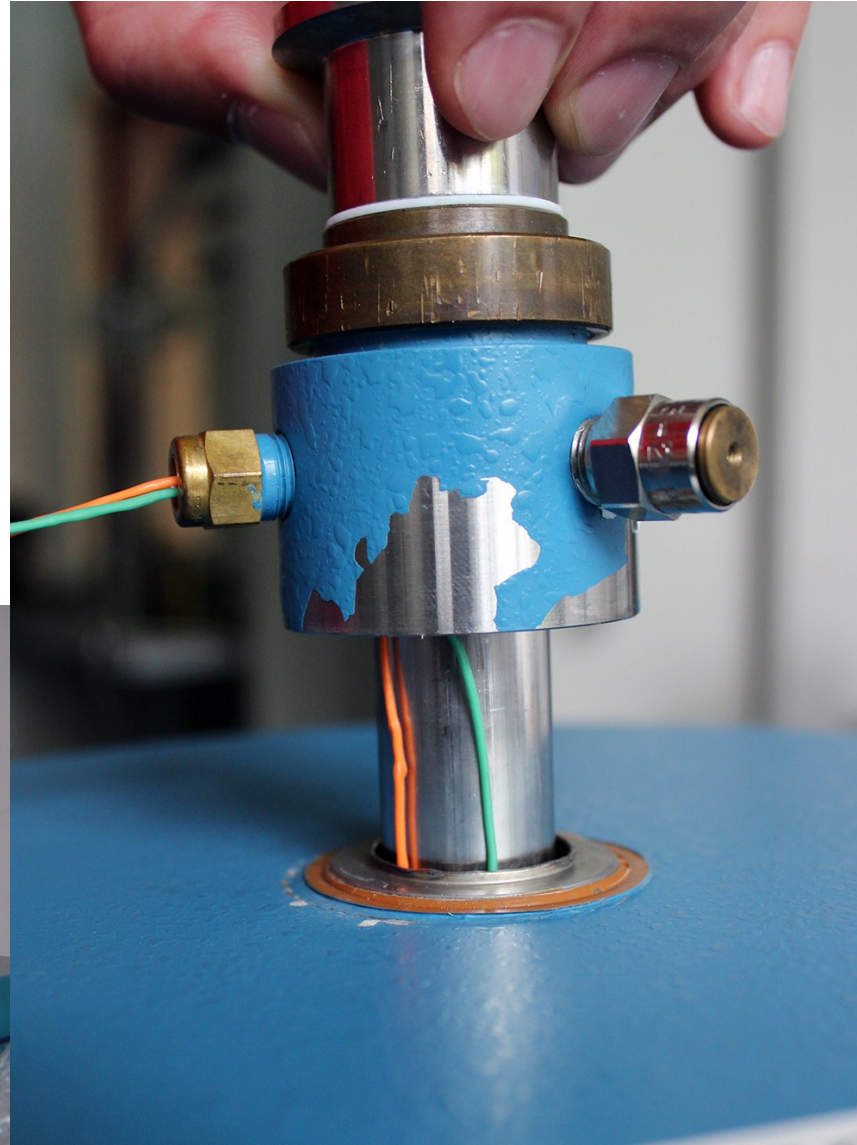
At a dewpoint of 16 °C:
Water begins to condensate on outer surface

**Best condition:
dry enviroment**

**Continuous checks of
humidity in the system**



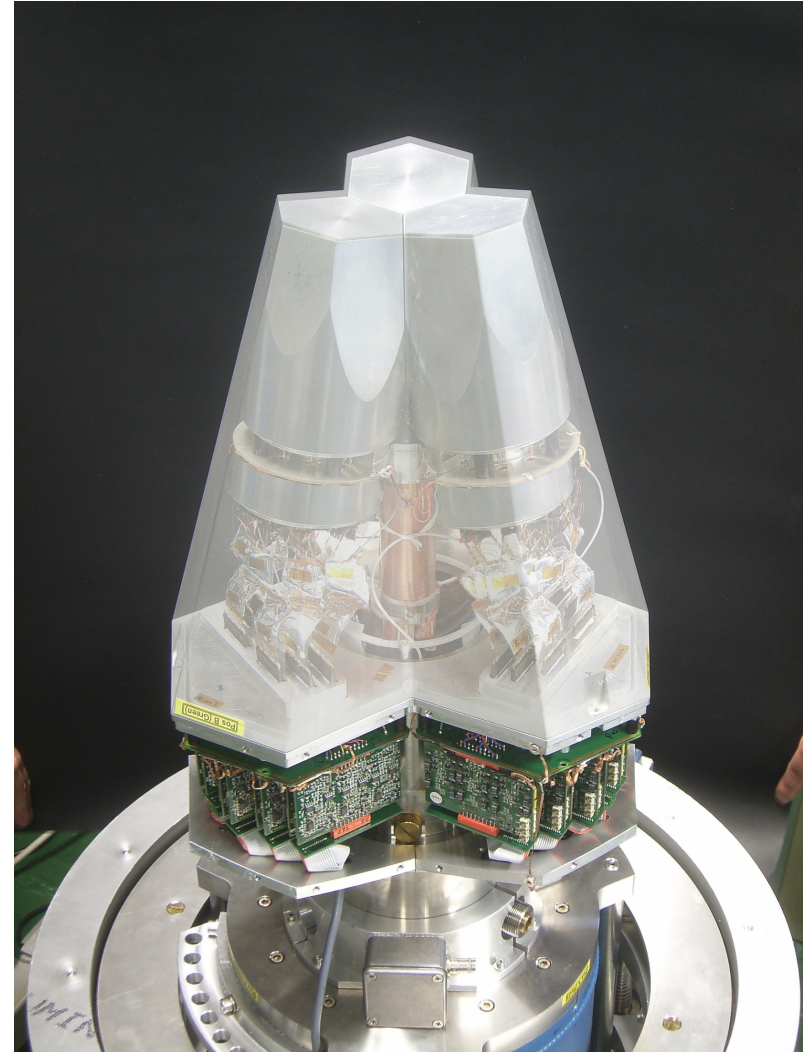
Outcome of using a pipe wrench on the filling nozzle



Maintenance of AGATA cryostats after accidental warm-up

Replacing of all affected parts

111 FET
3 feedthroughs
3 motherboards for the
39 warm preamplifiers
low voltage power supply



Maintenance of AGATA cryostats after accidental warm-up

Replacing of all affected parts

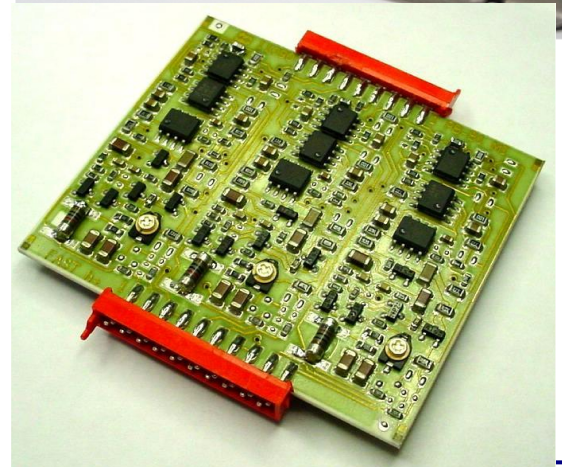
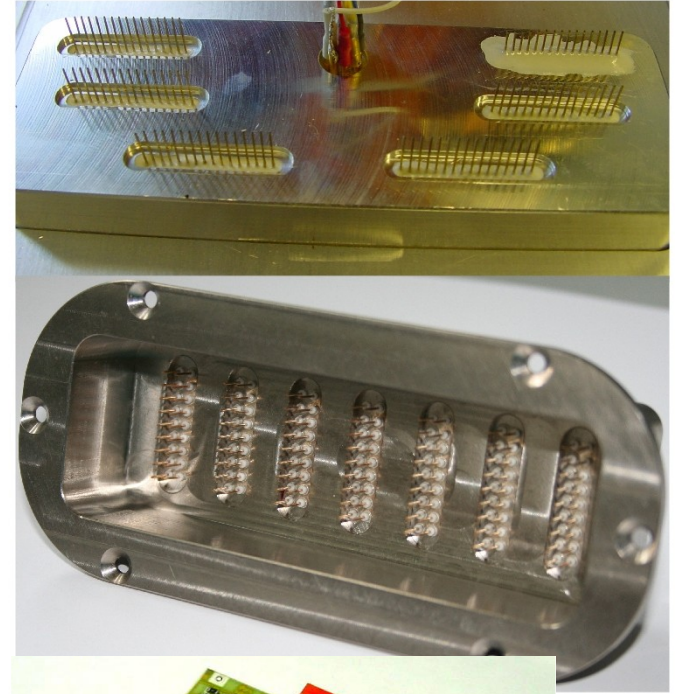
111 FET

3 feedthroughs ca. 8000
39 warm preamplifiers ca. 12000 €
3 feedthroughs ca. 8000 €

3 motherboards for the
warm preamplifiers ca. 1500 €
low voltage power supply

Total material costs ca. 21500 €

+ ca. 3 iterations for tests



Time schedule one-iteration repair

	Worktime	Detector time
<ul style="list-style-type: none"> • unmount capsule / cold electronics • leak test 	2 d	2 d
<ul style="list-style-type: none"> • repair/replacement of feedthroughs 	2 d	2 d
<ul style="list-style-type: none"> • annealing of cryostat 	1 d	7 d
<ul style="list-style-type: none"> • mounting of electronic test device cold & warm electronics 	1 d	1 d
<ul style="list-style-type: none"> • test of cabling, cold & warm preamps 	3 d	3 d
<ul style="list-style-type: none"> • assembly of detectors & cabling cold part & test 	3 d	3 d
<ul style="list-style-type: none"> • leak test / pumping 	1 d	4 d
<ul style="list-style-type: none"> • cooling 	1 d	1 d
<ul style="list-style-type: none"> • analog test at low energy 	4 d	4 d
<ul style="list-style-type: none"> • digital test at high energy 	4 d	4 d
<ul style="list-style-type: none"> • digital test crosstalk 	2 d	2 d
<ul style="list-style-type: none"> • warmup 	1 d	4 d

24 d

37 d



Does the AGATA
collaboration has the
funds and the manpower
to handle accidental
warm-ups???



AGATA cryostat: ATC1

Number of iterations: 4

Feedthroughs: Glued

FWHM Core ($^{241}\text{Am}/^{60}\text{Co}$):

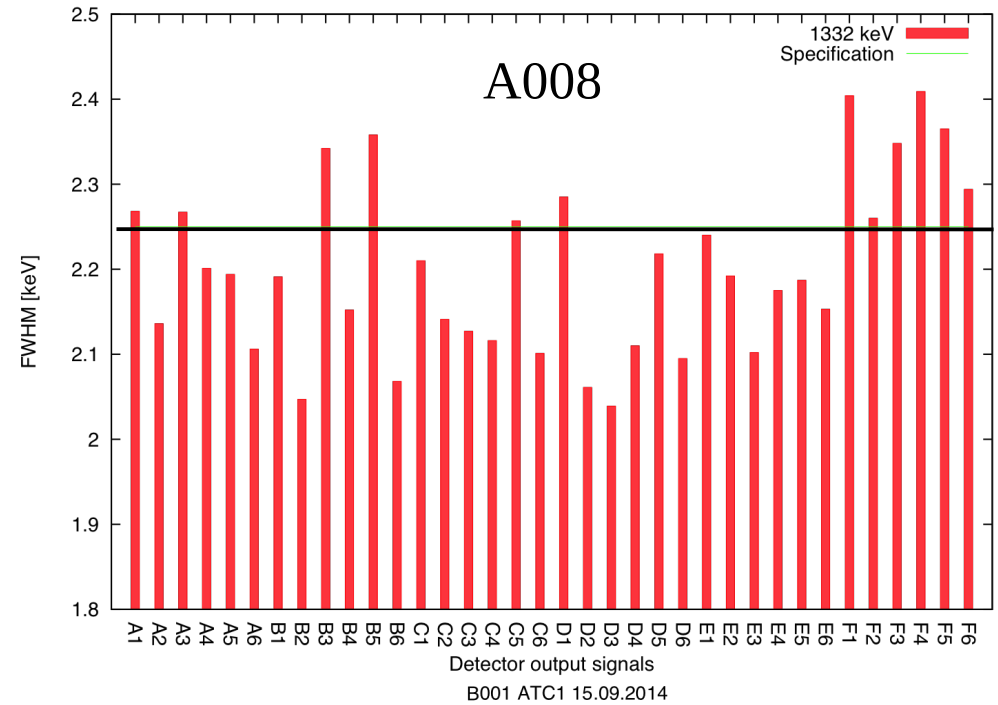
A008: 1.89/2.45 keV

B001: 1.07/2.74 keV

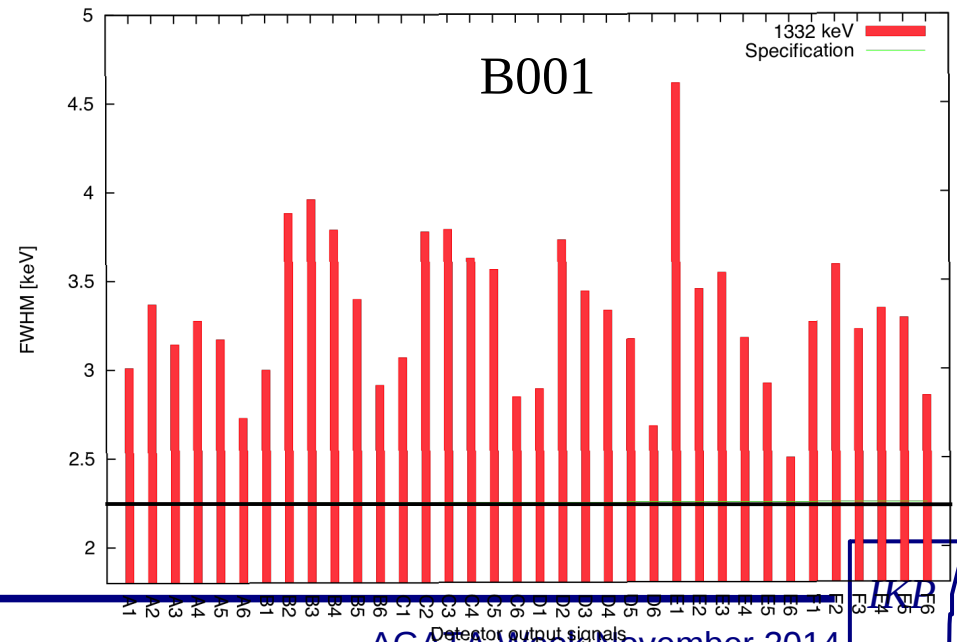
C003: 1.11/2.32 keV

Current status: mounted at GANIL

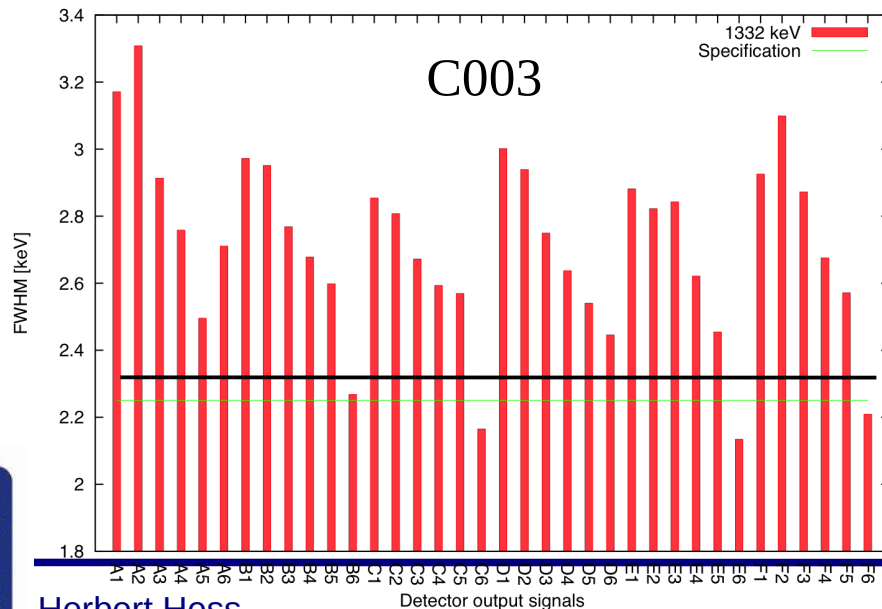
A008 ATC1 15.09.2014



B001 ATC1 15.09.2014

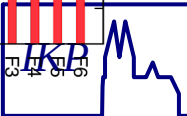


C003 ATC1 15.09.2014



Herbert Hess

AGATA Week November 2014



AGATA cryostat: ATC3

Number of iterations: 3

Feedthroughs: Ceramic

Dewar: no LN2 read-out!

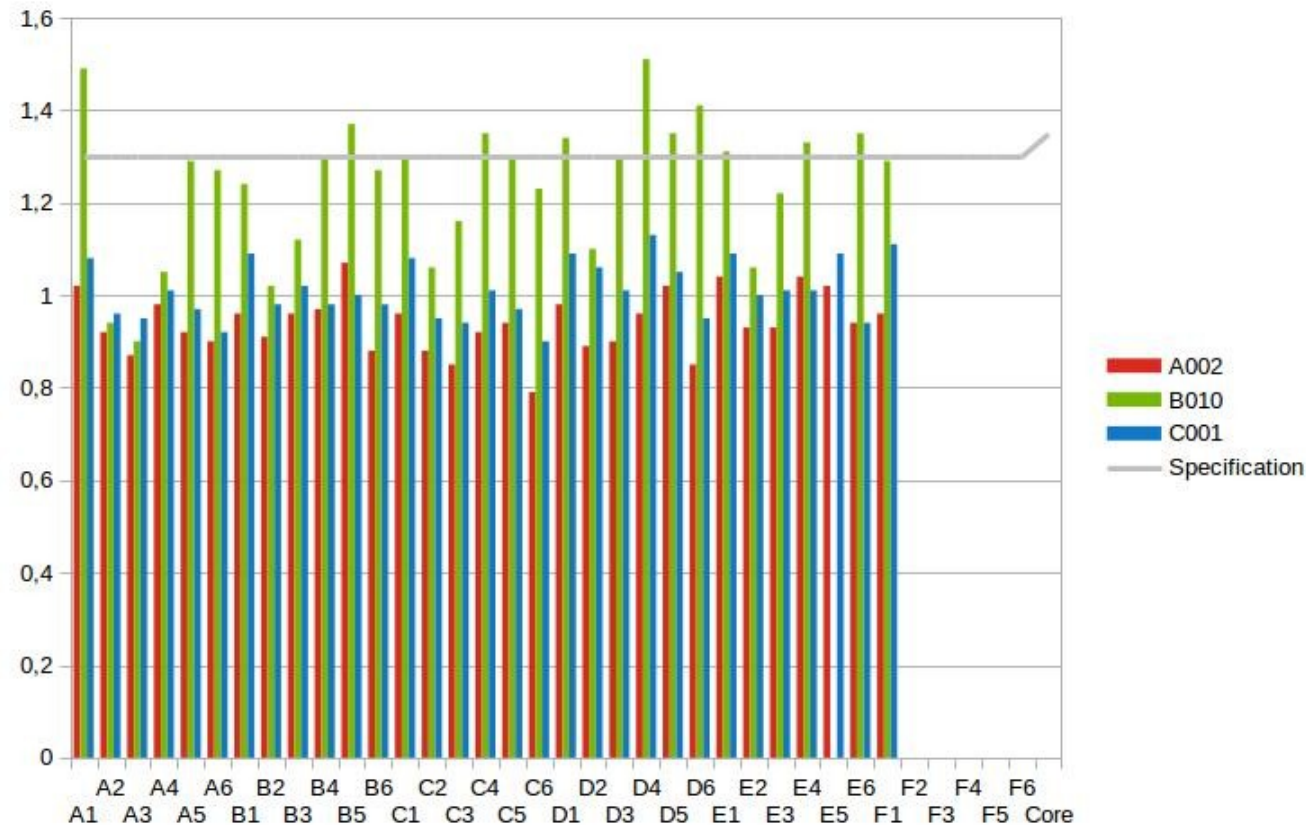
Mean value

FWHM low energy:

A002: 0.94 keV

B010: 1.24 keV

C001: 1.01/2.32 keV



Current status: GANIL

AGATA cryostat: ATC4

Number of iterations: 4

Feedthroughs: Ceramic

FWHM Core ($^{241}\text{Am}/^{60}\text{Co}$):

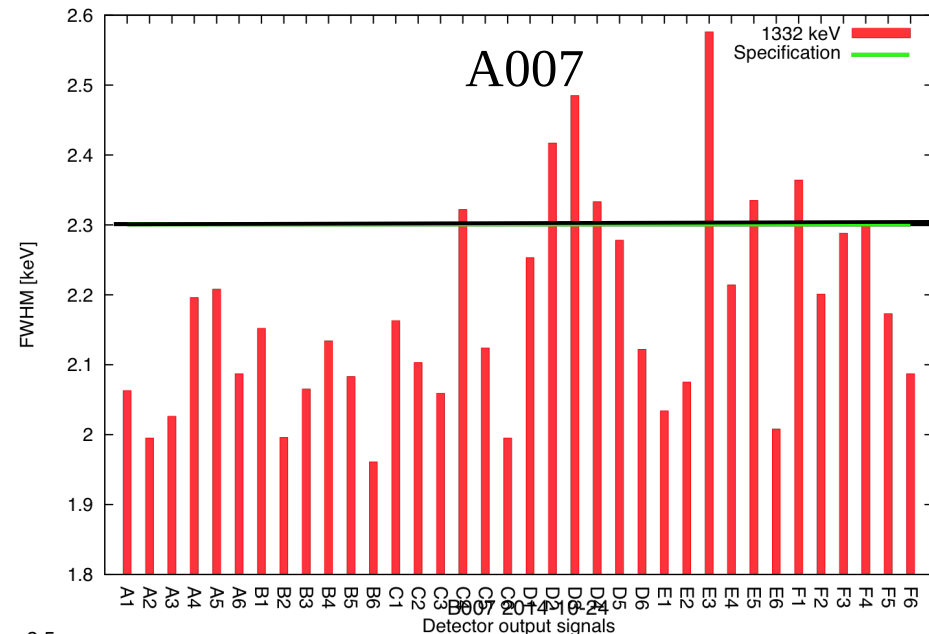
A007: 2.15/2.84 keV

B007: 1.45/2.42 keV

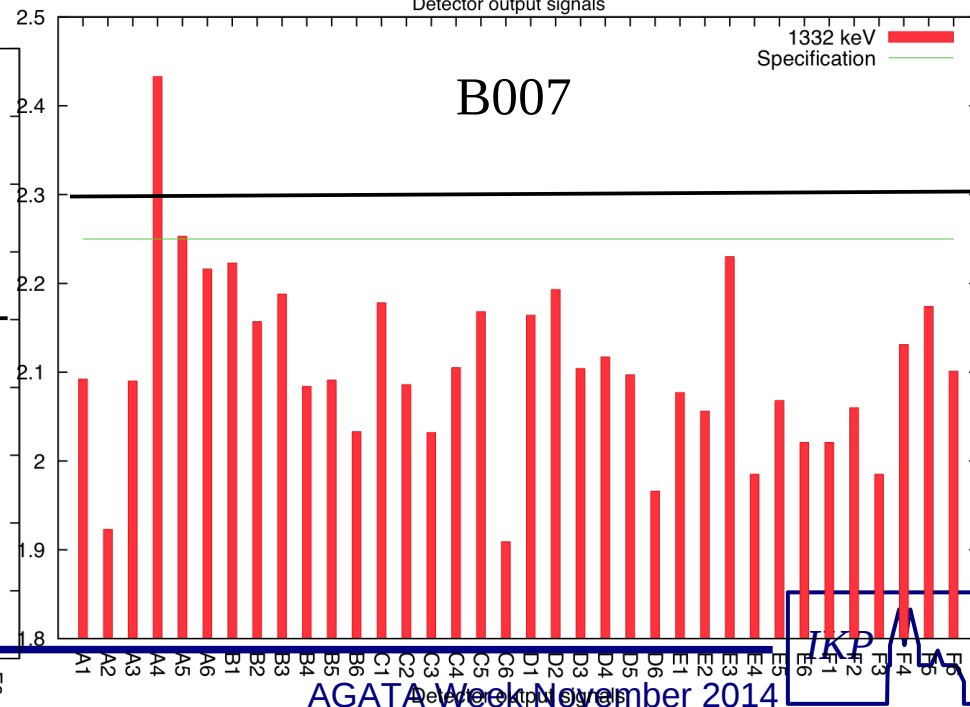
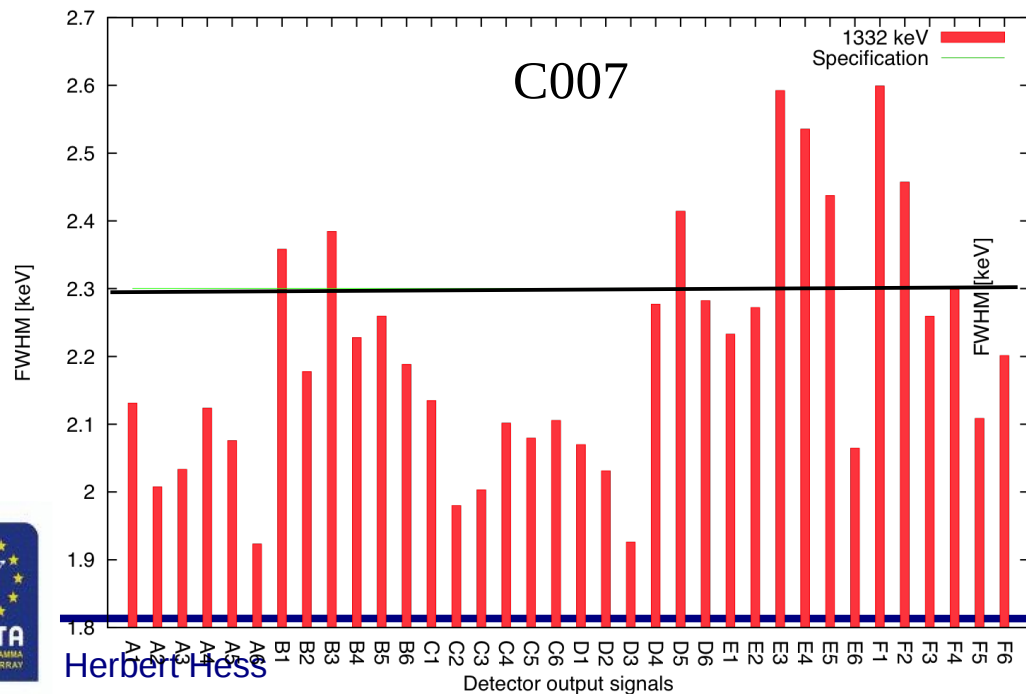
C007: 1.53/2.58 keV

Current status: mounted at GANIL

A007 2014-10-24

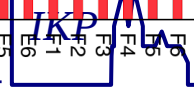


C007 ATC4 2014-10-24



Herbert Hess

AGATA Week November 2014



AGATA cryostat: ATC5

Number of iterations: 5

Feedthroughs: Ceramic

FWHM Core ($^{241}\text{Am}/^{60}\text{Co}$):

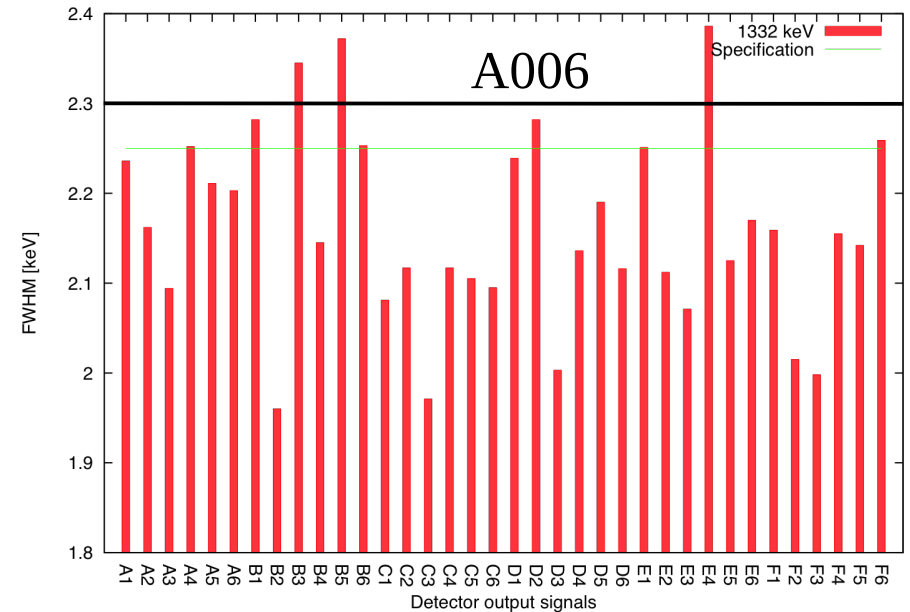
A006: 1.39/2.45 keV

B002: 1.18/2.22 keV

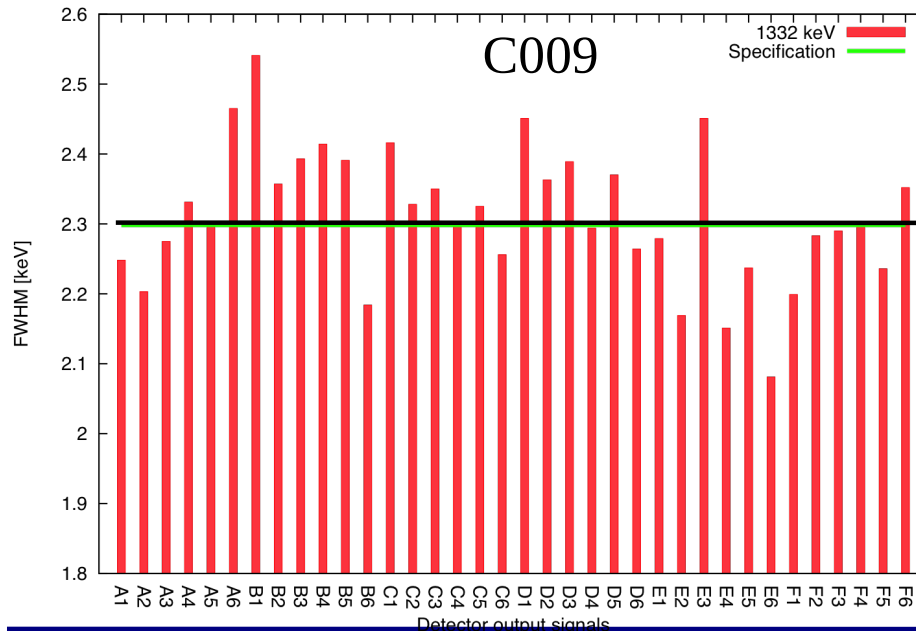
C009: 1.31/2.20 keV

Current status: mounted at GANIL

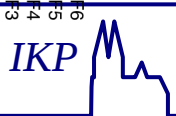
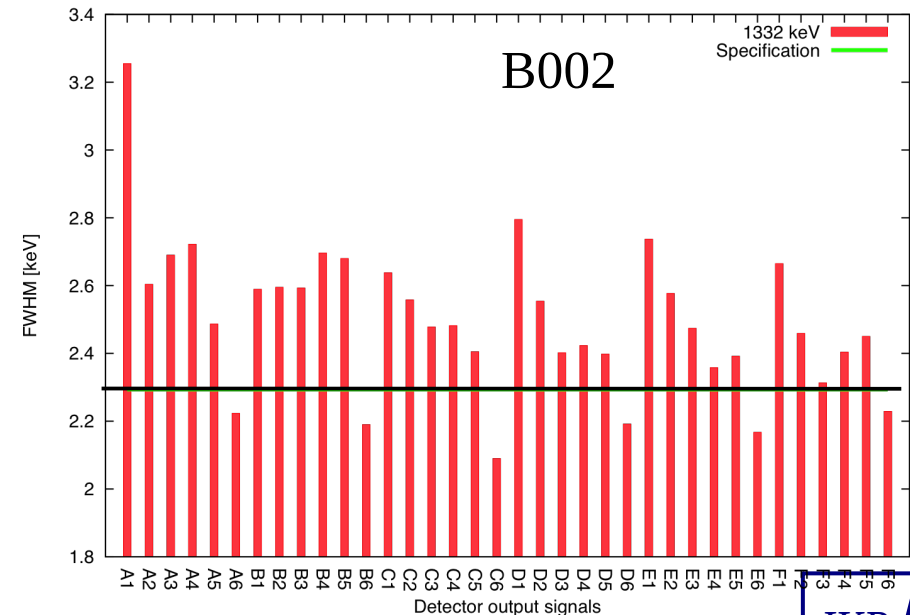
A005 ATC5 09.09.2014



C009 ATC5 09.09.2014



B002 ATC5 09.09.2014



AGATA cryostats: ATC2 & ATC6

ATC2:

Number of iterations: 1

Feedthroughs: Ceramic

Detectors A003, B003, C005 mounted

Current status: will be cooled down after
AGATA week

ATC6:

Number of iterations: 7

Feedthroughs: Glued

FWHM core:

A001: 1.65/2.43 keV

B004: 2.40/2.81 keV

C004: 1.41/2.41 keV

Current status: debugging ongoing



Assembly AGATA cryostats ATC7 & ATC8 (CTT)

ATC7:

Number iterations: 3

ATC7 = converted ADC

Feedthroughs: Ceramic

FWHM core:

A001: 1.47/2.37 keV

B004: 1.24/2.42 keV

C004: 1.62/2.81 keV

Current status: debugging ongoing

ATC8:

Number iterations: 1

Feedthroughs: Ceramic

Detectors A006, B013, C006 mounted

Current status: cold, debugging ongoing



Summary and Outlook

24 detectors will be prepared by the detector group & CTT for the beginning of the GANIL campaign

12 detectors are at GANIL:
ATC1, ATC3, ATC4, ATC5,

9 detectors are mounted in the frame, commissioning ongoing

12 detectors will be delivered from Cologne to GANIL
(ATC2, ATC6, ATC7, ATC8)

Every warm up without pumping:
Costs 25000 €/cryostat +
Repair time min. 6 months/cryostat

