Update from the IRFU/Saclay lab

M. Zielińska, CEA/IRFU/DPhN

(on behalf of the team I will present in due time)

History of the IRFU/Saclay lab

Nuclear Structure

SPhN 2004 - 2006

AGATA – The Advanced GAmma Tracking Array

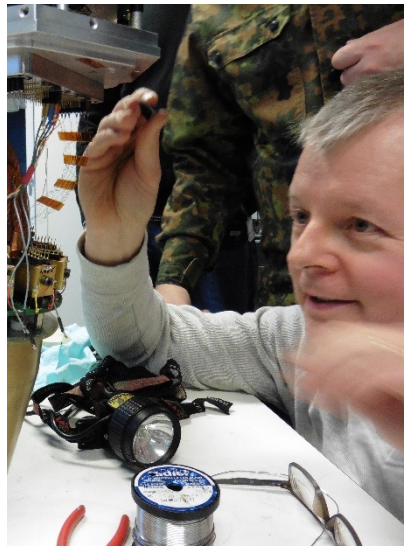
W. Korten, A. Bürger, A. Görgen, J. Ljungvall, A. Obertelli, Ch. Theisen (SPhN)
J. Pancin, Ph. Charvin (SEDI)
Ch. Veyssiere, R. Berthier, T. Boussuge, A. Bouty, S. Broussard, P. Contrepoids, G. Coulloux, Ph. Daniel-Thomas, P. Gros, J.-M. Joubert, Y. le Noa, A. Lotode, Y. Mariette, J. Noury, R. Touzery, Ch. Walter (SIS)
B. Hervieu (SACM)

A laboratory for the integration and testing of AGATA detector modules has been installed at CEA Saclay in collaboration between the nuclear physics division (SPhN) and the detector and electronics division (SEDI). The goal of this laboratory is to perform acceptance tests of the detector capsules delivered by the manufacturer Canberra–Eurysis and, as a second, closely related task, the integration of AGATA detectors into triple–cryostats followed by testing of the triple–modules. The laboratory will also be available for test measurements related to the R&D program on alternative cooling for germanium detectors (see below).

2.5 IRFU contributions to the AGATA project

In accordance with the MoU, IRFU has contributed ~25% of the French investment (~350k€) to the demonstrator. This investment went mainly into the share of the French AGATA triple cluster module and the detector support system (see below). IRFU has also become a strong partner with important responsibilities in the collaboration, in particular concerning the Germanium detectors and the related infrastructure. A new Germanium detector laboratory has been implemented successfully for AGATA at the SEDI, requiring additional investment.

History of the IRFU/Saclay lab



One of four detector labs of the collaboration, active since 2007

2007: Arrival of the test cryostat (and its temporary return to CTT due to vacuum problems)

2006-2010 “Chef de projet” (technical leader): Julien Pancin (at GANIL since 2010)

2010: Mark Karolak takes over as technical leader

2006-2014: several “responsables scientifiques” (scientific leaders): A. Goergen, W. Korten, A. Obertelli, M.-D. Salsac

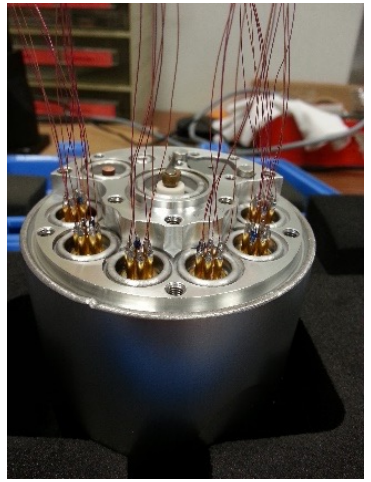
2014: M.-D. Salsac leaves for industry,
MZ takes over scientific leadership of the project (with an amazing support, also in the formal IRFU structure, from Ch. Theisen)

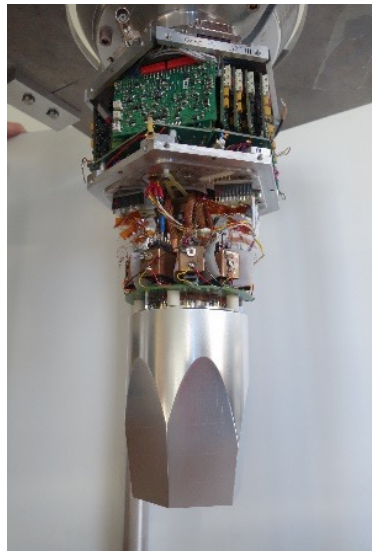
Reasonably stable situation between 2014 and 2025

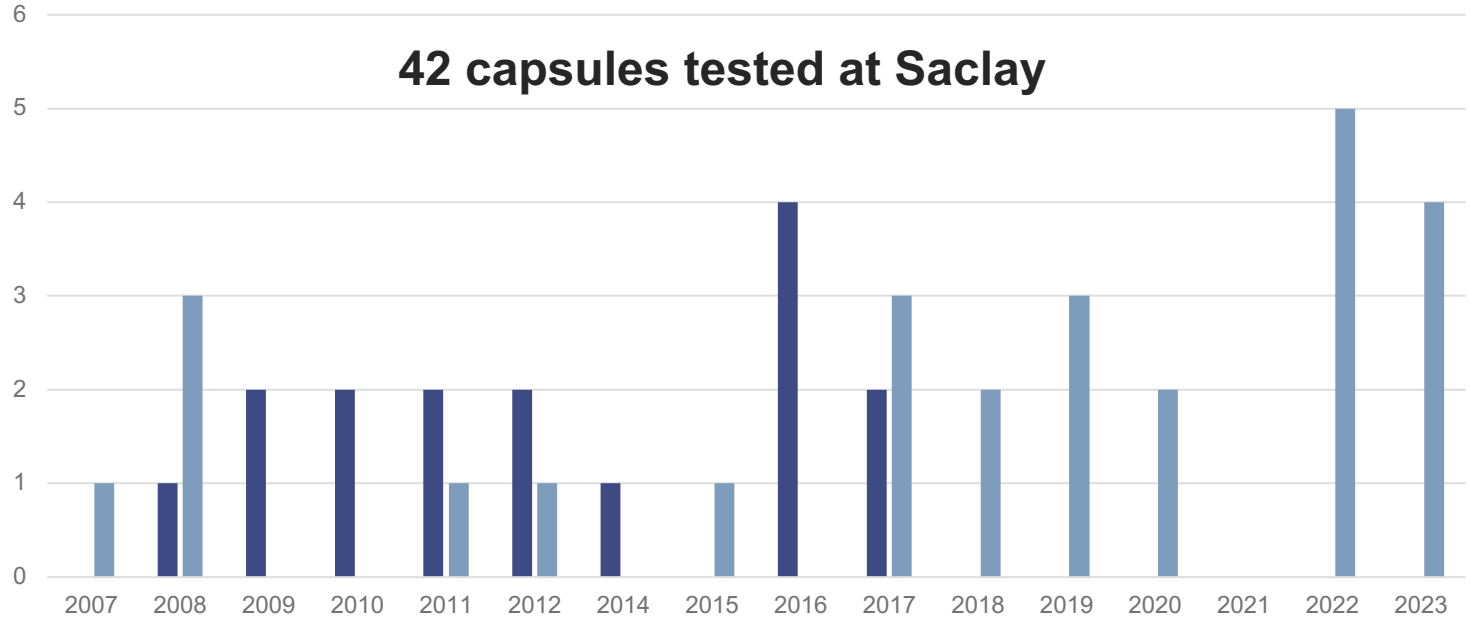
During this period, we ran 26 capsule tests at Saclay, 15 FAT at Mirion; IRFU/DIS team designed and implemented the new Autofill for AGATA 2π, and the new, more compact LVPS

IRFU/Saclay AGATA detector lab

- 2007-2017: mostly Customer Acceptance Tests (on delivery of new/repaired capsules)
- 2019: collaboration decides to replace CAT by Factory Acceptance Tests
- 2018-2023 we switch to testing “suspicious” capsules
- 2024: test cryostat refurbishment (completed)







Navy blue – CAT
Light blue – other tests

Recent internal project evaluation

- “Point project” – evaluation of the project at the level of CEA institute (IRFU)
- Discussion of funding and manpower requested for mid-term (~5 years) with a longer-term vision expected
- Last “point project” December 2024

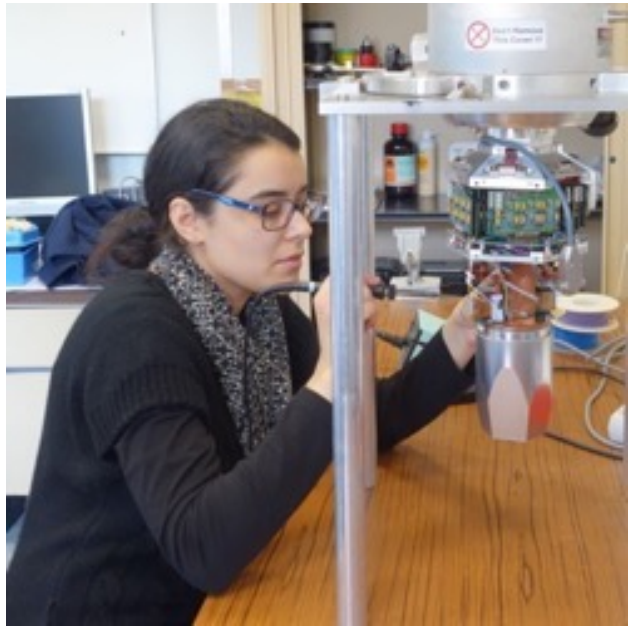
Recent internal project evaluation

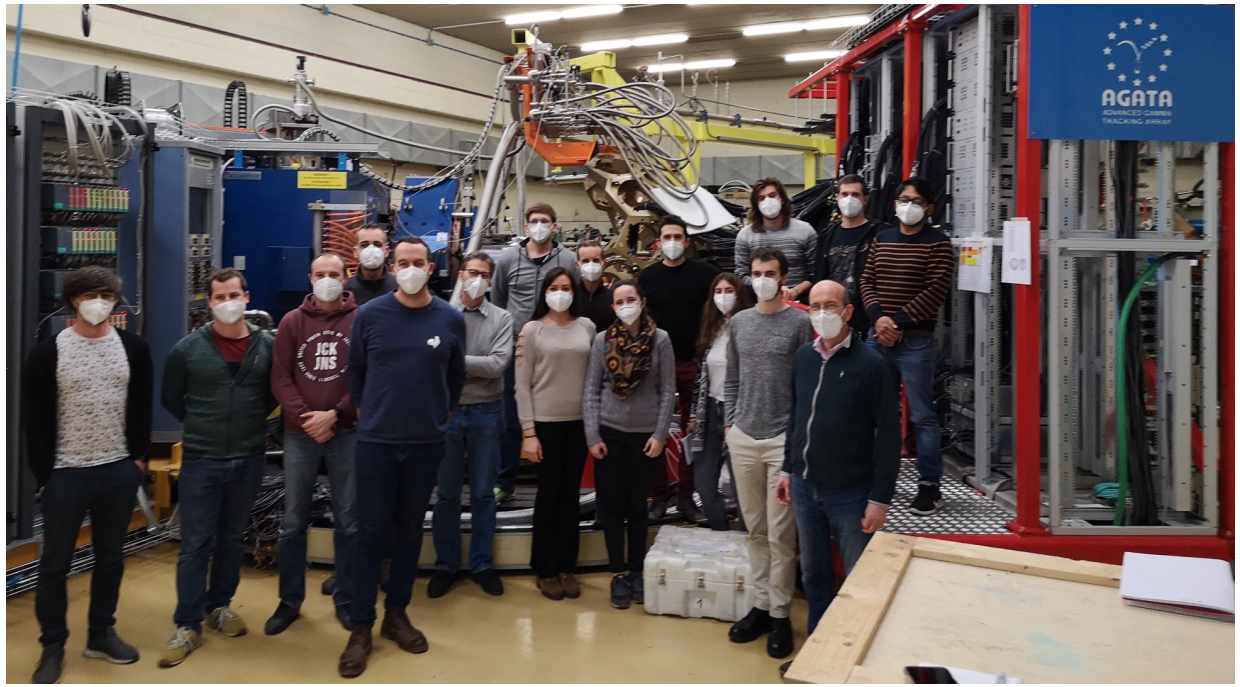
- “Point project” – evaluation of the project at the level of CEA institute (IRFU)
- Discussion of funding and manpower requested for mid-term (~5 years) with a longer-term vision expected
- Last “point project” December 2024
- Conclusions regarding the detector lab:

“IRFU recognises the importance of a dedicated detector lab for the success of the future AGATA campaign at GANIL as well as the importance of preserving the existing expertise related to segmented germanium detectors. A temporary solution has been identified to continue the capsule test activities at Saclay. The localisation of the future laboratory for maintenance of AGATA triple clusters, as well as the manpower necessary for this task, will be subject of a discussion between IRFU/Saclay and GANIL.”

IRFU/Saclay involvement in the AGATA project

IRFU/DEDIP:
AGATA detector laboratory –
various tests of AGATA/DEGAS capsules
(up to 5 per year)





IRFU/DIS:
Development and maintenance of the new LN_2 filling system (2021), low-voltage power supplies and related cabling

Technical leaders always worked at DEDIP and were strongly involved in the detector lab operation

2025: changes in the team

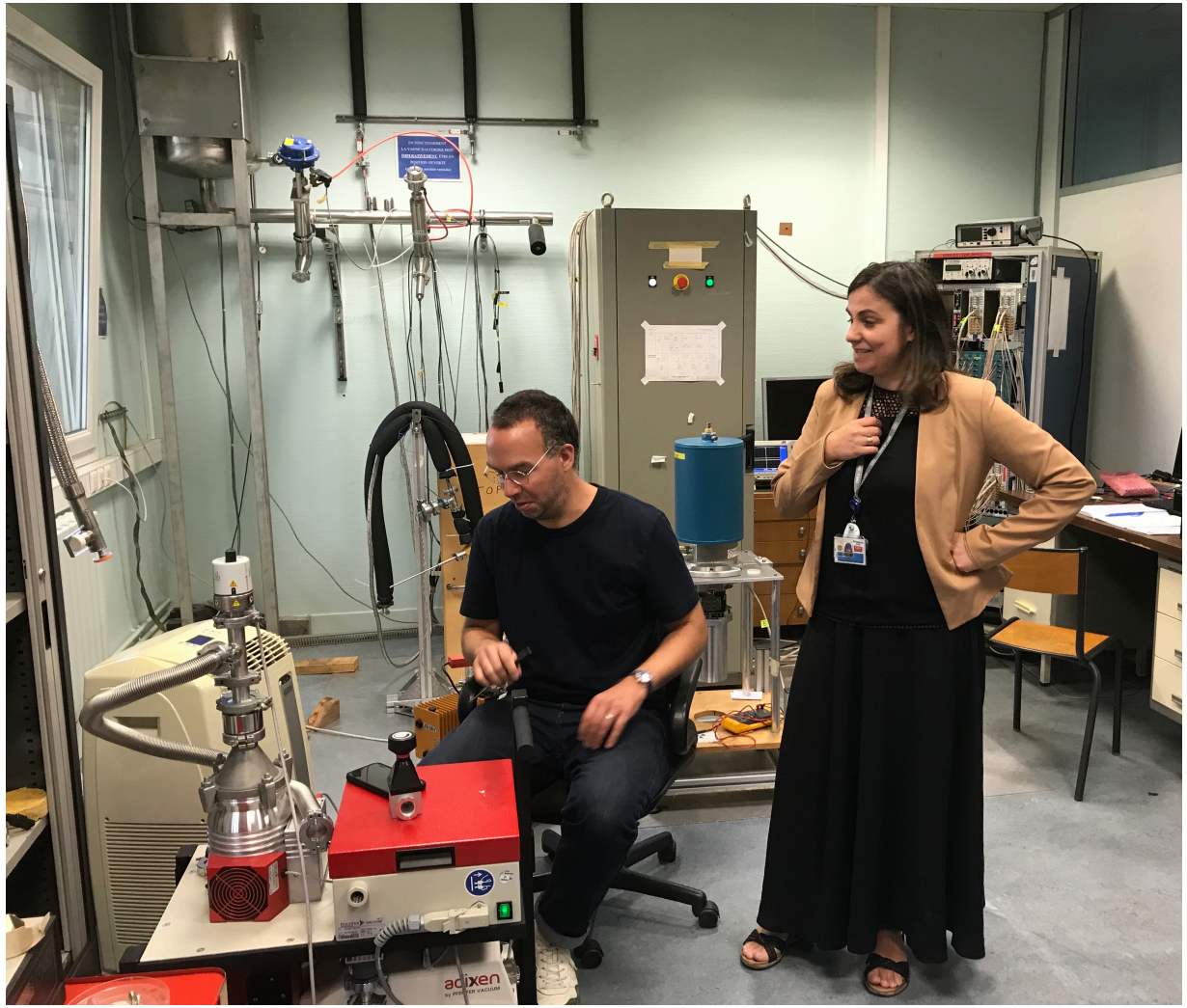
June 2025: Marc Karolak retires

March 2025: Tom Joannem (IRFU/DIS) becomes new technical leader of the AGATA project at IRFU/Saclay

June 2025: Caroline Lahonde (IRFU/DEDIP)
joins the AGATA detector team

October 2025: start of PhD contract of Matheo Coguic (main project on analysis of AGATA data, but has strong interest in joining the detector lab)

→ Young and motivated team that works very smoothly together



News from the detector laboratory

The test cryostat returned to Saclay in July 2025

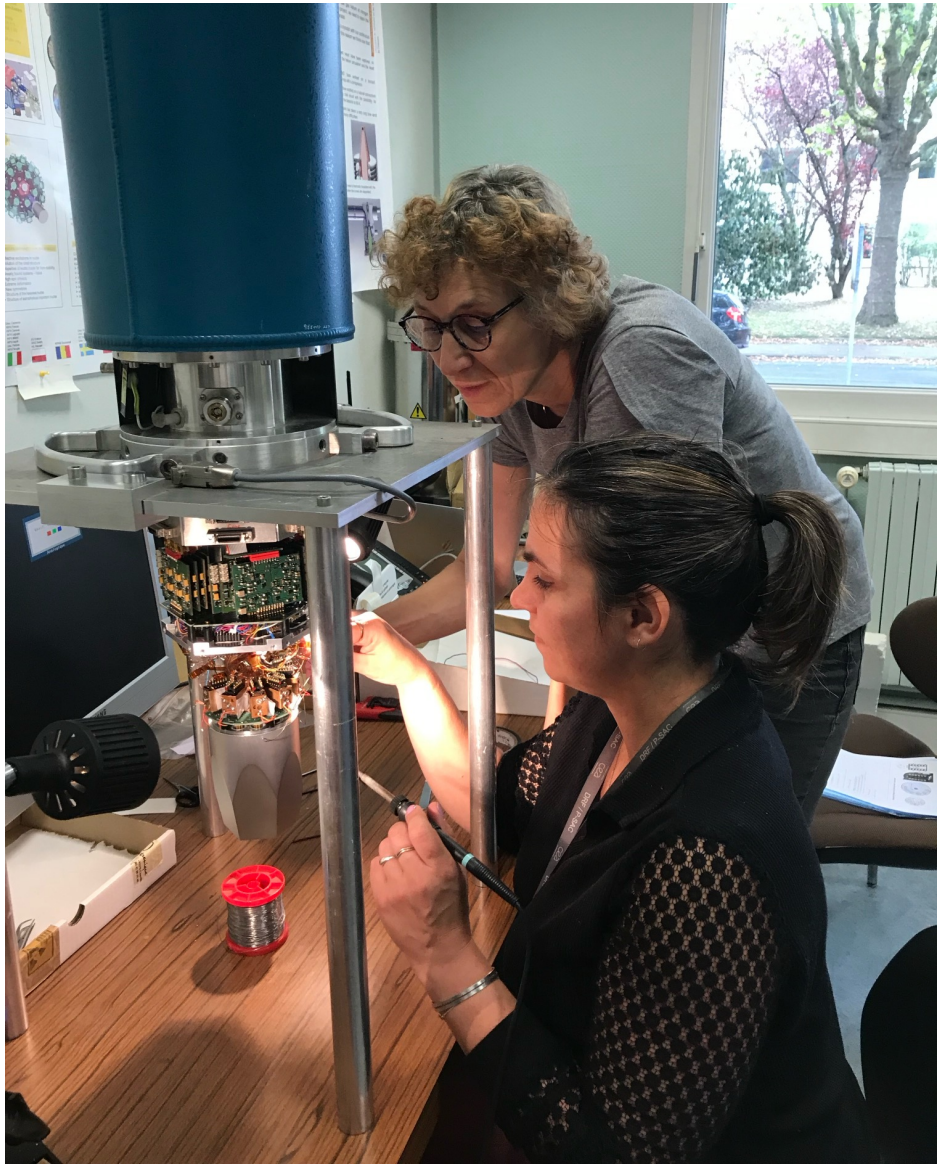
Together with H.-G. Thomas, we tested it with an electronic dummy

27-28 August: visit of Marie-Helene in the lab, mounting of C002

We will need to dismount it and anneal the cryostat before we can test it with a capsule
(accidental venting of the cryostat after the test with the dummy led to getter saturation)

We are undergoing various safety inspections and we will need to implement some changes before we are allowed to use the LN2 infrastructure

Our dry pump also needs to undergo maintenance (31k hours of operation)



Conclusions and outlook

The restart of activity of the detector lab is somewhat messy.

The transfer of competences before the departure of Marc did not work as we hoped.

However, starting with a clean slate makes easier to introduce changes and eventually improve the functioning of the lab (example – cryostat annealing; we move from a caddock system to hot air)

Thanks to our new technical leader, we currently are in discussion with local experts on vacuum and cryogenics, and we will introduce the suggested modifications to our installations.

We are very grateful to AGATA detector group members for their support.

We are very motivated to preserve the Saclay lab in the long term, and get back to operating conditions in the short term