



Science and  
Technology  
Facilities Council

# The AGATA Spectrometer ASC Update

John Simpson  
Daresbury Laboratory

AGATA Collaboration Meeting  
Nov-2021-LNL

# Outline

AGATA Steering Committee

NuPECC Long Range Plan 2017

Science Case (White Book) 2020

Memorandum of Understanding

ASC news

## **AGATA Steering Committee**

John Simpson (UK, Chair), Giacomo de Angelis (Italy), Piotr Bednarczyk (Poland), Mike Bentley (UK), Angela Bracco (Italy), Bo Cederwall (Sweden), Gilbert Duchêne (France), Jürgen Gerl (Germany), Paul Greenlees (Finland), Ayşe Kaşkaş (Turkey), Begoña Quintana (Spain), Peter Reiter (Germany), Dora Sohler (Hungary), Christophe Theisen (France), Dimitar Tonev (Bulgaria)

Jelena Vesić (Slovenia) Observer

Nicolae Marginean (Romania) Observer

Wolfram Korten (NuSTAR)

Benedicte Million (Resources)

Emmanuel Clement / Andres Gadea (Project Managers)

Silvia Leoni (ACC Chair)

MoU: “The AGATA Steering Committee, acting on behalf of the Parties, is responsible for the Project coordination and the science policy of the collaboration”

# NuPECC Long Range Plan 2017



## SUMMARY AND RECOMMENDATIONS

....

**Support to the completion of AGATA in full geometry**

AGATA represents the state-of-the-art in  $\gamma$ -ray spectroscopy and is an essential precision tool underpinning **a broad programme of studies in nuclear structure, nuclear astrophysics and Nuclear reactions.**

AGATA will be exploited at all of the **large-scale radioactive and stable beam facilities** and in the long-term must be fully completed in **full 60 detector unit geometry** in order to realise the envisaged scientific programme.

AGATA will be realised in phases with the goal of completing the first phase with 20 units by 2020.

....

# AGATA Science White Book

[Physics opportunities with the Advanced Gamma Tracking Array: AGATA | SpringerLink](#)

The European Physical Journal

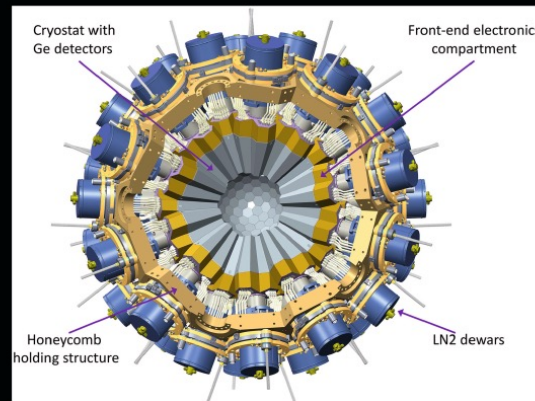
volume 56 · number 5 · may · 2020

# EPJ A



Recognized by European Physical Society

## Hadrons and Nuclei



View into the Advanced  
Gamma Tracking  
Array - AGATA for  
high-resolution  
spectroscopy

From: W. Korten et al. on "Physics opportunities with the Advanced Gamma Tracking Array: AGATA"



 Springer

May 2020

# AGATA Science White Book

[Physics opportunities with the Advanced Gamma Tracking Array: AGATA | SpringerLink](#)



## **Common Physics Working Group**

W. Korten (chair)

Gilbert Duchene (co-chair)

## **Facility Working Group: CERN/ISOLDE**

Magdalena Zielińska (chair)

Peter Reiter (co-chair)

## **Facility Working Group: GANIL/SPIRAL1/SPIRAL2**

Bo Cederwall (chair)

Emmanuel Clément (co-chair)

## **Facility Working Group: GSI/FAIR**

Andrea Jungclaus (chair)

Magdalena Górska (co-chair)

## **Facility Working Group: JYFL**

David Jenkins (chair)

Paul Greenlees (co-chair)

## **Facility Working Group: LNL/SPES**

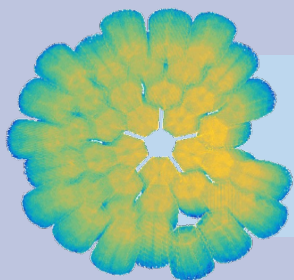
Silvia Leoni (chair)

José Javier Valiente Dobón (co-chair)

Many people contributed

THANKS TO ALL

# Experiments performed in 2015-2021 at GANIL with AGATA



**RIB**

SHE Cross section  $^{238}\text{U}+^{238}\text{U}$  in MNT

Search for Double Gamma decay in  $^{137}\text{Cs}$  source

Reaction mechanism : Fission of Light Hg

Octupole – Quadrupole correlation in  $^{112}\text{Xe}$   **$^{208}\text{Pb}$**

Studies of excited states in  $^{102,103}\text{Sn}$

Octupole correlation in  $^{207}\text{Pb}$

Evolution of collectivity around N=50:  
lifetime measurements  $^{104,106}\text{Sn}$

Exploration of alpha-cluster : the  
unique case of  $^{212}\text{Po}$  ( $^{208}\text{Pb} + \alpha$ )

Evolution of collectivity around  
N=50: lifetime measurements  $^{94}\text{Ru}$

N=126 Xe+Pt spectroscopy after MNT

Shape transition in the neutron-rich W isotopes

Search for isoscalar pairing in  
the N=Z nucleus  $^{88}\text{Ru}$

Transition Quadrupole Moments in  $^{166,168}\text{Dy}$ .

$i_{13/2}$  single particle state in  $^{133}\text{Sn}$  and high spin in  $^{108}\text{Zr}$

Isospin Symmetry Breaking in  
the A=63,71 mirror nuclei

Shape evolution in neutron rich fission  
fragments in the mass A~100 region

Above barrier narrow  
resonances in  $^{15}\text{F}$

Shell evolution around N=50:  $^{81}\text{Ga}$  spectroscopy

Deter. the  $\alpha+^{15}\text{O}$   
radiative capture rate

Evolution of collectivity around N=52: lifetime measurements in  $^{83,84}\text{Ge}$

Evolution of collectivity around N=40: lifetime measurements in  $^{73,75}\text{Ga}$

Evolution of collectivity around N=40: lifetime measurements in  $^{64}\text{Fe}$

Proton-neutron  
interactions across the N =  
28 shell closure via  
 $^{47}\text{K}(d,p)^{48}\text{K}$

Lifetime measurements of  
excited states in neutron-rich C  
and O isotopes

Evolution of the shell structure in the  
region of neutron-rich Ti isotopes

The lifetime in  $^{23}\text{Mg}$  as a probe  
for classical novae models

3-body contribution  
in  $^{20}\text{O}$  structure

Is there a problem with protons  
in N=28 nucleus  $^{46}\text{Ar}$  ?

# AGATA scientific results: technical publications

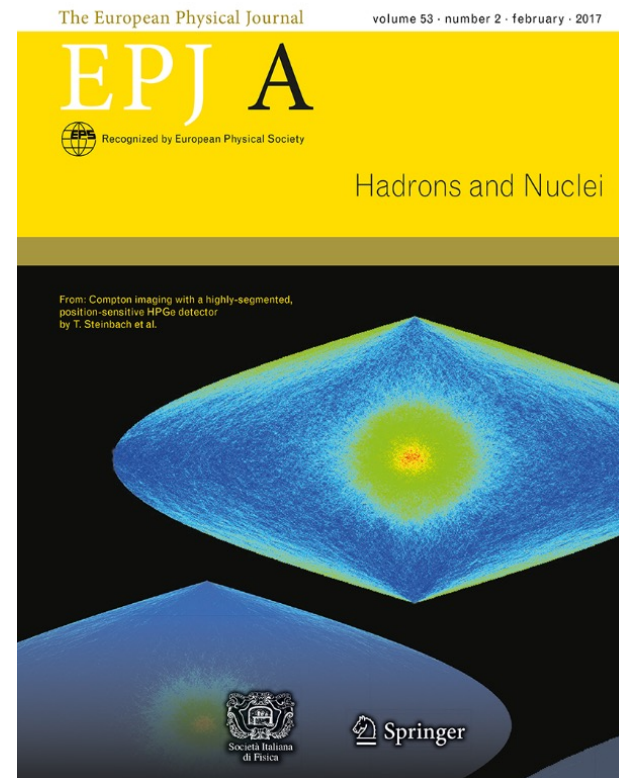
85 scientific publications (10 PRL/PL)

108 technical publications

66 PhDs, 18 Masters, 9 Diplomas, 11 Bachelor, 1 Licentiate (6/10/21)

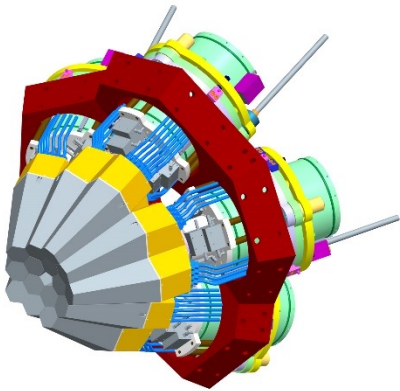
<https://www.agata.org/>

## Keep up to date!

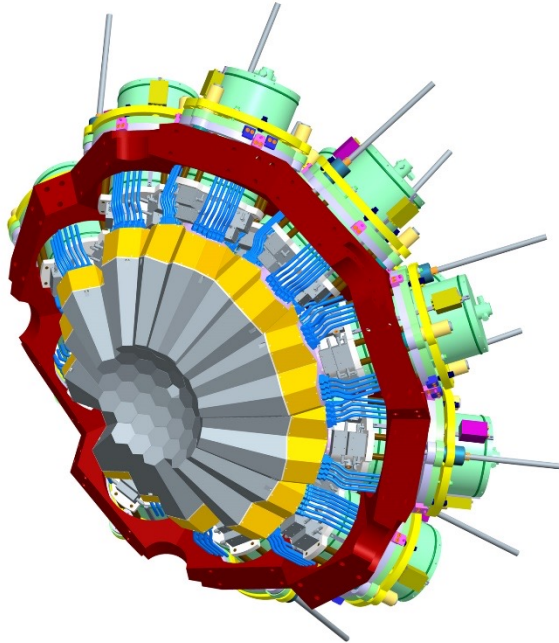


# AGATA is operated under a Memorandum of Understanding

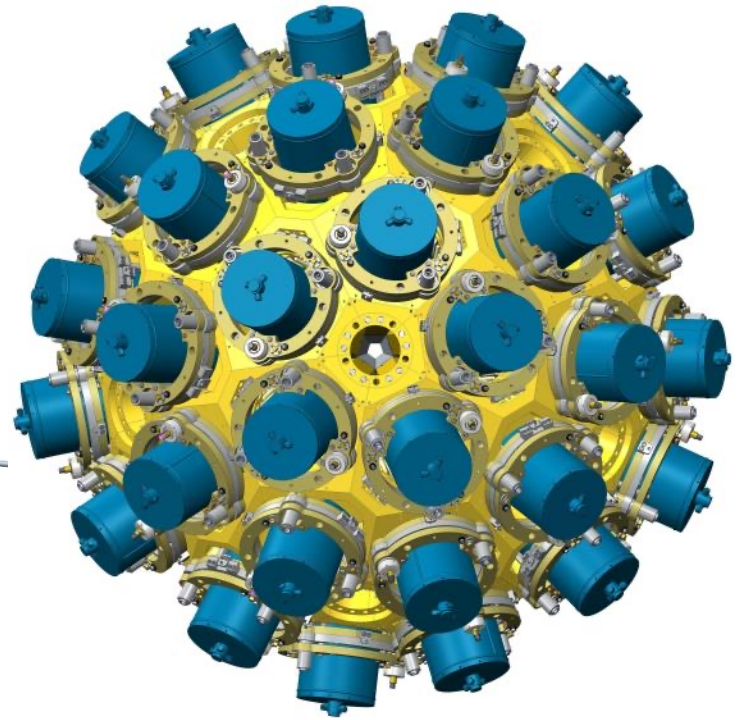
I MoU  
AGATA 15  
Demonstrator  
2003-



II MoU  
AGATA 60  
2008-2020



III MoU  
AGATA 180 =  $4\pi$



# Memorandum of Understanding

- Science case take next step to  $4\pi$
- Presentation of MoU and AGATA plans to funding agencies GSI November 2019
- Positive feedback science convincing
- International Review
  - Membership
    - Robert Janssens (North Carolina at Chapel Hill) chairperson
    - Florence Ardellier CNRS-APC
    - Eric Delannes CAR-IRFU
    - Guiseppe Cardella INFN Catania
    - Alba Formicola INFN LNGS
    - Haik Simon Gsi
    - Augusto Macchiavelli LBNL
    - Reiner Krucken Triumf
  - Charge
    - Science (135/180 Detectors  $3\pi/4\pi$ ) over 10 years, including sites stable/RIBs
    - Technology (choice, cost effectiveness, appropriate..)
    - Organisation
    - Project Management
    - Resources (appropriate to deliver, operate across all partners and host laboratories)

# Memorandum of Understanding

## International Review

- Excellent Outcome
- **Conclusion:** Through the completion of phases 1 and 2 of the project and the lessons learned in doing so, the AGATA collaboration has demonstrated that it has developed the technology as well as the management and organisational tools required for the timely completion of phase 3. There is no doubt that the instrument is poised to become the flagship in Europe for nuclear structure research with radioactive and stable beams in the coming decade and beyond. **In its  $4\pi$  configuration with 180 detectors, AGATA will achieve the detection sensitivity and the tracking capability essential (i) for physics with the low-intensity radioactive beams furthest away from stability, and (ii) for detection of the weakest gamma-ray transitions characteristic of new nuclear modes of excitation. Furthermore, intermediate configurations with a smaller number of detectors, in particular the  $3\pi$ , 135-detector one, will have unprecedented discovery potential when coupled with powerful magnetic spectrometers and other ancillary detectors.** It is clear, however, that the timely completion of the full  $4\pi$  configuration will uniquely enable the most science return for the significant investment the project represents. Hence, the review Committee endorses with enthusiasm and without reservation the timely completion of the full AGATA project and the continuous use of the instrument during the construction phase.
- In detail several recommendations

# Memorandum of Understanding

- RSC
  - Representatives of funding agencies, Chaired by Fanny Farget (IN2P3)
  - To agree MoU prepared by the collaboration ASC/AMB
- **Present MoU extended to 31/12/21 by an amendment**
- **Amendment agreed and sent for signature on 3/3/21**
- New MoU agreed and sent for signature 30/6/2021
- **Signed by Bulgaria, Finland, Hungary, Italy, Poland Spain, Sweden and UK.**
- **Germany, France, Turkey in progress**

# Memorandum of Understanding

## **The high-level philosophy of the MoU:**

- The ultimate aim of the collaboration is to build the full  $4\pi$  device.
- The costings and plans defined in the Annexes of the MoU are based on the completion of the  $3\pi$  device in 10 years.
- The project is planned to be reviewed every 5 years, with specific goals for each period written into the MoU and costed for the upcoming 5 years.
- Continuation after each 5 year period has to be agreed by the parties
- An AGATA Resource Review Board will be set up to provide financial oversight and contact with the funding agencies.

## **The specific objectives as defined in the MoU for the first five years are:**

- To continue the construction of the Project in line with the final goal;
- To secure funding from the Parties for at least an additional thirteen systems in the next five years, which corresponds to half of the goal to reach  $3\pi$ , i.e., an additional twenty-six systems. The costs are based on funding a  $3\pi$  system in ten years; and
- To continue to operate the spectrometer in science campaigns at the Hosts

The MoU started on 1/7/21. The overlap with the present MoU is accepted by the Parties to enable some of them to bid for and approved funding in this initial period.

# Memorandum of Understanding

## AGATA Management Structure

- The governance and management bodies under this MoU shall be:
- 
- The AGATA Steering Committee (ASC), acting on behalf of the Parties, is responsible for the Project coordination and the science policy of the collaboration
- **The AGATA Collaboration Council (ACC), representing all the institutions collaborating under the AGATA Project, advises the ASC on scientific matters**
- The AGATA Project Manager (PM) and the AGATA Management Board (AMB) are responsible for the execution of the Project along the lines defined by the ASC and the AGATA Resource Review Board (ARRB)
- The AGATA Resource Review Board provides financial scrutiny of the project and the contributions of all Parties

# Memorandum of Understanding

## AGATA Collaborating Council (ACC) and the AGATA Spokesperson

**Membership:** One representative from **each Collaborating Institution** and the AGATA Spokesperson. The AGATA Spokesperson chairs meetings of the ACC. The Campaign Spokespersons are invited to attend.

### **Terms of Reference:**

The ACC is the advisory body of the ASC on scientific matters concerning the AGATA project.

### **The tasks of the ACC are:**

- elect the AGATA Spokesperson from someone in the collaborating institutions who will serve for a period of two (2) years. This position is renewable for a further two (2) years;

**Silvia Leoni**

- advise the ASC on scientific matters concerning the AGATA project and the research programme through the AGATA Spokesperson;
- nominate the Campaign Spokesperson for each experiment campaign to the ASC;

**Magda Zielińska**

- hold meetings, at least annually, to receive reports from the ASC and AMB on the progress of the Project and from the Campaign Spokespersons on the progress of the research programme;
- hold an annual open meeting of the AGATA user community to present the status of the Project and to discuss future experiment campaigns.

# ASC News

- Last ASC 25/10/21 (Zoom)
- AGATA Resource Review Board (set-up)
- Core author list LNL
- Vice Chair (Angela Bracco) Chair 4/2022-
- Diversity Charter
- EU Funding Call INFRATECH

# Diversity Charter

## JENAA-Joint ECFA-NuPECC-APPEC Activities

Diversity working group: to the importance of diversity as a motor to boost productivity and innovation, fight prejudice and discrimination and contribute to the improvement of social and economical standards.

[JENAA \(nupecc.org\)](https://nupecc.org/) link to overview

Diversity charter: [Diversity Charter of APPEC ECFA NuPECC-9.pdf](#)

Diversity monitoring: [Monitoring Diversity Charter of APPEC ECFA NUPPEC-9.pdf \(nupecc.org\)](#)

List what they believe can be monitored and an initial list of Consortia, Committees, Collaborations, and Conferences that could involved

AGATA signed up to this charter in 2020

Monitorable variables (as listed by the Diversity group)

- Gender;
- Tenure diversity - Career level: not tenured, tenure track, tenured;
- Age diversity - Age groups (20 - 30, 31 - 40, 41 - 50, 51 - 60, > 60);
- Country where working;
- Citizenship.

AGATA starting to collate information on its committees ASC, AMB, ACC

Some information from AGATA week, and these meetings.

**COMMENTS?**

<https://ecfa.web.cern.ch/>

<http://www.nupecc.org/>

<http://www.appec.org/>

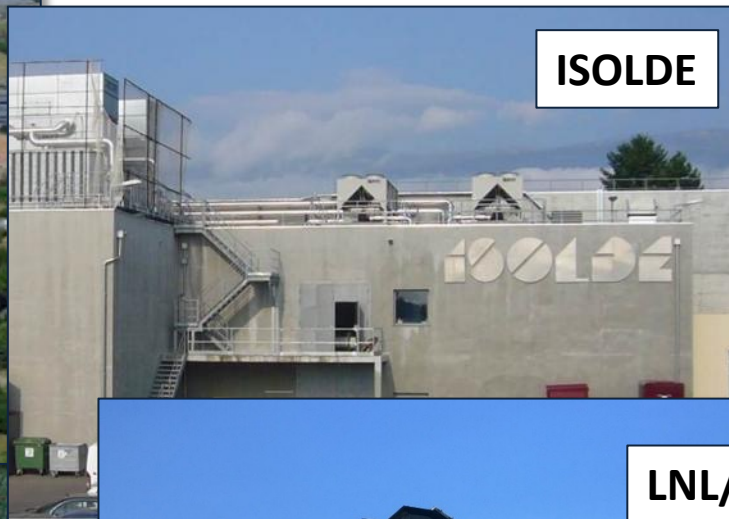


# The next decade for AGATA

GANIL



ISOLDE



LNL/SPES



GSF/FAIR



JYFL



# AGATA at LNL

