AGATA: Advanced Gamma Tracking Array

Memorandum of Understanding

Phase 2

Preamble

In 2008 the Institutes forming the AGATA Collaboration agreed a Memorandum of Understanding (MoU) concerning the construction and operation of the gamma-ray tracking spectrometer AGATA (Advanced Gamma Tracking Array). The MoU stated that the spectrometer was to be built up in phases and defined the first phase. This MoU was due to expire 31st December 2020 but was extended by an amendment to 31st December 2021 to set the operation costs in 2021 and continue the collaboration while this MoU was being finalised.

The aim of project is to build up and operate the full 4π spectrometer. This MoU follows the recommendation of the NuPECC Long Range Plan 2017 Perspectives in Nuclear Physics: "Support to the completion of AGATA in full geometry". The AGATA Physics case[1] and the AGATA Phase 2 Project Definition contain the science opportunities and the technical realisation and estimated costs, respectively

It is the intention of the Parties to build the 3π configuration in ten (10) years from the commencement of this MoU. The continuation of the project will follow reviews in 5 (five) year periods until completion.

1. Introduction

1.1 AGATA is a collaborative European project (hereafter referred to as the "Project" or the "AGATA project") to construct and operate a gamma-ray tracking spectrometer. It is based on the successful research and development project started in 2003 that demonstrated the feasibility of achieving the ultimate goal of a 4π spectrometer through the technique of gamma-ray energy tracking in electrically segmented Ge detectors. The resulting AGATA spectrometer will have an unparalleled level of detection sensitivity to nuclear electromagnetic radiation. AGATA will allow the pursuit of a very rich science programme using both radioactive and stable ion beams as described in the AGATA White Book. To maximise the science output of AGATA, campaigns of experiments with complementary research programmes will be pursued at research facilities within Europe.

1.2 The 4π AGATA spectrometer comprises Sixty (60) systems comprising three (3) Ge detectors in a cryostat, and the associated electronics, data acquisition and related equipment. The intention is to build up and operate the system in phases. The first phase has been built and is operational; it comprises nineteen (19) systems, as defined in Annex B.1.

1.3 The project enters its second phase of construction with the present MoU.

2. Parties of this MOU

This MoU is between the Parties that are listed in Annex A.l. The Institutes or Institutions forming the AGATA Collaboration are listed in Annex A.2 (hereinafter "the Collaborating Institutions").

3. Purpose of this MoU

3.1 The purpose of this MoU is to specify what the Parties intend with respect to planning, funding, constructing and operating the AGATA project in its second phase.

3.2 The intention of the Parties and/or the Collaborating Institutions as appropriate is to provide the necessary construction and operational costs and human resources to carry out the Project.

3.3 This MoU is not legally binding, but the Parties and the Collaborating Institutions recognise that the success of the Project depends on all its Parties adhering to its provisions. Any discrepancy will be investigated by The AGATA Resource Review Board (ARRB).

3.4 The second phase of the Project is to initially build a 3π AGATA spectrometer that consists of forty five (45) systems. While achieving this goal AGATA will operate with a gradually increasing number of systems over the duration of the Project.

3.5 The equipment required for the second phase AGATA system is given in Annexe B1. Their costings are given in table B.1.1 and B.1.2. The already funded construction costs related to the previous phases of AGATA project are summarized in Table B.2.1, as well as their sharing and the committed human resources by the Parties. The required construction investment, human resources and the resource sharing among the Parties are given in Annex B.2. Resource planning is specified in Annex B2, for the first five (5) years and estimated for 10 (ten) years for the 3π system. The operational costs of the project for the first five (5) years are set out in Annex C.

3.6 The objectives for the first five (5) years of the second phase under this MoU are:

3.6.1 To continue the construction of the Project in line with the final goal;

3.6.2 To secure funding from the Parties for at least an additional thirteen (13) systems in the next five years, which corresponds to half of the goal to reach 3π, i.e., an additional twenty-six (26) systems. The costs are based on funding a 3π system in ten (10) years; and

3.6.3 To continue to operate the spectrometer in science campaigns at the Host.

3.7 The Parties agree to operate the AGATA system in campaigns of experiments at Host Laboratories throughout the period.

3.8 Collaborating Host Laboratories (hereinafter "Host" or "AGATA Host"), FAIR in Germany, GANIL/SPIRAL2 in France, JYFL in Finland and LNL/SPES in Italy, have expressed their interest to host AGATA. The location and sequence of the AGATA campaigns will be decided by the AGATA Steering Committee (ASC) in agreement with the AGATA Hosts. The Parties acknowledge and agree for the ASC to sign a Host Agreement and the Working Together documents with each Host on behalf of the Parties. These documents will detail the intended tasks of the Host and of the collaboration for each campaign.

3.9 Campaigns at any other Host Laboratory, in particular outside of the Collaborating Host Laboratories, for example ISOLDE, are subject to negotiations within, and decision of, the ASC, and will follow the same procedures as defined in Article 3.9.

4. Commencement, Duration and Withdrawal

4.1 This MoU will become effective on 01/07/21 and shall continue for five years. This MoU can be extended a for further five (5) year by an amendment signed by all the Parties as provided for in paragraph 6 following the completion of a Project review, organised by the ASC.

4.2 The ASC will organise a Project review with the Project's management bodies which will be undertaken no later than six months before the 5 (five) year review date. The Project review shall include the assessment of scientific results, a review of the technical achievements and Project implementation with respect to the AGATA Phase 2 Project Definition and make recommendations on the resources and planning for the next five (5) years. This review is to include a validation of the funding requested from the Parties for the upcoming five (5) years by the AGATA Resource Review Board. The Project review documents together with revised Annexes will be submitted to the Parties for their approval, within six (6) months of receipt.

4.3 The equipment and material shall remain in the ownership of the Parties that provided them for the Project subject to the withdrawal paragraph 4.4.

4.4 Any Party may withdraw from this MoU, giving not less than twelve (12) months' prior notice in writing to the ASC. The Withdrawing Party acknowledges and agrees that equipment and material provided by the Withdrawing Party in the Project will remain for use by the AGATA Collaboration for the duration of the Project as defined in the MoU. However, if the Withdrawing Party intends to remove its equipment or material from the Project, the Withdrawing Party will be required to provide a reasonable compensation to the AGATA Collaboration which shall be negotiated with the ASC and confirmed by the ARRB.

5. Organisation and Management

5.1 The AGATA organisation and the governance bodies for the construction and operation of AGATA are described in Annex D.

5.2 AGATA is an open collaboration. New Parties and Collaborating Institutes may accede to this MoU through a written procedure defined by the ASC.

6. Amendments and Modification of the MoU

This MoU may be amended or modified at any time if agreed by the ASC, as defined in Annex D, subject to a written amendment signed by the Parties.

7. Intellectual property

7.1 Intellectual Property means all property, including know-how, in all forms such as drawings, designs, documents, inventions, software programs, reports, techniques, processes and protocols that is protected by such means as secrecy, patents, copyrights and trademarks.

7.2 Any intellectual property rights generated by two (2) or more involved Parties pursuant to this MoU shall vest in those Parties in proportion to the respective intellectual contribution of each Party.

7.3 In case of joint results, which could be patented, the Parties shall decide, via the ASC, on a case by case basis the conditions of protection and sharing of the rights.

7.4 This MoU does not affect the ownership of any Intellectual Property contributed to the Project (Background IP), such Intellectual Property will remain vested in the Party that contributed it to the Project (or its third party such as licensors). For the avoidance of doubt any Background IP acquired or vested in a Party shall continue to vest in that Party. In addition, any results generated or derived from a Background IP shall be deemed belonging to the owner of that Background IP (Results IP), and the owner of the Results IP shall be entitled to exploit such Results IP as the owner sees fit.

7.5 The licence to use any Background IP or Results IP by another Party other than the owner is not granted or implied by this MoU except where the rights are explicitly granted in this MoU.

7.6 Each Party will procure that its employees and students assign and assist with the registration and protection of the Results IP generated or derived from another Party's Background IP.

7.7 Any Intellectual Property rights generated by two (2) or more Parties and for which it is impossible to segregate each Party's intellectual contribution, the Parties shall be joint owners of the joint results in proportion to the respective intellectual contribution of each Party. The joint owners shall co-operate and jointly decide how best to protect, share and exploit the joint results.

8.Publications

Publications are subject to the AGATA publication policy[2], which is approved by the ASC.

9.Contribution to annual operation costs

9.1 Contributions to Operation Costs, defined in Annexe C, may be made in two ways:

- **'direct payments'** made by a Party in order to cover costs related to operation and maintenance of AGATA Project (purchase of services or items etc.);
- **'fund transfer'** to a dedicated Common Fund Account, which will be established through a dedicated account at IN2P3/CNRS. The Common Fund will be managed and operated by the IN2P3/CNRS representative at the ASC. Its operation will be monitored by the ASC.

9.2 Parties are free to decide whether they accept to join the AGATA Common Account or not. Details concerning the Common Account are given in Annexe E.

10. General Provisions

10.1 The Parties intend to conduct the collaboration in terms of this MoU and in compliance with the applicable laws and regulations. The undertakings of each Party and/or Collaborating Institution are subject to the availability of funds and human resources.

10.2 Nothing in this MoU will affect any other understandings or any agreements concerning cooperation between the Parties.

10.3 Nothing in this MoU is intended to, or shall be deemed to, establish any partnership or joint venture between the Parties, nor authorise any Party to make or enter into any commitments for or on behalf of the other Party.

10.4 All questions regarding the interpretation of this MoU will be resolved consensually by the Parties within the ASC. Any dispute as may arise between the representative of the Parties to the ASC or ARRB the Parties hereto in connection with this MoU, which cannot be resolved, shall be escalated to the signatories of the Parties.

10.5 Information provided by any Party under this MoU and implementing agreements shall be accurate to the best of that Party's knowledge and belief but no warranty, expressed or implied, is given by that Party to such information. The decision of the signatories of the Parties will be final and settled. The dispute will be held in English.

10.6 Each Party and/or Collaborating Institution shall be responsible for their own insurance cover in relation to the health and welfare (not limited to occupational injuries or disease) of their own employees in accordance with their national law.

10.7 Each Party and/or Collaborating Institution is liable, in accordance with the applicable law, for loss or damages to the property or employees of another Party and/or Collaborating Institution or third parties as a result of gross negligence or willful misconduct caused by its own employees.

10.8 Each Party and/or Collaborating Institution shall be liable, in accordance with the applicable law, for loss and damages caused to its property or employees arising under or in connection with this MoU, that is, without any right of claim against any other Party and/or Collaborating Institution arising from or in connection with this MoU, unless it was a result of gross negligence or willful misconduct by another Party.

10.9 The following documents and Annexes are an integral part of this MoU:

Annex A:	List of Parties and Collaborating Institutions
Annex B:	AGATA Equipment, Construction Investment and Installation
Annex C:	AGATA Operation
Annex D:	AGATA Management Structure
Annex E:	Management of the Common Fund Account

10.10 References to documents referred to in this MoU.

1) Physics opportunities with the Advanced Gamma Tracking Array: AGATA", Eur. Phys. J. A 56, 137 (2020).
https://doi.org/10.1140/epja/s10050-020-00132-w
2) Publication policy https://www.agata.org/physics_publications
https://www.agata.org/technical_publications

10.11 This MoU is drawn up and executed in English, in one original document.

AGATA

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Signature Sheet

Date and Place: 06.09.2021, Sofia, Bulgaria

INRNE - BAS

Signature: [redacted]

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Signature Sheet

Date and Place: 7 July 2021 JYVÄSKYLÄ

Signature: [redacted]

AGATA

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Signature Sheet

Date and Place: Paris 05.01.2022

Signatu [redacted]

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Date and Place: Saclay

Signature: [redacted]

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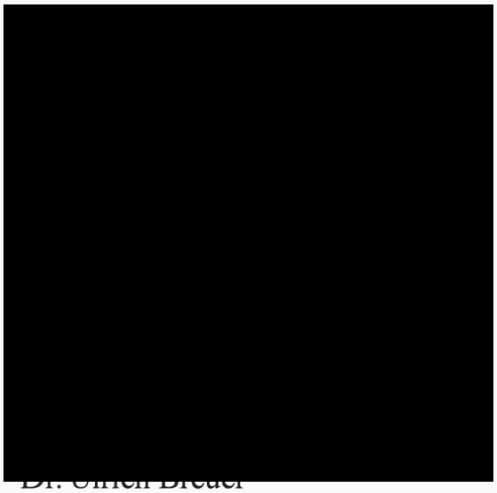
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GSI Helmholtzzentrum für Schwerionen GmbH

Date and Place: Darmstadt, 21.03.2022



Dr. Ulrich Breuer

AGATA

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Institute for Nuclear Research, (ATOMKI), Hungary

Date and Place:

5 July 2021, Debrecen, Hungary



Erzsébet CSÖRGŐNÉ MOLNÁR
Financial Director

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Date and Place: 23 LUG. 2021, Rome

[redacted]

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Date and Place: 2021 -09- 13 KRAKOW

Signature: [redacted]

Prof. Tadeusz Lesiak
The Director of the Henryk Niewodniczański Institute of Nuclear Physics of the Polish Academy of Sciences, Kraków, Poland

Signature: [redacted]

Prof. Adam Maj
The President of the Consortium of Polish Institutions (COPIN) Management Board

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For CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (CSIC):

[redacted]

Dr. Ángeles Gómez Borrego
Vice-President International Affairs
Place: Madrid
Date:

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Date and Place:

Signature: [redacted]
University of Valencia
Dolores Real
Vice-Chancellor for Innovation and Transfer

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For UNIVERSIDAD DE SALAMANCA

[redacted]

Dr. D. José Miguel Mateos Roco
Vice-rector of Research and Transfer
Place: Salamanca
Date:

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Date and Place: Stockholm, 2021-07-06

[redacted]

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Date and Place:

Signature: 

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Signature Sheet

Date and Place: 16/7/21
London

Signature: [redacted]

Annex A: Parties and Collaborating Institutions

Annex A.1: Parties

- Univ. Sofia, Bulgaria
- Bulgarian Academy of Sciences, Institute for Nuclear Research and Nuclear Energy, Bulgaria
- Univ. Jyvaskyla, Department of Physics, Accelerator Laboratory, Finland
- Centre National de la Recherche Scientifique - Institut National de Physique Nucléaire et de Physique des Particules, France
- Commissariat à l'Energie Atomique et aux Energies Alternatives –Direction de la Recherche Fondamentale, on behalf and for the account of Institut de recherche sur les lois fondamentales de l'Univers (CEA/DRF/IRFU), France
- GSI Helmholtzzentrum für Schwerionenforschung GmbH, Germany
- Institute for Nuclear Research (Atomki), Eötvös Loránd Research Network, 4001 Debrecen, P.O. Box 51, Hungary
- Istituto Nazionale di Fisica Nucleare, Italy
- Consortium of Polish Institutions (COPIN), represented by The Henryk Niewodniczański Institute of Nuclear Physics of the Polish Academy of Sciences (IFJ PAN), Kraków
- Ministerio de Ciencia e Innovaciòn (MICINN), Spain
- Universidad de Salamanca, Spain
- Universitat de València, Spain
- KTH Royal Institute of Technology, Stockholm, Sweden
- Ankara University, Turkey
- United Kingdom Research and Innovation Science and Technology Facilities Council (UKRI-STFC)

Annex A.2: Collaborating Institutions

Bulgaria:	Univ. Sofia, INRNE Sofia
Finland:	Univ. Jyväskylä, Department of Physics, Accelerator Laboratory, Finland
France:	IP2I Lyon, IJC Lab Orsay, IPHC Strasbourg, GANIL Caen, DRF/IRFU Saclay
Germany:	GSI Darmstadt, TU Darmstadt, Univ. zu Köln
Hungary:	Institute for Nuclear Research (Atomki), Eötvös Loránd Research Network
Italy:	INFN Firenze, INFN Legnaro, INFN Milano, INFN Padova
Poland:	IFJ PAN Krakow, University of Warsaw (HIL)
Spain:	CSIC-Universidad de Valencia, Instituto de Fisica Corpuscular. Universidad de Valencia, Escuela Tecnica Superior de Ingenieria CSIC, Instituto de Estructura de la Materia, Madrid Universidad de Salamanca, Laboratorio de Radiaciones Ionizantes.
Sweden:	Lund Univ., KTH Royal Institute of Technology Stockholm, Uppsala Univ, Stockholm Univ.
Turkey:	Univ. Ankara, Univ. Istanbul, Univ. Kocaelli, Univ. Bitlis Eren
UK:	Univ. Brighton, UKRI-STFC Daresbury Laboratory, Univ. Edinburgh, Univ. Liverpool, Univ. Manchester, Univ. Surrey, Univ. West of Scotland, Univ. York

Annex B: Construction investment, human resources and sharing

Annex B.1 Equipment and corresponding Construction Investment

Each AGATA system comprises a triple Ge detector unit, comprising 3 Ge detectors and a triple cryostat, with its associated electronics, data acquisition and storage system and related equipment. These items are provided and supported by the AGATA collaboration. Specifications of all items will be produced by the AGATA management board prior to production. All cost estimates are based on 2020 prices in Euro without tax.

Definition of AGATA Equipment

Germanium detector	Encapsulated, 36-fold segmented HPGe detector
Triple Cryostat	Cryostat for three HPGe detectors incl. 111 preamplifiers
Electronics, Digitiser and Pre-processing	Digitizer modules for 36+ 2 high resolution Ge channels and cards with the pre-processing FPGAs
Trigger system	GTS or SMART
PSA Computer farm	PC farm and shared infrastructure
DAQ system	DAQ including data storage
Detector and electronics infrastructure	Detector Support System: high- and low-voltage supplies, auto-fill control system detector cabling, crates and shared infrastructure
Mechanics	Mechanical support structure, individual frames etc.

The AGATA Equipment budget is then distributed over each AGATA system, as given in table B.1.1. for one system.

Item	**Cost k€**
Detectors (×3)	546.5
Cryostat (×1)	118.4
Electronics (×3) + GTS/SMART	58.2
PSA & Data Flow + Storage + Analysis	46.7
Infrastructure	29.1
Mechanics	13.3
Total	**812.2**

Table B.1.1 Construction costs in k€ without tax for one AGATA system. Average cost over 10 years including 1.5% increase per year. These costs are based on completing the 3π, 45 systems, by 31st December 2030.

Item	**Costs k€**
Phase 0 and Phase 1 Electronics Upgrade	779.5

Table B.1.2 Construction costs in k€ without tax for the common AGATA items

In addition to the construction cost in table B.1.1, the cost of the upgrade of the Phase 1 electronics has to be included in Phase 2, and this is shown in table B.1.2.

Construction cost for 26 additional AGATA systems

Taking into account the above AGATA system price, the total cost for 26 AGATA systems, including the upgrade of the phase 0 and phase 1 electronics, is **21897 k€.** Cost changes are expected throughout the duration of the project. These will be monitored by the Management Board and reported to the ARRB and ASC.

Annex B.2: Sharing of the Construction investment and Human resources

The Parties and/or Collaborating Institutions have committed to the construction and operation, and human resources, plus host laboratory contributions for installation and operation prior to this MoU. These are summarised in table B.2.1.

Country	Funds committed in k€ without tax (2003-2020)	%	Personnel in FTE (2003 - 2020)	%
Bulgaria	0	0	4.3	0.5
Finland	287.2	1.6	1.4	0.1
France (IN2P3) (GANIL) (IRFU)	3879.3 (2243.7) (583.3) (1052.3)	22.0	289.5 (203.8) (34.3) (51.4)	28.7
Germany	4065.2	23.0	196.8	19.5
Hungary	739.7	4.2	0.4	
Italy	3852.4	21.8	277.7	27.5
Poland	24.3	0.1	32.5	3.2
Romania	57.0	0.3	3.3	0.3
Spain	639.5	3.6	34.4	3.4
Sweden	819.0	4.7	28.5	2.8
Turkey	750.1	4.3	8.7	0.9
UK	2543.6	14.4	132.6	13.1
Total	**17657.3**	**100.0**	**1010.1**	**100.0**

Table B.2.1 Construction investment cost and human resources that have been contributed to AGATA up to 2020. Personnel, including host laboratory contributions, are given in full time equivalent.

The Parties and/or Collaborating Institutions as appropriate are planning to make bids to contribute with the construction costs given in table B.2.2 for AGATA units and common items as given in Annex B.1. The construction costs do not include contingency. Parties are encouraged to contribute to the Project contingency as defined by the ARRB. In addition to the construction cost investment defined in table B.2.2, the Parties and/or Collaborating Institutions intend to make additional contributions, whenever possible, and to make best use of the expertise and experience acquired during the previous construction phase. The total construction cost required for a 3π configuration (45 systems) in ten years, distributed among the countries, is summarised in table B.2.2. The funding required in the first five years is also given.

The collaborating Institutions are planning to make human resources (physicists, engineers and technicians) available to the AGATA project for its construction and maintenance, as given in table B.2.3. This effort has several components; the effort specified in the project definition (physicists, engineers and technicians), to realise the construction following the sharing of deliverables; the ongoing effort from the Parties and/or the Collaborating Institutions to support the experimental activity, also given in Annex C.3; project management; effort to perform the experiments. The human resources from the Host are indicated for information in table B.2.3 and will be formalised in a letter of agreement between the AGATA Steering Committee and each Host.

Country	Total capital investment (2021-2025) [k€]	%	Total capital investment (2021-2030) [k€]	%
Bulgaria	278	3	591	3
Finland	278	3	591	3
France (IN2P3) (GANIL) (IRFU)	2249 (742) (1125) (382)	20	4500 (1485) (2250) (765)	20
Germany	2249	20	4500	20
Hungary			591	3
Italy	2249	20	4500	20
Poland	278	3	591	3
Spain	561	5	920	4
Sweden	842	8	1204	6
Turkey	278	3	591	3
UK	1684	15	3318	15
Total	**10946**	**100**	**21897**	**100**

Table B.2.2 Capital investment sharing between each country for the first five years and ten years. Costs are in euro without tax. The sharing between the French partners IN2P3/GANIL/IRFU is in the ratio 0.33/0.5/0.17.
it is expected that for contributions due under the first five (5) year period, payments can be made within six (6) months of the end of the interval 2021-2025.

Country	Human resources (2021 - 2025) *[FTE]*			Human resources (2021 - 2030) *[FTE]*		
		%	Host		%	Host
Bulgaria						
Finland	0.4	0.1		0.8	0.1	
France (IN2P3) (GANIL) (IRFU)	64.2 (51.4) (6.3) (6.5)	22.3	2.7	115.1 (95.5) (6.5) (13.1)	20.5	16.8
Germany	71.9	24.9		143.8	25.5	15.8
Hungary	1.2	0.4		2.4	0.4	
Italy	77.4	26.9	19.8	154.8	27.5	19.8
Poland	9.2	3.2		18.3	3.3	
Spain	16.3	5.7		32.5	5.8	
Sweden	1.0	0.3		2.0	0.4	
Turkey	0.4	0.1		0.8	0.1	
UK	46.3	16.1		92.5	16.4	
Total	**288.3**	**100.0**	**22.5**	**563**	**100.0**	**52.4**

Table B.2.3 Human resources with the sharing between the countries for the first five years and ten years. These numbers include the resources from all collaborating Institutions for the tasks defined in the project definition for construction and maintenance, for ongoing experimental support, the effort needed run each experiment and project management. Estimates of extra Host contributions are indicated. The % of the contribution, excluding host effort is given.

Annex C: AGATA operation Costs

Contributions by the Parties to operation costs consist of:

(1) financial contributions to the operational costs for maintenance and repairs

(2) contributions to support the realisation of the experimental campaigns at the Host (see Annex C.3).

The cost is dependent on the number of operational AGATA units, and is reviewed annually by the ASC. The costs in k€ are based on a 19 operational systems at the start of this phase building up to 45 systems in 2030. The sharing between countries is given in table C.2.

The operation costs in 2021 are covered in the amendment to the phase 1 MoU.

Annex C.1: AGATA annual operation costs

Item	**2021 (k€)**	**2022 (k€)**	**2023 (k€)**	**2024 (k€)**	**2025 (k€)**	**2026 (k€)**
Detectors in setup	57	60	66	75	81	90
Detectors						
LN2	20	54	59	68	73	81
Capsule maintenance/repair	225	228	231	235	238	302
Detector & Cryostat maintenance/repair	78	79	88	101	111	125
Detector laboratories	60	60	60	60	60	60
Infrastructure						
HV/LV, Autofill, infrastructure	22	22	24	27	30	33
Electronics and DAQ						
Elect. maintenance/replacement	35	43	41	88	94	105
DAQ maintenance/replacement	63	63	69	79	85	95
Other costs						
Grid costs	24	24	24	24	24	24
Shipping costs	25	25	25	27	27	29
Mechanics	8	8	8	8	8	8
Total operation & maintenance costs	**560**	**606**	**629**	**717**	**750**	**862**

Table C.1: Estimate of the annual operation costs without tax for AGATA from 2021 to 2026.

Annex C.2: Sharing of the AGATA operation costs

The Parties intend to share the operation costs, as defined in table C.1. The distribution is based on a common participation cost and a contribution based on the construction investment.

Country	**2021 (k€)**	**2022 (k€)**	**2023 (k€)**	**2024 (k€)**	**2025 (k€)**	**2026 (k€)**
Bulgaria	18	20	20	23	24	27
Finland	21	23	24	27	28	33
France	102	110	115	130	136	157
Germany	102	110	115	130	136	157
Hungary	28	30	31	36	38	43
Italy	102	110	115	130	136	157
Poland	18	20	20	23	24	27
Spain	28	30	31	36	38	43
Sweden	35	38	39	46	47	54
Turkey	28	30	31	36	38	43
UK	78	85	88	100	105	121
Total	**560**	**606**	**629**	**717**	**750**	**862**

Table C.2. Sharing of the operation costs (in k€ without tax and excluding personnel) between the countries. These are estimated costs that will be reviewed annually by the ASC. The sharing between the French partners IN2P3/GANIL/IRFU is in the ratio 0.33/0.5/0.17.

Annex C.3: Support of experimental data taking

Expert personnel are needed to support experimental data taking. These are from the Host, Parties or the Collaborating Institutions. Table C.3 gives an estimate of the minimum required effort. This is included in table B.2.3. This effort does not include those in each experimental collaboration.

Personnel	**Number of FTE's per year**
On-site support personnel Physicists: Data Taking Support: On-line Data Analysis Support: Engineer Technician	 1 1 1 1
Off-site support personnel Physicists/engineers: Detector Support: Infrastructure Support: Electronics Support: Data Acquisition and GEC Support:	 1 1 1 1
Total	8

Table C.3. Estimate of the minimum expert effort required to support the experimental programme.

The total number of FTE's and the required expertise needed for each campaign will be discussed at the annual meeting of ACC.

Annex D: AGATA Management Structure

The Parties intend to manage the AGATA Project as follows.

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

The terms of reference of these bodies are given in more detail below.

AGATA Steering Committee (ASC)

Membership:

Members are nominated by the Parties of the MoU.

Any country having contributed via its Institutions to the AGATA construction costs has the right to be represented in the ASC by at least 1 (one) member. Voting rights require a minimum contribution of 1% of the construction costs.

Countries whose total contribution represents more than 10% of the construction cost investment have the right to be represented in the ASC by maximum two (2) members. Should a country contribution be made through 2 (two) or more signatory Parties, the latter decide among them and nominate their representatives.

One of the ASC members, nominated by the ASC, is the contact person of the AGATA Project Manager enabling fast financial decisions and reports to the ASC.

The AGATA Project Manager and the AGATA Spokesperson are invited to attend meetings of the ASC, without voting rights. The ASC can invite others to attend as needed for consultation, for example the Chairperson of the ARRB, and the Campaign Spokespersons and Local Campaign Managers.

Parties or new Parties who have not committed construction cost investment have the right to attend the ASC meetings as, non-voting, associate members.

The ASC may invite observers to the committee from countries not formally parties to the MoU. These observers are those with a clear intention to join at a later date. Observers will have no voting rights.

Voting rights:
To the furthest extent possible, all decisions shall be taken by consensus. If exceptionally it is not possible to attain consensus, decisions shall be taken by a qualified majority of two-thirds (2/3) of its present members. The ASC shall not make any decision unless a quorum of two thirds (2/3) of the votes is represented.

Each member has one (1) vote. Additional voting rights may be attributed by ASC for each future commitment to the Project of one AGATA unit or the equivalent monetary value.

Terms of reference:
The ASC is the decision-making body of the AGATA Collaboration and responsible for the allocation of financial resources supplied by the Parties and the collaborating institutions. The ASC will ensure that the primary criterion for deployment of any equipment is based on scientific merit.

The tasks of the Steering Committee are as follows:

1. define the scientific policy of the AGATA Collaboration taking advice from the AGATA Collaboration Council
2. elect a chair and chair-elect among its members who will each serve for a period of two (2) years
3. appoint a Project Manager and members of the AGATA Management Board
4. monitor the Project based on reports received from the Project Manager

5. report to the Parties concerning the evolution and/or modifications of the Project
6. decide on the experiment campaigns for AGATA and the timetable for the deployment of AGATA systems at various facilities
7. appoint the Campaign Spokesperson for each experiment campaign
8. review the scientific progress of each experimental campaign based on reports received from the Campaign Spokesperson
9. approve the publications policy and data management plan
10. review annually the construction investments, the running cost statements and allocations and the personnel work and allocation and therefore modify or amend if needed Annexes B and C by decision taken unanimously
11. verify that Parties' financial contributions are consistent with this MoU and make recommendations when required
12. inform the ARRB annually on all financial aspects of the projects including construction investment and operation costs
13. organise overall project reviews at key points in the project, e.g. for the (5) five yearly update to the resources in the MoU Annexes that is required

The ASC shall meet at least once a year.

Minutes of each meeting shall be drafted by the chairperson and communicated to the other members not later than one (1) month after the meeting. The minutes of each meeting shall be considered as accepted by the other members if, within thirty (30) calendar days from receipt, the other members have not objected in writing to the chairperson.

The minutes shall include a detailed financial report on the construction resources and operational costs for each Party during the preceding and upcoming year.

In case modifications of the Project with respect to the present plan of the MoU have to be considered, exceptional meetings shall be summoned following the request of one or more Parties, for review and eventual approval of the ASC decision.

AGATA Project Manager (PM)

The AGATA Project Manager is appointed by the ASC to coordinate the execution and implementation of the project. For this purpose, the PM can create and dissolve working groups in the AMB as needed and after acceptance by the ASC. The PM will nominate the chairpersons of these working groups.

AGATA Management Board (AMB)

Membership of the AMB:
The AGATA Project Manager, the chairpersons of the working groups and the chairperson of ASC (ex- officio) are members of the AMB. The AGATA Project Manager will chair the AMB.

The Local Campaign Manager(s) nominated by each Host in agreement with the AMB are invited to attend.

Voting rights:
All members have equal voting rights.

Terms of Reference:
The AMB executes and implements the project. The AMB shall report to and be accountable to the ASC through the AGATA Project Manager.

The tasks of the AMB are as follows:

1. manage the effective and efficient implementation of the Project
2. define the management structure of the project
3. manage all technical aspect of the project
4. collect information on the progress of the Project, examine that information to assess the compliance of the Project with the programme decided by the ASC and, if necessary, propose modifications of the programme to the ASC
5. provide reports of the progress of the Project to the ASC including an annual planning and resource report
6. advise the ASC on technical issues
7. work with the Local Campaign Manager of each Host to ensure the successful operation of AGATA
8. organise AGATA working group meetings as needed
9. manage the Core Funds for the construction of the equipment, carry out its repair and maintenance and report to the ASC the Core money and operation costs usage. Review annually the operation cost budget and report to the ASC
10. organise once a year the AGATA week workshop with reports of all the Working Groups and teams
11. organise technical reviews as necessary

AGATA Collaborating Council (ACC) and the AGATA Spokesperson

Membership:
One (1) representative from each Collaborating Institution and the AGATA Spokesperson. The AGATA Spokesperson chairs meetings of the ACC. The Campaign Spokespersons are invited to attend.

Voting:

All members have equal voting rights. The AGATA Spokesperson is excluded from any vote concerning the Spokesperson role.

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:

1. 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;
2. advise the ASC on scientific matters concerning the AGATA project and the research programme through the AGATA Spokesperson;
3. nominate the Campaign Spokesperson for each experiment campaign to the ASC;
4. 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;
5. hold an annual open meeting of the AGATA user community to present the status of the Project and to discuss future experiment campaigns.

AGATA Resource Review Board

The AGATA Resource Review Board (ARRB) comprises one representative at least of each Parties that are contributing to the AGATA project.

The ARRB will elect a chairperson who is invited to attend the ASC.

The annual meetings of the ARRB are the means to inform the Parties about the overall financial status and progress of AGATA.

The role of the ARRB includes:

1. receive reports from the ASC
2. monitor the general financial and human resources in the AGATA project and its operation
3. monitor contributions from Parties with respect to their required contribution
4. evaluate the effect of new members joining or members withdrawing on the resource planning
5. advise on the prosecution and continuation of the Memorandum of Understanding
6. endorse the annual construction, maintenance and operation budgets of the AGATA project and its exploitation
7. make all efforts to put in force an AGATA common account for construction investment, enabling funds to be co-ordinated, for mass purchases at reduced prices and efficient procurement
8. provide oversight on the contingency policies in each partner

The ASC informs the ARRB about funding plans and needs for further funding.

Any modification in the construction and human resources commitment specified in this MoU has to be reported to the ARRB who validates the modification via the minutes of the meeting.

Annex E:

Management of the Common Fund Account

1. The Parties adhering to the Common Fund Account, agree that the GANIL manage on their behalf, the contributions concerning maintenance and operational costs of the AGATA Collaboration;

2. At the beginning of the quarter of each year, the contributions of each Party as defined by the ASC after consultation of the AMB will be made. A receipt of the invoice will be issued by GANIL and will be sent to each of the above Parties;

3. The accountant administering the invoices is the Gie GANIL SG CAEN Côte de Nacre (0051), 7 Boulevard Maréchal Juin, 1400 CAEN.

4. The banking information of the GANIL is :

[redacted]

5. By signing this Annex, Parties agree to join the Common Fund Account and accept the conditions of his functioning as defined, in article 9 and this Annex.

Signatures

Date : 5.01.2022

Party : Le Directeur de l'IN2P3

[redacted]

Reynald Pain

Annex E:

Management of the Common Fund Account

1. The Parties adhering to the Common Fund Account, agree that the IN2P3/CNRS manage on their behalf , the contributions concerning maintenance and operational costs of the AGATA Collaboration;

2. At the beginning of the quarter of each year, the contributions of each Party as defined by the ASC after consultation of the AMB will be made. A receipt of the invoice will be issued by CNRS/IN2P3 and will be sent to each of the above Parties;

3. The accountant administering the invoices is the Agent Comptable Secondaire de la Délégation Paris Michel-Ange du CNRS, 3 rue Michel-Ange, 75794 Paris Cedex 16.

4. The banking information of the Délégation Paris Michel of CNRS is :



5. By signing this Annex, Parties agree to join the Common Fund Account and accept the conditions of his functioning as defined, in article 9 and this Annex.

Signatures

Date : 5 July 2021, Debrecen, Hungary
Party : Institute for Nuclear Research (ATOMKI), Hungary

Zsolt DOMBRÁDI
Director

Erzsébet CSÖRGŐNÉ MOLNÁR
Financial Director

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Signatures

For CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (CSIC):

[redacted]

Dr. Ángeles Gómez Borrego
Vice-President International Affairs
Place: Madrid
Date:

Management of the Common Fund Account

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Signatures

For UNIVERSIDAD DE SALAMANCA



Dr. D. José Miguel Mateos Roco
Vice-rector of Research and Transfer
Place: Salamanca

Annex E:

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Signatures

[redacted]

Date :
Party :

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[redacted]

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Signatures [redacted]

Date : 16/7/21

Party : STFC. (UK)