Amendment 2

Memorandum of Understanding

Phase 2

AGATA Advanced Gamma Tracking Array

Preamble:

Amendment to the Memorandum of Understanding for the AGATA Collaboration

In 2008, the institutes forming the AGATA Collaboration agreed upon a Memorandum of Understanding (MoU) concerning the construction and operation of the Advanced Gamma Tracking Array (AGATA), a state-of-the-art gamma-ray tracking spectrometer. The Collaboration committed to a phased approach for its construction and operation, with the ultimate goal of realising the full 4π spectrometer. This MoU aligns with the recommendation of the *NuPECC Long Range Plan 2024 – Perspectives in Nuclear Physics*, which calls for:

“Support to the completion of AGATA in full geometry.”

This initial agreement was followed by a second MoU (Phase 2), covering the continued construction and operation of AGATA. Under this agreement, the Parties aim to complete the 3π configuration within ten (10) years from the commencement of this MoU, which became effective on 1 July 2021 for a duration of five years. The continuation of the project will follow reviews in 5 (five) year periods until completion of the 4π configuration.

This document constitutes an **amendment** to the Phase 2 MoU, specifically to define the capital and operational costs necessary to complete and operate the 3π configuration by 31 December 2030.

In accordance with Article 4, “Commencement, Duration, and Withdrawal” of the AGATA MoU, a formal review was conducted by the AGATA Steering Committee (ASC) six months prior to the five-year review date. The findings were submitted to the AGATA Resource Review Board (ARRB).

The review, concluded on 22 April 2025, evaluated the project's scientific and technical progress, implementation status, and resource management. The ARRB endorsed the findings and recommended that the project proceed over the next five-year period to achieve the 3π array milestone.

Accordingly, the Parties agree to the following amendments:

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1. Purpose

This amendment updates Annex B: **"AGATA Equipment, Construction Investment and Installation"** and Annex C: **"AGATA Operation."**

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2. Modification of Table B.2.2 in Annex B

The AGATA Steering Committee has approved the construction and capital investment costs for the period **2026–2030**. The revised capital investment figures are detailed in **Table B.2.2b**.

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3. Modification of Annex C: “AGATA Operation”

At its meeting on **1–2 April 2025**, the AGATA Steering Committee approved the updated operation costs for the period **2026–2030**, as reflected in the revised **Tables C.1 and C.2**.

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4. Miscellaneous

All other articles and annexes of the **Phase 2 MoU** remain unchanged and in full effect.

Annex B: Construction investment, human resources and sharing

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. The capital investment made to 2025 is given in table B.2.1a.

Table B.2.1a *Capital costs that have been committed up to 2025.*

Country	Funds committed (2003 - 2020) without tax [k€]	Funds committed (2021 - 2025) without tax [k€]
Bulgaria	0	
Finland	287.2	
France *(IN2P3)* *(GANIL)* *(IRFU)*	3879.3 *(2243.7)* *(583.3)* *(1052.3)*	2413 *(749)* *(1326)* *(337)*
Germany *(Universities)* *(GSI)*	4065.2 *(4065.2)*	776 *(776)*
Hungary	739.7	
Italy	3852.4	2299
Poland	24.3	
Romania	57.0	
Spain	639.5	603
Sweden	819.0	
Turkey	750.1	
UK	2543.6	1629
Total	**17657.3**	**7720**

Table B.2.2b: *Sharing of capital Investment (without tax) for 2026-2030 (in* k€*, excluding personnel) between the collaborating institutions of the countries forming the AGATA Collaboration. The sharing between the institutions is based on the completion of the full MoU for each partner. The sharing between the French partners IN2P3/GANIL/IRFU is in the ratio 0.33/0.50/0.17, while the sharing between German partners Universities/GSI is in the ratio 0.80/0.20.*

Country	Total capital investment (2026 - 2030) without tax [k€]
Bulgaria	426
Finland	426
France	2369
(IN2P3)	*(782)*
(GANIL)	*(1184)*
(IRFU)	*(403)*
Germany	3963
(Universities)	*(3170)*
(GSI)	*(793)*
Hungary	426
Italy	2369
Poland	426
Spain	355
Sweden	1144
Turkey	426
UK	1777
Total	**14107**

Annex C: AGATA operation Costs

Table C.1: Operation costs without tax for 2026 till 2030. These are based on an increase of detector systems from 81 to 135 over the period. This is consistent with the foreseen procurement schedule for 45 systems to 31/12/30.

Item	2026 (k€)	2027 (k€)	2028 (k€)	2029 (k€)	2030 (k€)
Capsules ordered	92	103	113	124	135
Capsules in Host Lab	75	84	96	105	117
Detectors					
LN2	139	144	150	156	162
Capsule maintenance/repair	243	249	254	260	268
Detector & Cryostat maintenance/repair	104	115	138	153	173
Detector laboratories	60	60	60	60	60
Infrastructure					
HV/LV, Autofill, infrastructure	27	30	35	38	42
Electronics and DAQ					
Elect. maintenance/replacement	89	98	112	122	137
DAQ maintenance/replacement	79	88	101	110	123
Other costs					
Grid costs	24	24	24	24	24
Shipping costs	19	19	19	19	19
Mechanics	8	8	8	8	8
Total operation & maintenance costs	**792**	**835**	**901**	**950**	**1016**

Table C.2: Sharing of running and maintenance costs for 2026-2030 (in k€*, excluding personnel) between the collaborating institutions of the countries forming the AGATA Collaboration. The sharing between the French partners IN2P3/GANIL/IRFU is in the ratio 0.33/0.50/0.17, while the sharing between German partners Universities/GSI is in the ratio 0.80/0.20.*

Country	**2026**	**2027**	**2028**	**2029**	**2030**
	(k€)	**(k€)**	**(k€)**	**(k€)**	**(k€)**
Bulgaria	25	26	28	30	32
Finland	29	30	33	35	38
France	138	146	158	166	177
Germany	138	146	158	166	177
Hungary	38	40	43	46	49
Italy	138	146	158	166	177
Poland	25	26	28	30	32
Spain	39	41	44	47	50
Sweden	77	81	87	90	98
Turkey	38	40	43	46	49
UK	107	113	121	128	137
Total	**792**	**835**	**901**	**950**	**1016**

AGATA

Advanced Gamma Tracking Array

Amendment 2 of the MoU Phase-2

Signature Sheet

Date and Place:

Signature:

[redacted]