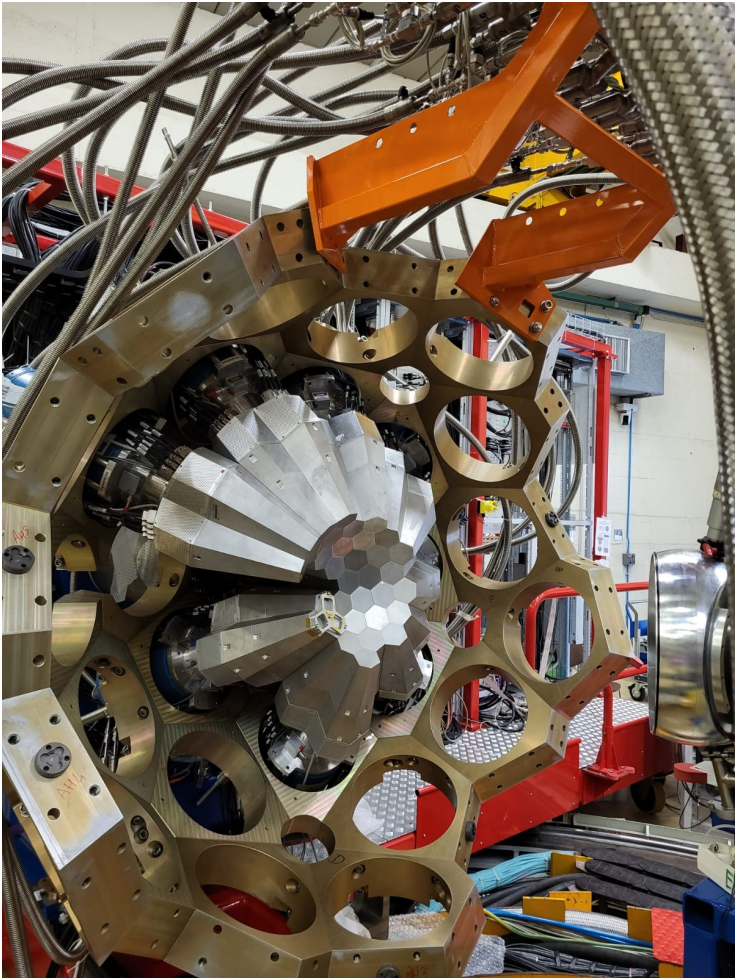




Project Manager Report

Emmanuel Clément (GANIL)

AGATA Week June 2022



Congratulations to all AGATA WG and Teams,



to the Local Team



for the AGATA transfer,

installation

and first data taking

We are starting a new phase of the Project : Phase 2

The objectives of Phase 2 funded by the MoU are :

- Acquiring 78 Asymmetric segmented HPGe capsules – 3π available for experiments
- Acquiring 26 AGATA Triple cryostats
- Acquiring 1 Po storage disk
- Acquiring Data Acquisition Infrastructures such as network switches and blades for services
- Acquiring a computer farm (HPC) for the PSA on-line treatment of 135 capsules
- Acquiring a Detector Support System for 135 capsules, Low and High voltages supplies, LN2 auto-fill system and related cables.
- Maintaining An up-to-date Data Base
- Developing and maintaining a set of software algorithms for on-line and off line data processing
- Developing, maintaining and distributing a framework for Data Analysis
- Designing and constructing a unique mechanical structure holding 45 AGATA Triple cryostats
- Developing and maintaining a unique Front and back electronic for 135 capsules (Analog preamps, digitizer DIGOPT12, Processing PACE-STARE with clock and trigger functionalities (GTS/SMART)) and its software control.
- Developing, maintaining and distributing a state of the art simulation package and performances control.

The AGATA Project includes a continuous R&D activities which is included in each Working Group structures but not funded by the MoU.



Project Plan Phase 2

The detailed Project Plan : ATRIUM-563607, ATRIUM-563609



The present project plan, conceived technically for a 4π array, foresees the construction of a 3π array with capital investment from 2021 to 2030, consistent with the MoU,

22M€ investment

The production of the Triple Clusters constrains the project

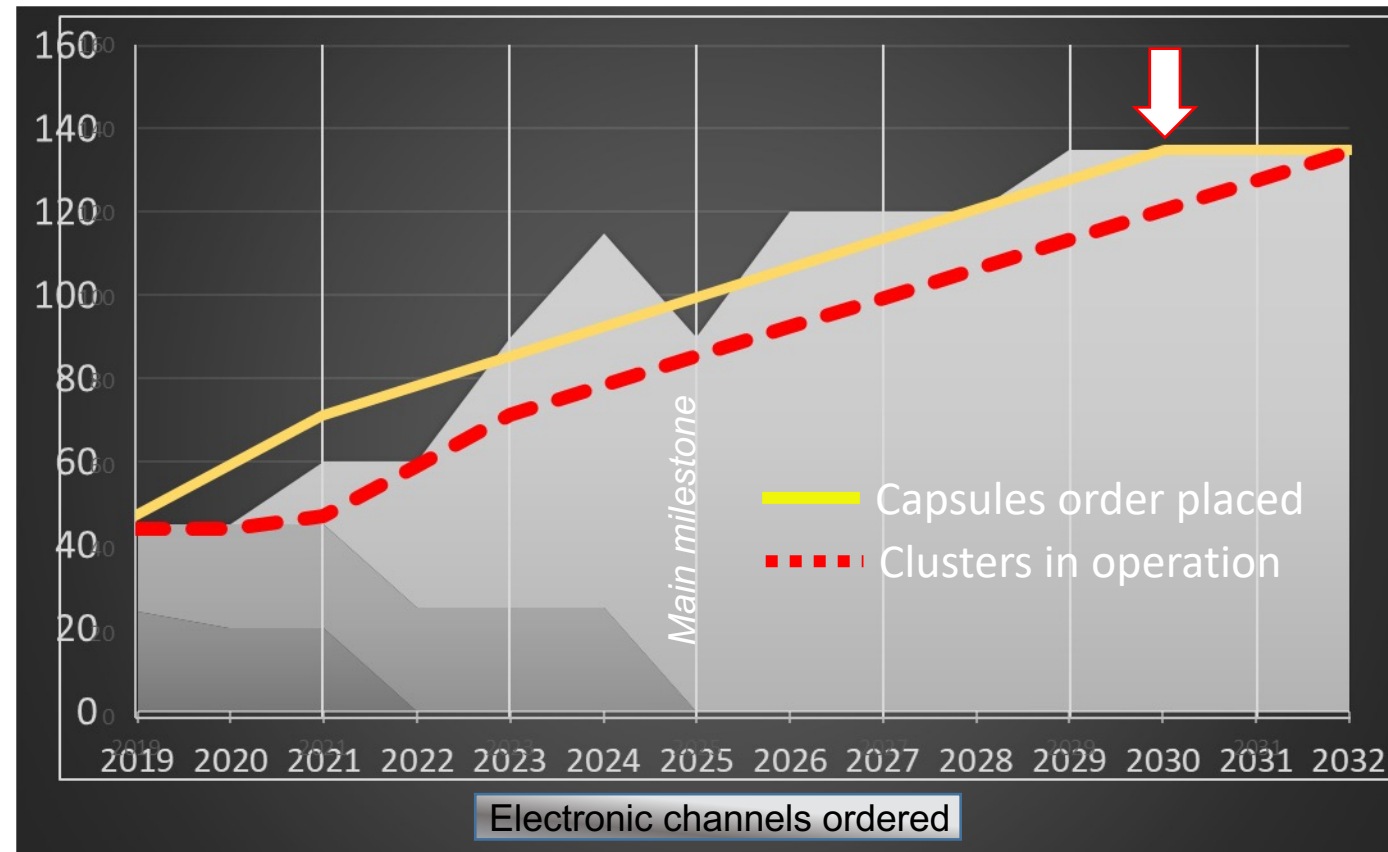
The project plan is based on an annual production of 2-3 Triple Clusters (ordered, produced, assembled and tested)

→ A 2π system available by the end of the LNL campaign (~ 2025-2026) and for the start of the next campaign >2026 (FAIR, GANIL, ISOLDE ...)

→ Close to the 3π system delivered by the end 2028-2029

→ The project plan will evolve to the construction of the 4π array

MoU funding scheme (section 3.6)





→ League change

15k channels of High Resolution
150 k parameters for LLP setting
~100 To / week if traces ...
Summer 2020 – International review

DOMAINE SCIENTIFIQUE PRINCIPAL	DOMAINE(S) SCIENTIFIQUE(S) SECONDAIRE(S)	ACRONYME	TITRE COMPLET DE L'INFRASTRUCTURE
Physique nucléaire et des hautes énergies		CERN	Organisation Européenne pour la Recherche Nucléaire
		CERN LHC	Large Hadron Collider
		DUNE / PIP-II	Deep Underground Neutrino Experiment / Proton Improvement Plan II
Astronomie et astrophysique		EGO-Virgo	European Gravitational Observatory - Virgo
		FAIR	Facility for Antiproton and Ion Research
		GANIL-SPiRAL2	Grand Accélérateur National d'Ions Lourds – Système de Production d'Ions Radioactifs en Ligne de 2 ^e génération
		AGATA	Advanced GAMMA Tracking Array
		JUNO	Jiangmen Underground Neutrino Observatory
Astronomie et astrophysique		KM3NeT	Kilometre Cube Neutrino Telescope
		LSM	Laboratoire Souterrain de Modane
Astronomie et astrophysique		LSST	Legacy Survey of Space and Time
Astronomie et astrophysique		PAO	Pierre Auger Observatory

MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR, DE LA RECHERCHE ET DE L'INNOVATION
L'État
Le Futur



L'objectif de la collaboration AGATA est de fournir pour l'étude de la physique nucléaire un instrument de nouvelle génération, capable d'observer des événements rares avec une grande précision. AGATA permettra d'améliorer notre compréhension de l'interaction nucléaire grâce à la mesure des rayonnements gamma émis lors de différents processus nucléaires. Sa haute résolution et sa grande efficacité en font un outil puissant pour sonder les signatures électromagnétiques des différents comportements de la matière nucléaire, ainsi que leur impact sur les processus astrophysiques, les données nucléaires et le cycle du combustible. AGATA fédère une large communauté de 300 chercheurs en Europe. La collaboration Européenne a pour objectif de construire, maintenir et exploiter ce nouveau type de multi-détecteur au Germanium ultra pur, basé sur le concept de trajectographie gamma. Il s'agit d'une rupture technologique qui permet

Relations avec les acteurs économiques et/ou impact socio-économique

La construction et la maintenance des différents éléments du détecteur AGATA (des cristaux de Ge jusqu'aux éléments d'infrastructure) se font en collaboration avec des entreprises Européennes. AGATA est également un outil de formation pour les jeunes ingénieurs et physiciens dans des domaines de haute technologie électronique, acquisition et gestion de données, algorithmes, physique du solide, physique et astrophysique nucléaire...

Science ouverte et données

- Une partie des publications issues de projets utilisant l'infrastructure est en accès ouvert
- Les codes sources produits par l'infrastructure sont ouverts sur une forge logicielle https://gitlab.in2p3.fr/IN2P3_GAMMA
- Production annuelle de données : 100 To
- Les données validées et décrites sont publiées sur un entrepôt de données <https://cc.in2p3.fr>

Catégorie : IR
Type d'infrastructure : distribuée
Localisation du siège de l'infrastructure (en France) : Caen
Établissement(s) français porteur(s) : CNRS-IN2P3,
CEA-DRF

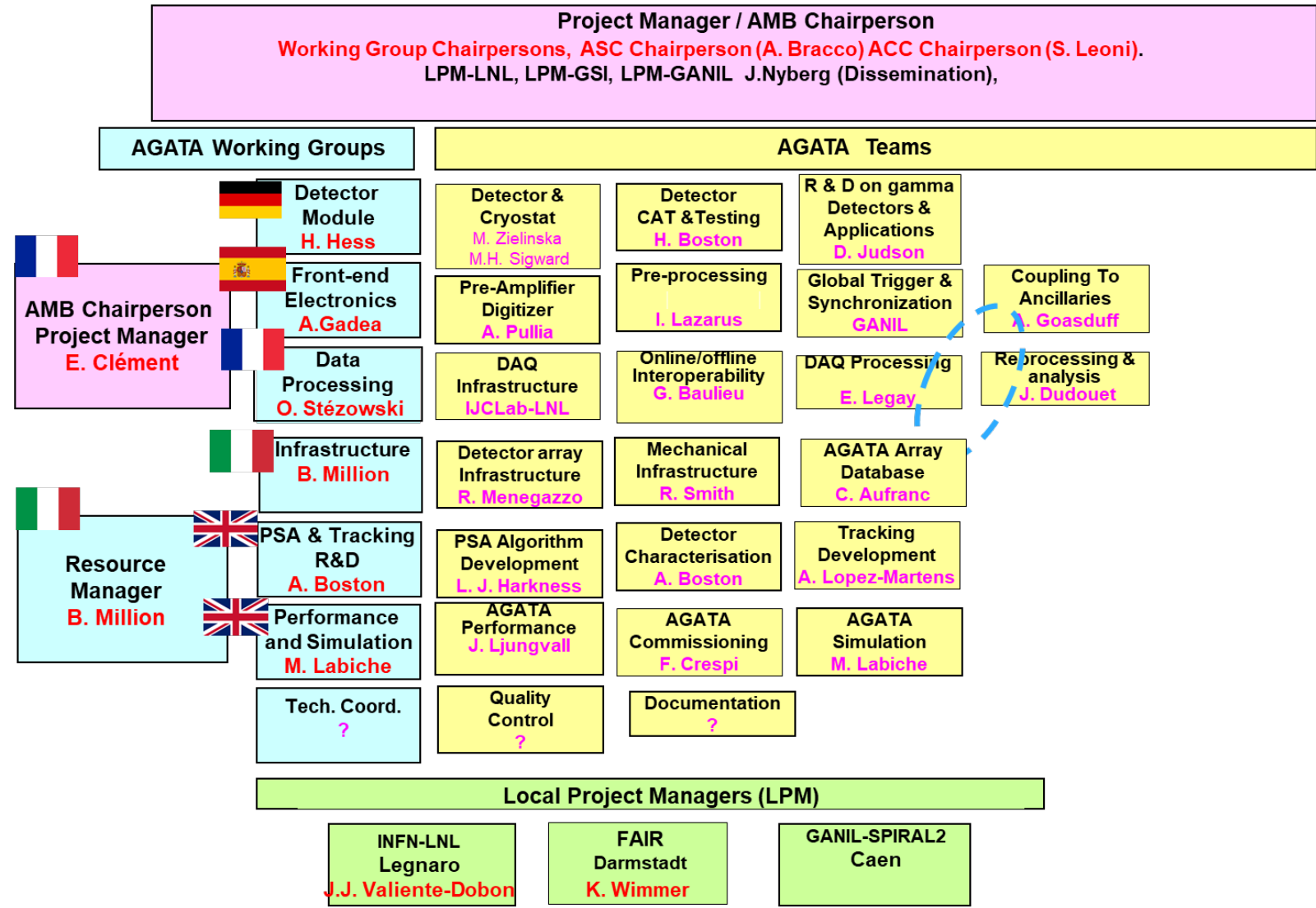
Directeur de l'infrastructure ou représentant(s) en France : Emmanuel Clément
Année de création : 2003
Année d'exploitation : 2014
Totaux/Partenaires : GANIL, Université Claude Bernard-Lyon 1, Université Paris-Saclay, Université de Strasbourg
Contact en France : Emmanuel.Clement@ganil.fr
Site web : <http://agata.in2p3.fr>

Dimension internationale

Responsable : John Simpson (président du comité de pilotage AGATA) **Pays partenaires :** DE, BG, ES, FI, FR, HU, IT, PL, UK, SE, TR
Site internet : www.agata.org



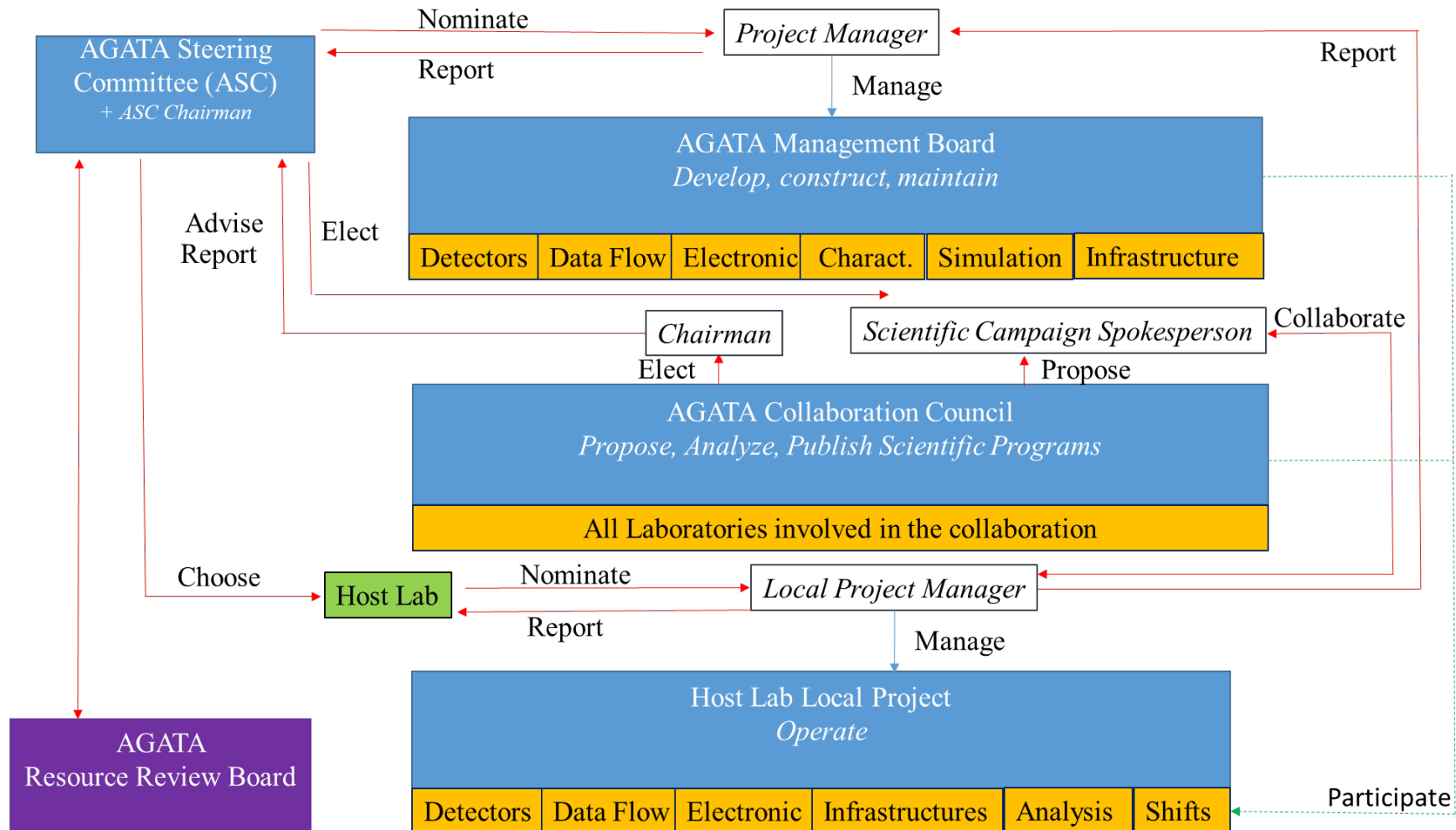
AGATA Management Board and Teams Phase 2



<https://atrium.in2p3.fr/>
 Detailed task distribution and responsibilities : **ATRIUM-620936**
 Risk analysis : **ATRIUM-563604**

Phase 2 Management

Part of the management portfolio : ATRIUM-563598



AGATA Phase 2 funding

MoU

Core investments

For material investments

- Detectors
- Electronic
- Mechanics
- Data acquisition
- Infrastructures

Shared between countries
(Major countries Fr, Ge, It 20%, UK 15%)

ASC and funding agencies discussion (inc. ARRB) and agreement via MoU

Operation Costs

For repairs, replacement of broken or obsolete material for the Core items

Shared between countries and scaled and re-evaluated annually with capital investments and real cost

Endorsed by ASC via MoU

Host Lab installation

For all local services and interfaces for all material from the Core investments needed to host and operate AGATA

Fully covered by the Host Laboratory and managed within the local host project breakdown structures

R&D and Travels

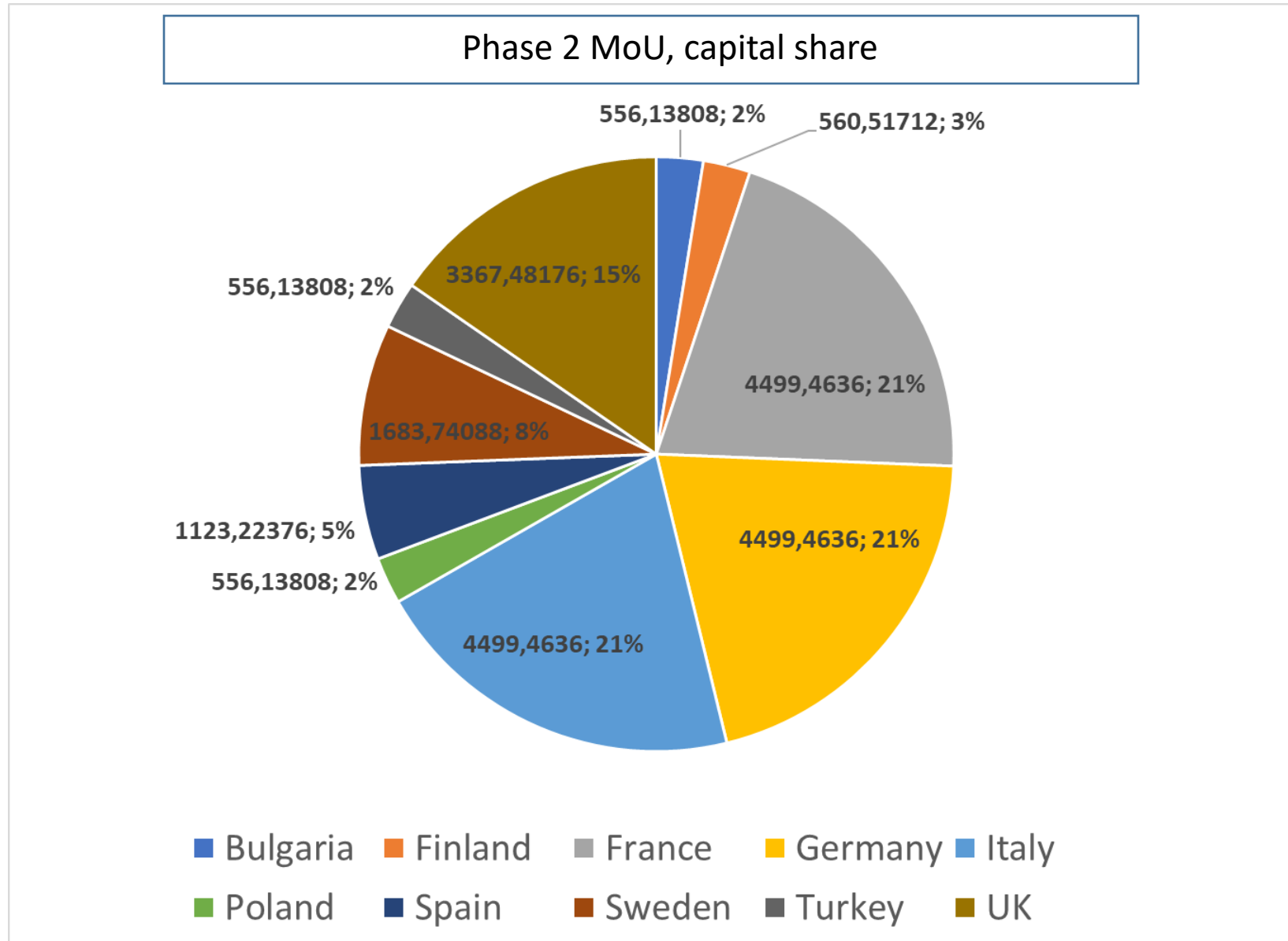
For travels between partners institutions and to the host laboratory, annual meetings, workshops, Post-docs, PhD and Technical Short Terms contracts, Technical or scientific R&D

Not financed by the collaboration. National Grant (ERC, National Grant, EU support etc ...)

International ASC - ARRB



Phase 2 Capital Cost





Phase 2 Capital Cost

Costs in k€ per year: **Expected** Cost purchasing 7 to 8 detectors/year (VAT Excluded)

Item	2021 64/21	2022 72/24	2023 80/26	2024 88/29	2025 96/31	2026 104/34	2027 111/37	2028 119/40	2029 127/43	2030 135/45	Total
Detector	1214,5	1357,7	1378,1	1398,7	1419,7	1441,0	1327,9	1540,4	1563,5	1587,0	14228,6
Cryostat	225,1	228,5	338,7	235,4	238,9	354,2	359,5	364,9	370,4	375,9	3091,4
Electronics	0,0	345,8	0,0	0,0	54,3	275,7	372,6	0,0	383,8	0,0	1432,2
Electronics Upgrade	340,7	0,0	438,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	779,5
GTS/SMART	0,0	0	104,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	104,6
PSA & Data Flow	0,0	157,9	0,0	284,4	52,5	53,3	151,0	48,0	55,7	113,1	915,8
Storage	0,0	117,6	0,0	0,0	0,0	124,9	0,0	0,0	0,0	0,0	242,5
Analysis	0,0	10,5	0,0	0,0	0,0	11,1	0,0	0,0	0,0	11,8	33,3
Infrastructure	461,0	0,0	0,0	266,6	0,0	0,0	0,0	0,0	0,0	0,0	727,7
Mechanics	169,8	0,0	0,0	96,3	10,9	11,1	16,9	17,2	17,4	0,0	339,6
Total	2411,1	2218,0	2260,1	2281,5	1776,4	2271,2	2227,9	1970,5	2390,8	2087,7	21895,2

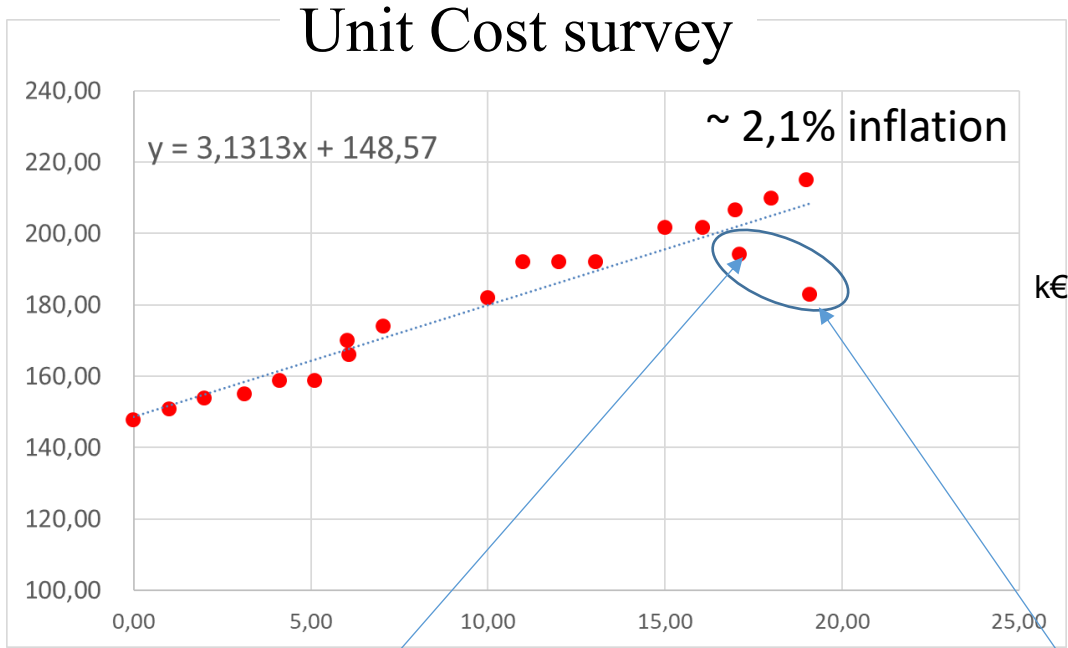
Detectors procurement represents ~80% of the AGATA Core budget

Annual profile for each country has been planned (available within ASC)

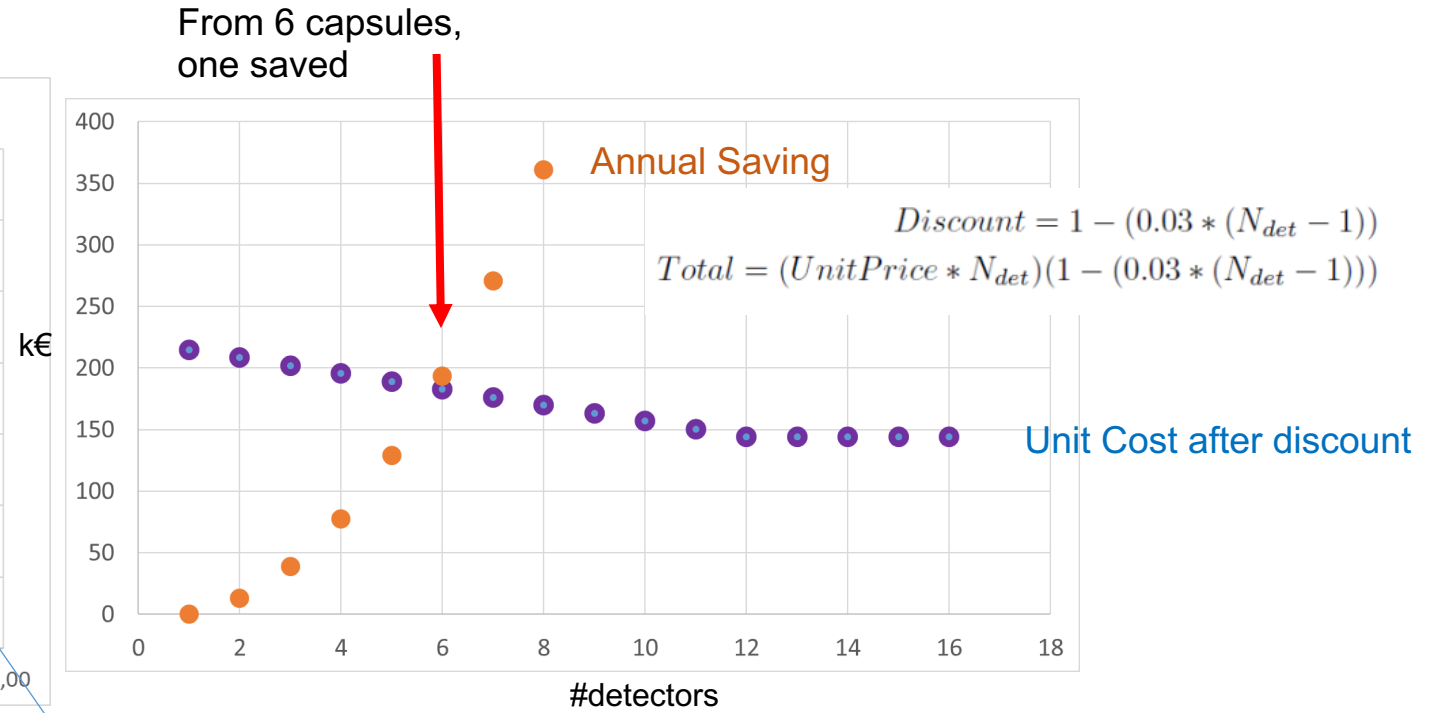


AGATA Capsules cost survey

Coordinated effort to concentrate the capsules purchase mitigates European inflation effect



3 simultaneous order for UK -- discount



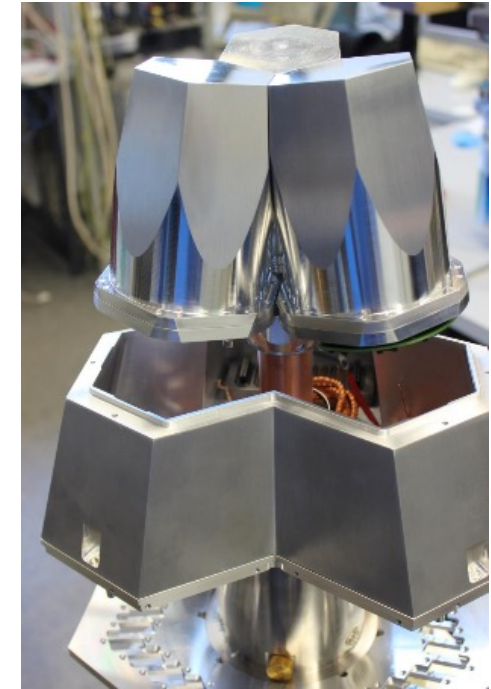
6 simultaneous orders discount from several parties in the collaboration. AMB-ASC effort
 2-3 years visibility allows significant savings
 Regular meetings with the present provider MIRION©
 Overall good collaboration with the provider (Letter to ASC)

Highly depending on the European inflation level

Planned procurement of detector per countries in 2 milestones

		2021-2025			2026-2030			Total		
FULL ATC	Bulgaria	0,33	278	2,54%	0,37	313,00	2,86%	0,70	591	2,70%
	Finland	0,33	278	2,54%	0,37	313,00	2,86%	0,70	591	2,70%
	France	2,67	2249	20,55%	2,67	2251,00	20,56%	5,34	4500	20,55%
	Germany	2,67	2249	20,55%	2,67	2251,00	20,56%	5,34	4500	20,55%
	Hungary	0,00	0	0,00%	0,70	591,00	5,40%	0,70	591	2,70%
	Italy	2,67	2249	20,55%	2,67	2251,00	20,56%	5,34	4500	20,55%
	Poland	0,33	278	2,54%	0,37	313,00	2,86%	0,70	591	2,70%
	Spain	0,67	561	5,13%	0,43	359,00	3,28%	1,10	920	4,20%
	Sweden	1,00	842	7,69%	0,44	362,00	3,31%	1,44	1204	5,50%
	Turkey	0,33	278	2,54%	0,37	313,00	2,86%	0,70	591	2,70%
	UK	2,00	1684	15,38%	1,94	1634,00	14,92%	3,94	3318	15,15%
total number		13,00	10946	100,00%	13,00	10951	100,00%	26,00	21897	100,00%

Planned		2021	2022	2023	2024	2025	2021-2025	da MoU - Proj Def 2021-2025	2026	2027	2028	2029	2030	2026-2030	Total 2021-2030	da MoU - Proj Def 2021-2030	da MoU - Proj Def 2021-2030	
Inflation +1.5%/year		64/21	72/24	80/26	88/29	96/31			104/34	111/37	119/40	127/43	135/45					
DETECTORS	Bulgaria	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2		
	Finland	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2		
	France	0	3	2	1	2	8	8	3	0	2	2	1	8	16	16		
	Germany	0	0	0	0	0	0	8	0	0	0	0	0	0	0	16		
	Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
	Italy	0	2	2	2	1	7	8	2	2	2	1	2	9	16	16		
	Poland	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2		
	Spain	0	1	0	0	0	0	1	2	0	0	0	0	0	0	1	3	
	Sweden	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
	Turkey	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2		
	UK	3	0	0	0	0	0	3	6	0	0	0	0	0	3	12		
total number		3	6	4	3	19	39	5	2	4	3	3	17	3	77	78		
total price		595,9	1094,9	792,7	623,2	639,9	3739,2		1002,3	448,2	881,9	692,6	703,0	3728	7410		1 extra capsule to be distributed	
price / Unit		198,6	182,5	198,2	207,7	210,8			200,5	224,1	220,5	230,9	234,3	1110				
CRYOSTATS	Bulgaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Finland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	France	1	0	1	0	2	4	2	0	1	0	0	0	1	7	5		
	Germany	0	0	0	0	0	0	2	0	0	0	0	0	0	2	5		
	Hungary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Italy	2	0	0	0	1	3	2	0	1	0	1	0	2	7	5		
	Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Spain	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Sweden	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1		
	Turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	UK	1	0	0	0	0	1	2	0	0	0	0	0	0	3	4		
total number		3	0	1	0	3	7	9	0	2	0	1	0	3	21	26		
total price		328,8	0,0	119,0	0,0	348,9	796,7		0,0	246,1	0,0	130,1	0,0	376	1173,0		5 extra cryostats to be distributed	
price / Unit		109,6	#DIV/0!	119,0	#DIV/0!	116,3	113,8		#DIV/0!	123,1	#DIV/0!	130,1	#DIV/0!	130,1	#DIV/0!			



From the first year of the MoU, ~50% of the procurement are identified

Next steps :

- UK : 3 capsules not yet identified → next grant
- Germany : waiting for the next grant
- Other countries as soon as MoU is applied
- Competitive Grants → publications and scientific results matter !



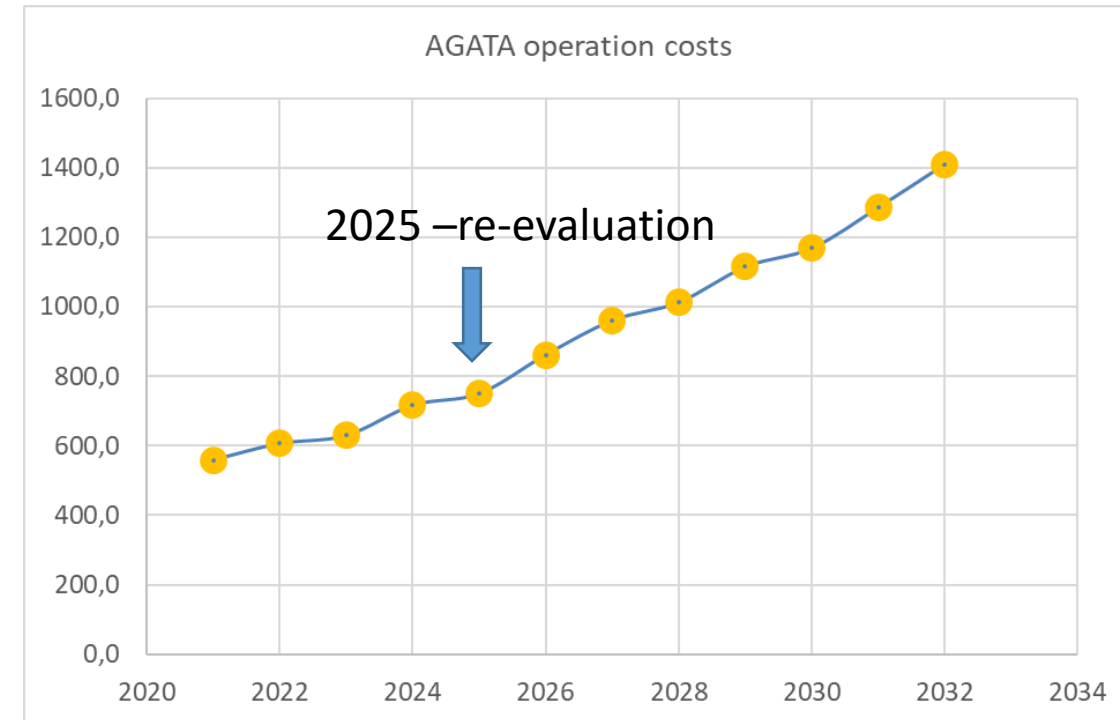
Operation Cost As planned for MoU Phase 2

Item	2021	2022	2023	2024	2025
Capsules in setup	57	60	66	75	81
Expected Capsule failures	5	5	5	6	6
failures Under Warranty	1	1	1	2	2
Detectors in setup	19	20	22	25	27
Detectors					
LN2	20	54	59,4	67,5	72,9
Capsule maintenance/repair	224,6	228,0	231,4	234,8	238,4
Detector&Cryostat maintenance/repair	77,6	78,7	87,9	101,4	111,1
Including Preamplifier exchange...					
Other repairs (feedthrough, cabling,...)					
Detector laboratories	60	60	60	60	60
Infrastructure					
HV/LV, Autofill, infrastructure	21,8	21,8	23,9	27,2	29,4
Electronics and DAQ					
Elect. maintenance/replacement	35,1	43,8	40,5	87,7	94,4
DAQ maintenance/replacement	63	63	69,3	78,75	85,05
Other costs					
Grid costs	24	24	24	24	24
Shipping costs	25	25	25	27	27
Mechanics	8	8	8	8	8
Total operation & maintenance	559,1	606,3	629,4	716,4	750,2

Major re-evaluation in 2025 after careful survey of the capsules failure post-repairs in 2021-2022

Detailed annual evaluation at the ASC meeting

Annual maintenance is ~3 % of the full core investment

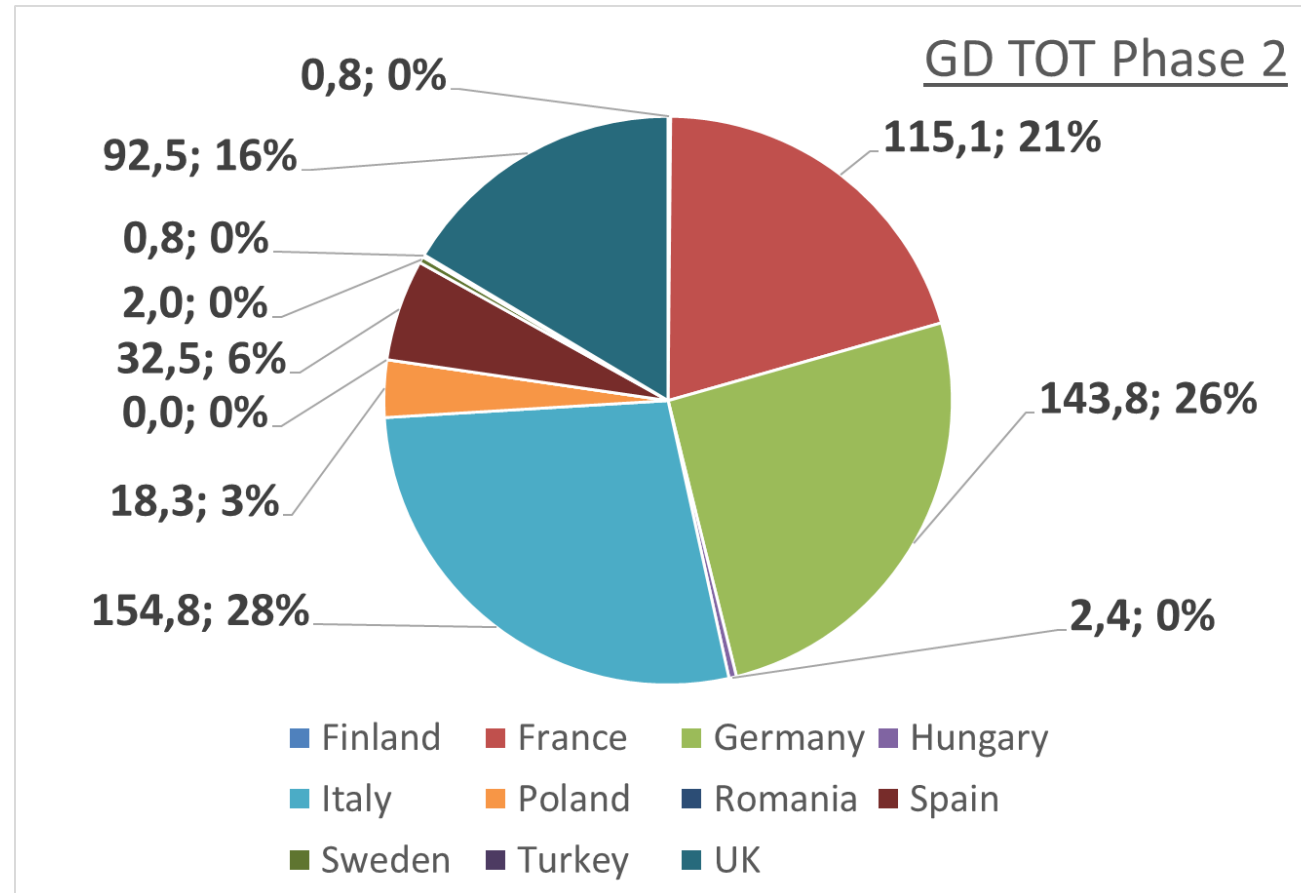


2 Common accounts for OC in KTH and France (IPHC→GANIL)



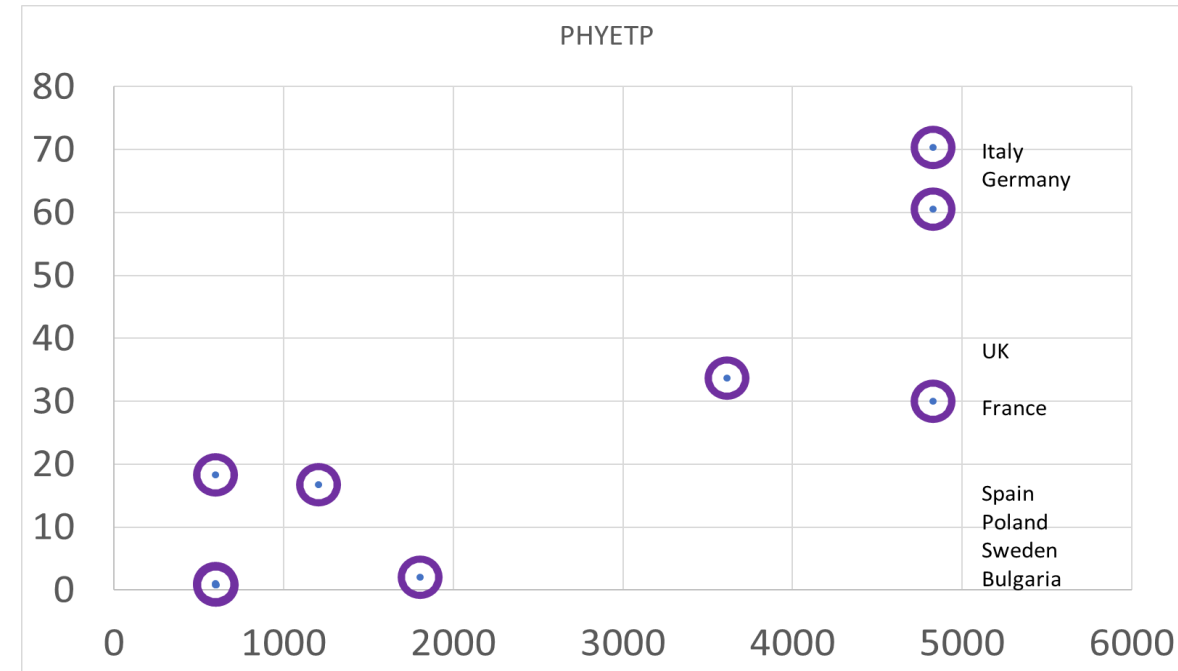
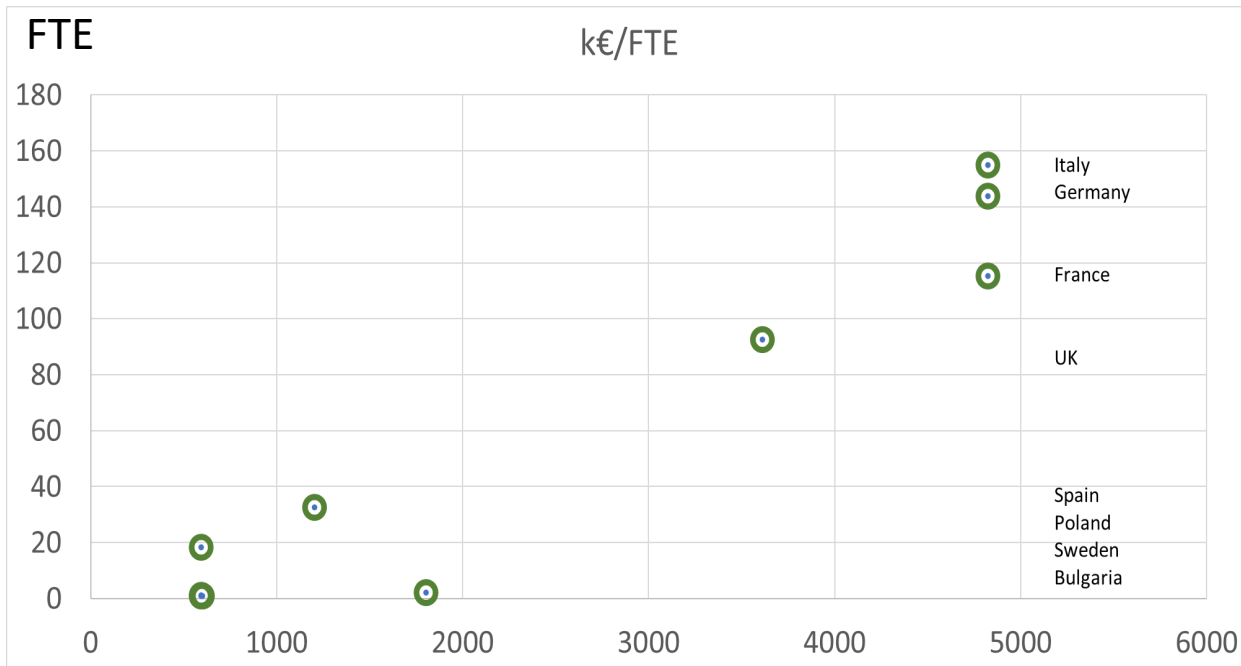
Phase 2 Human resource Plan

FTE for 10 years (Phy and Tech)





Phase 2 Human resource Plan



k€ core

European Commission | Funding & tender opportunities
Single Electronic Data Interchange Area (SEDIA)

SEARCH FUNDING & TENDERS | HOW TO PARTICIPATE | PROJECTS & RESULTS | WORK AS AN EXPERT | SUPPORT

R&D for the next generation of scientific instrumentation, tools and methods
TOPIC ID: HORIZON-INFRA-2022-TECH-01-01

The INFRATECH initiative will be the seed for the R&D phase of the next decade in AGATA. These R&D's could be the technical specifications of a major upgrade of AGATA for Phase 3 [2030-2040]. The delivery of the INFRATECH proposal for AGATA will be a Super-AGATA cluster, from capsules to data processing, including all the new technologies we are willing to introduce. We propose four pillars.

- Detectors developments (capsules and cryostat)
 - - p-type highly segmented encapsulated HPGe (WG – Detector – INFN-CNRS-MIRION)
 - Improved cryostat with electrical cooling ((WG – Detector – IKP- CTT)
- Front-end electronic development
 - ASIC Preamplifier in the cold part of the cryostat (WG FEBEE - INFN-IFIC-CNRS- CEA)
- Computing and algorithms developments
 - New Algorithms (NN, IA, GPU) (WG DAQ -CNRS)
 - Reducing the power consumption for climate change
- Applications
 - Nuclear imaging for health, national security and nuclear waste fields

**IMATRA –
IMAGING and TRACKING of radiation for
science and society
P.I Paul Greenless (Uni. Jyvaskyla)**

Submitted date

20 April 2022 17:00:00 Brussels time

Horizon Europe -Work Program 2021-2022 – TNA ACCESS

↳ EURO-LABS bid approved January 2022


↳ TNA access for LNL (physics campaign)

↳ “Optimal employment of travelling gamma detectors (INTRANS)”
Participants: GSI (coordination), IJCLab, LNL Legnaro
→ Technical support

Dissemination

- **Technical Papers** –
- Scientific Papers
- PhD – Master etc ...

https://www.agata.org



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Printer-friendly version

The Advanced GAMMA Tracking Array (AGATA) is a European gamma-ray spectrometer used for nuclear structure studies. Click [about](#) for further information.

AGATA Home Page



AGATA + DIAMANT + NEDA + NWall setup at GANIL (photo by Johan Nyberg 2018-04-03).

Recent Publications

Complete set of bound negative-parity states in the neutron-rich nucleus ^{18}N

Lifetime measurements in the even-even $^{102-108}\text{Cd}$ isotopes

Evidence for enhanced neutron-proton correlations from the level structure of the $N=Z+1$ nucleus $^{87}_{43}\text{Tc}_{44}$

A Development of a 40-Gb/s Readout Interface STARE for the AGATA Project

Full-volume characterization of an AGATA segmented HPGe gamma-ray detector using a ^{152}Eu source

Gamma spectroscopy with AGATA in its first phases: New insights in nuclear excitations along the nuclear chart

News

AGATA Collaboration Meeting 2021

The meeting will be held at LNL in Italy, November 10-12, 2021.
[Read more](#)

AGATA@LNL Pre-PAC Workshop

The workshop will be held at LNL in Italy, November 8-10, 2021.
[Read more](#)

Contact : J. Nyberg

