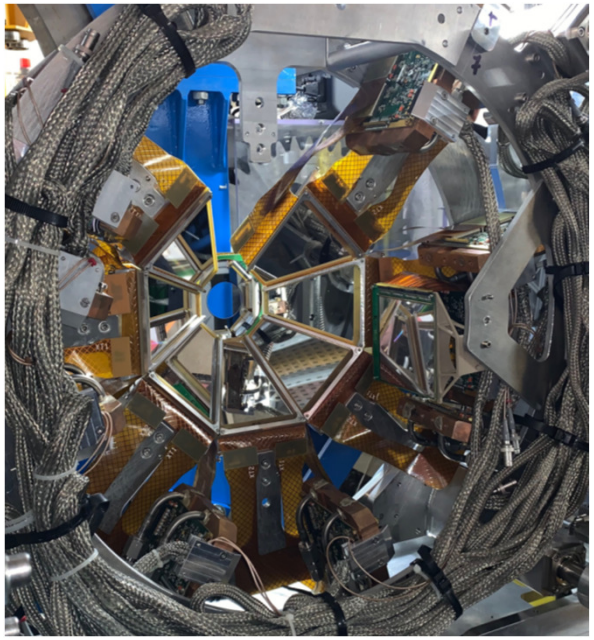
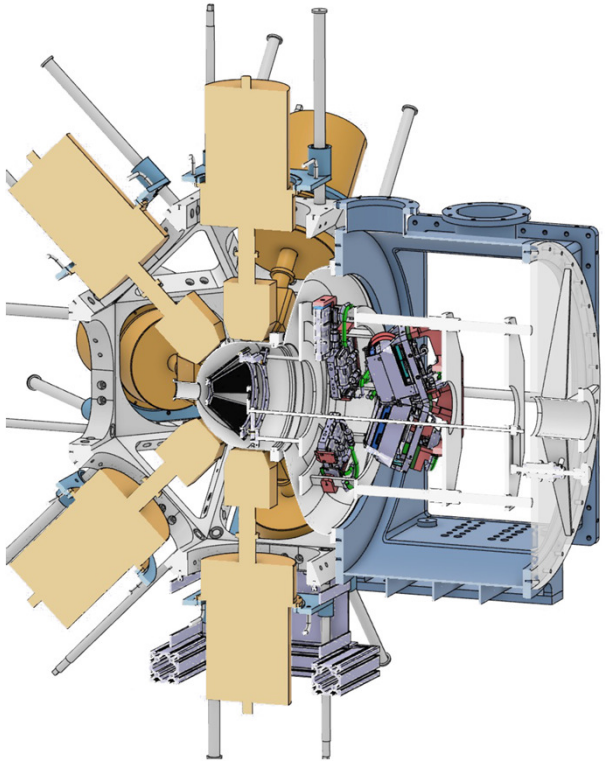
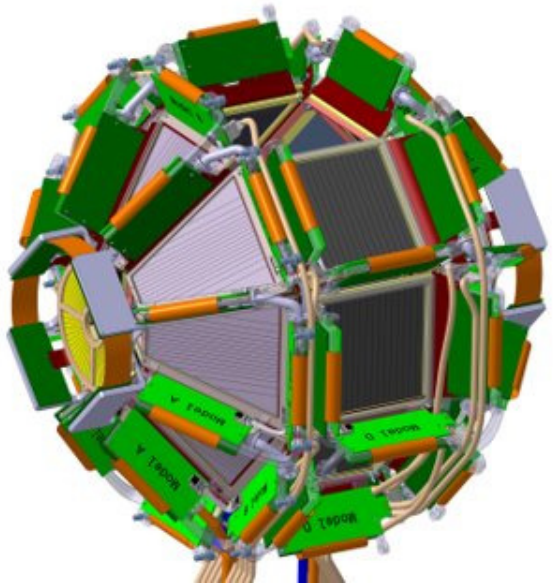
demandes AP 2025 MUGAST&GRIT







Physiciens IJCLab: M.Assié, D.Beaumel, Y.Blumenfeld, N.de Séréville, S.Franchoo, V. Girard-Alcindor, F.Hammache, I.Stefan
Doctorants: H.Jacob, T. Zanatta Martinez

MUGAST@LISE : physics program (as for now…)

2023

Commissioning of the campaign

^{58}Ni (p,d) ^{57}Ni @30 MeV/u

M.A. V. G-A (IJCLab)

PAIRING : How does deformation influence neutron-proton pairing? Study of ^{48}Cr(p,^{3}Heγ)^{46}V

M. Assié (IJCLab)

^{48}Cr beam at 2.5 10^{5} pps

PhD : H. Jacob

SHELL MODEL

Study of ^{68}Ni by neutron adding and removing reactions

S. Koyama, O. Sorlin (GANIL)

^{68}Ni(d,pγ) and ^{68}Ni(p,dγ)

Post-doc : O. Atkas + PhD

2024

SHELL MODEL

Evolution of the neutron $1d_{3/2}$-$1d_{5/2}$ spin-orbit splitting at N = 19 and Fermi surface in ^{34}Si

F. Galtarossa (INFN-LNL)
O. Sorlin (GANIL)

PhD: Raquel Nicolas del Alamo

CLUSTERING

Cluster structure of the g.s.of light exotic nuclei beyond alpha-clustering

V. Girard-Alcindor,
D. Beaumel (IJCLAB)

PhD : Tania Zanatta-Martinez

- Demande Post-doc MUGAST

- 2 to 3 new proposals may be submitted at GANIL PAC (dec 2024):

2025

COMMISSIONING ZDD

SHELL MODEL

Evolution of the neutron $1d_{3/2}$-$1d_{5/2}$ spin-orbit splitting at N = 19 and Fermi surface in ^{34}Si

F. Galtarossa (INFN-LNL)
O. Sorlin (GANIL)

NUCLEAR ASTROPHYSICS

Determining the thermonuclear ^{18}Ne(α,p)^{21}Na reaction rate by measuring ^{7}Li(^{18}Ne,t)^{22}Mg(p)^{21}Na

C. Diget (U. York), N. de Séréville (IJCLab), L. Lalanne (CERN)

Post-doc CNRS

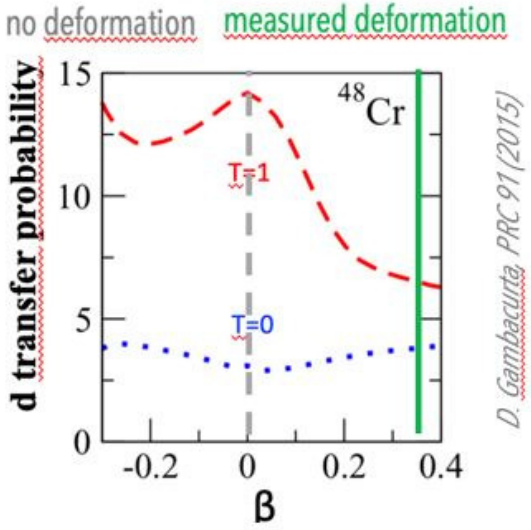
CLUSTERING

The tetra-neutron Isobaric Analog State in ^{4}H : The case for the ^{6}He(p,^{3}He) reaction

A.O. Macchiavelli (ORNL),
M. Assié (IJCLab)

Probing nuclear superfluidity by transfer reactions

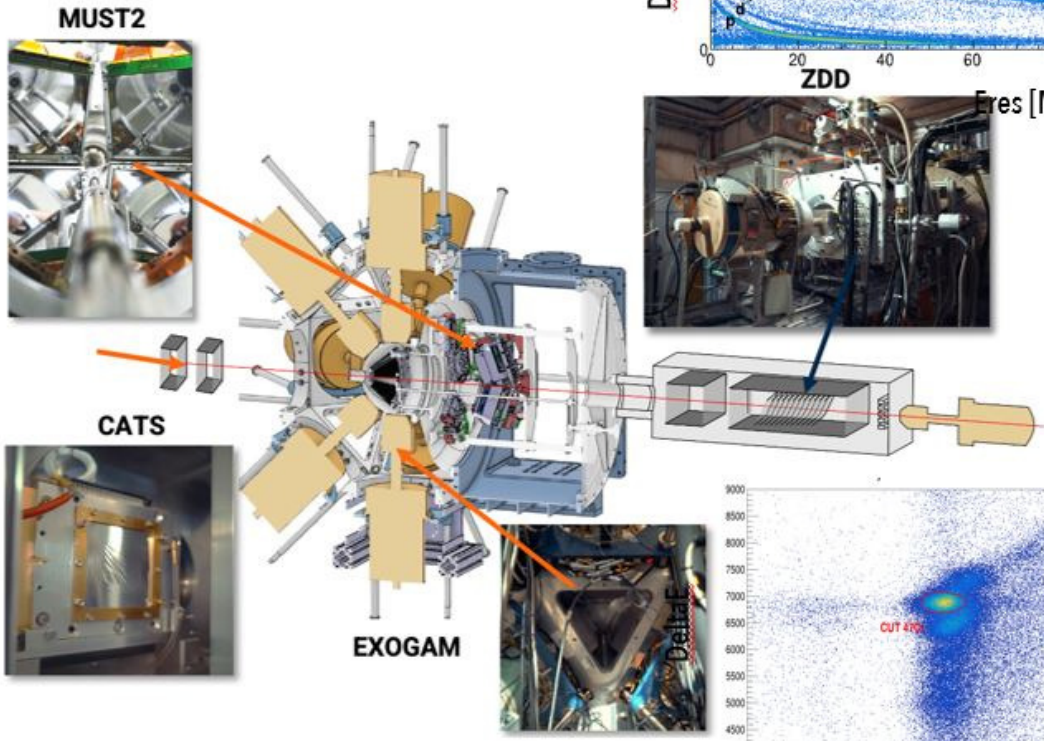
- How to probe the effect of deformation ?
  --> Cross-section for T=0 pairs not affected
  --> Cross-section for T=1 pairs very much reduced



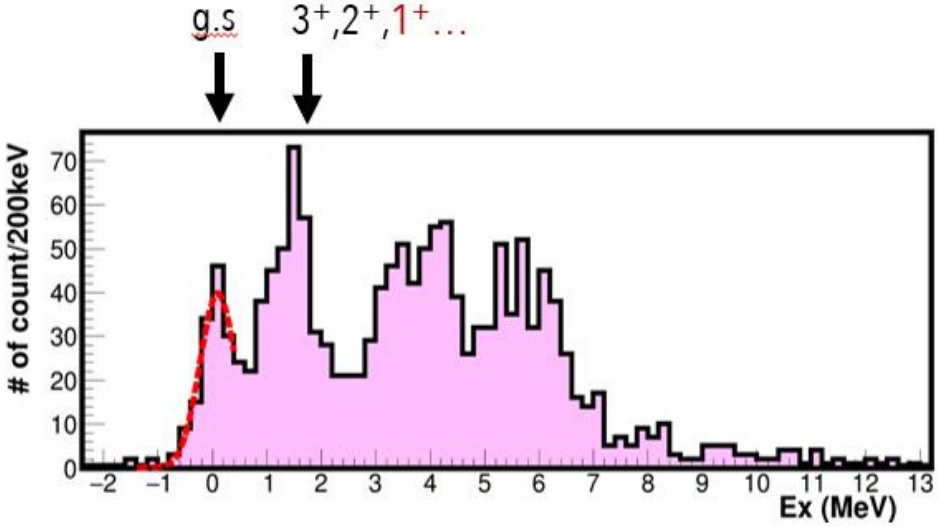
The ratio of cross-sections CS(0+)/CS(1+) will be strongly affected

H. Jacob (PhD), M. Assié (SP)

- Goal of the experiment : measure cross-section for removing a neutron-proton pair (T=0 or T=1) from ^{48}Cr (β=0.35) via the reaction ^{48}Cr(p,^{3}Heγ)^{46}V



Preliminary results for the two-nucleon transfer 48Cr(p,3He)



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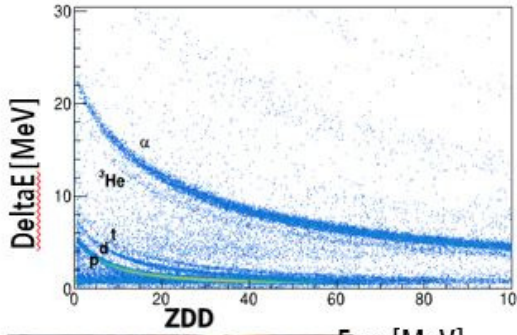
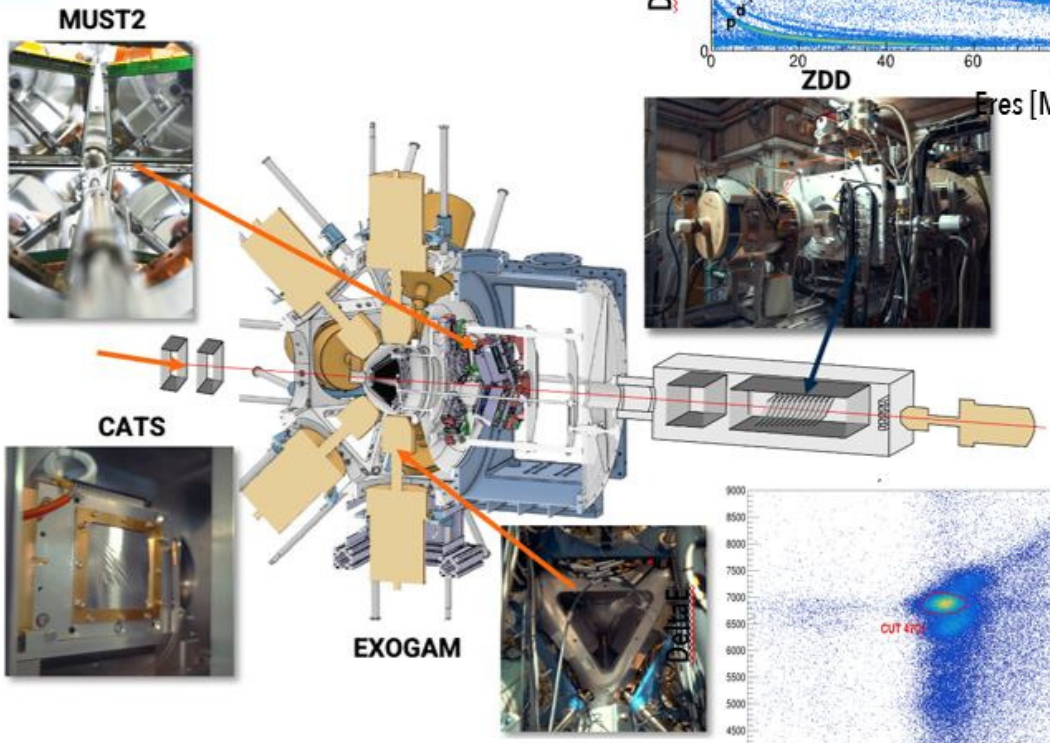
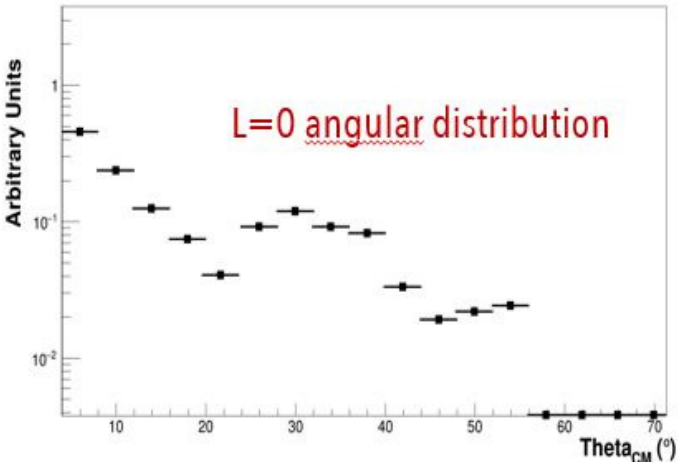
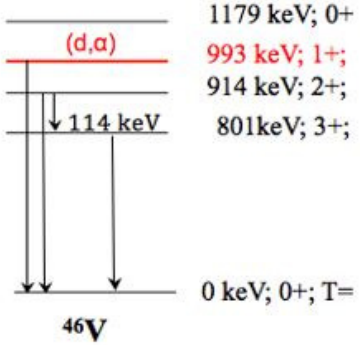




Angular distribution for ^{46}V g.s





1179 keV; 0+
993 keV; 1+;
914 keV; 2+;
801keV; 3+;
0 keV; 0+; T=

ToF CATS-ZDD

H. Jacob (PhD), M. Assié (SP)

Thèses/Post-docs en cours

T. Zanatta-Martinez-> thèse démarrée Nov. 2023
H. Jacob(IJCLab) --> thèse débutée sept 2022
O. Atkas (GANIL) post-doc

R. Nicolas del Alamo (INFN)

Publications

MUGAST (depuis 2022):

I. Zanon et al, PRL 131, 262501(2023)
L. Lalanne et al, PRL 131 , 092501 (2023)
S. Koyama et al, PRC 109, L031301 (2024)
D. Brugnara et al, submitted to Nature Physics

MUGAST

Demande AP 2024 (TGIR GANIL)

- Expériences MUGAST en 2024 :
  43 k€ de missions

- Divers petits équipements **5 k€** équipement

TOTAL = **48 k€**

The GRIT array

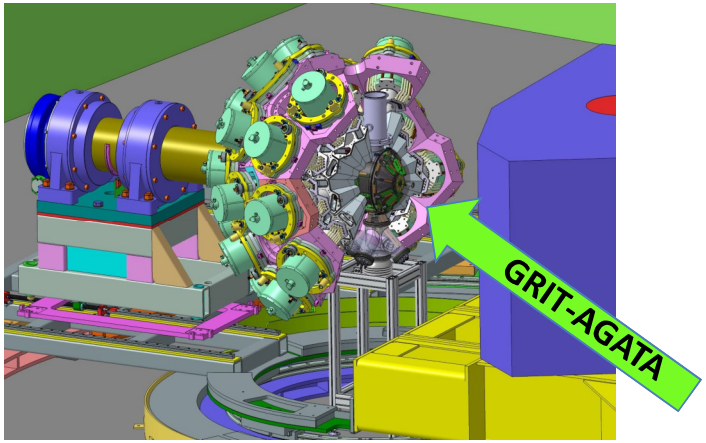
4π Silicon array fully integrable in AGATA & PARIS

DETECTORS

- High efficiency for particles
- High granularity (strip pitch < 0.8 mm)

Layers of Silicon

- 500 um DSSD pitch < 0.8 mm
- 1.5 mm DSSD pitch ~10mm



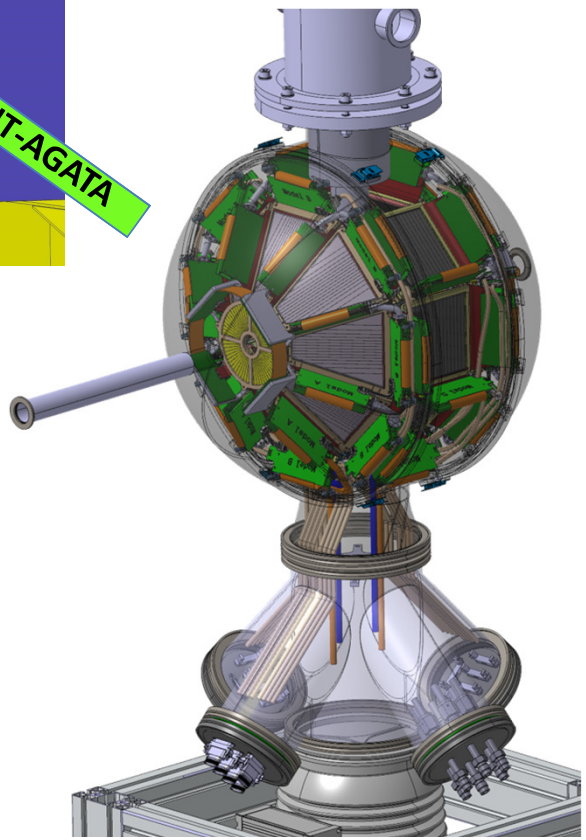
ELECTRONICS

- Large dynamical range
- PID using Pulse Shape Analysis techniques

New Integrated Digital electronics designed by IJCLab, LPC Caen, INFN

MECHANICS

- Integration into **AGATA** (**radius=23 cm**)
- transparency to gamma-rays
- high compacity
- Special targets : cryogenic, tritium, windowless



DETECTORS STATUS

TRAPEZOIDS

1st layer (500 µm, 128 N + 128 P strips): (micron designation: FF2)

14 serial pieces purchased but 3 pieces are still pending orders (for Orsay, INFN Milano and Valencia)

From the 11 pieces available:

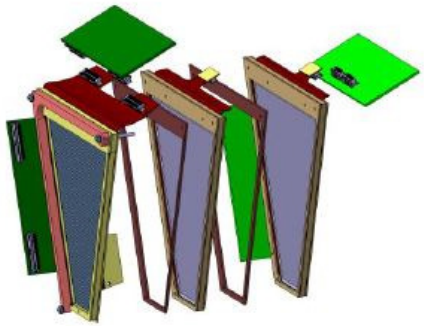
- 8 pieces tested and validated (7 by Orsay + 1 by Huelva)
- 3 pieces to be tested (@ Orsay)

2nd layer (1.5 mm, 16+16 strips): (micron designation: MMM4)

- 12 serial pieces purchased and received (LPC Caen) with packaging design modifications
- First test results encouraging, planned to be completed by end of June 2023

3rd layer (1.5 mm, 16+16 strips): (micron designation: MMM4)

- Same detector type as 2nd layer detector but nothing done so far for the packaging design - no purchase



SQUARES

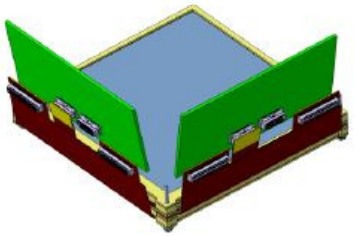
1st layer (500µm, 128 N + 128 P strips): (micron designation: TTT1)

- 4 pieces (1 prototype + 3 serial) purchased and received recently (INFN Padova) with packaging design modifications
- Tests planned in the June / July 2023

2nd layer (1.5mm, 16 N + 16 P strips): (micron designation: TTT16)

- Prototype ordering with packaging design modifications postponed due to administrative issues (INFN Padova)
- The packaging would be ready for shipment according to last news from Micron
- Tests start unclear (depending on the delivery date)

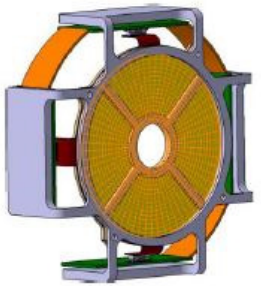
Proto just delivered



ANNULARS

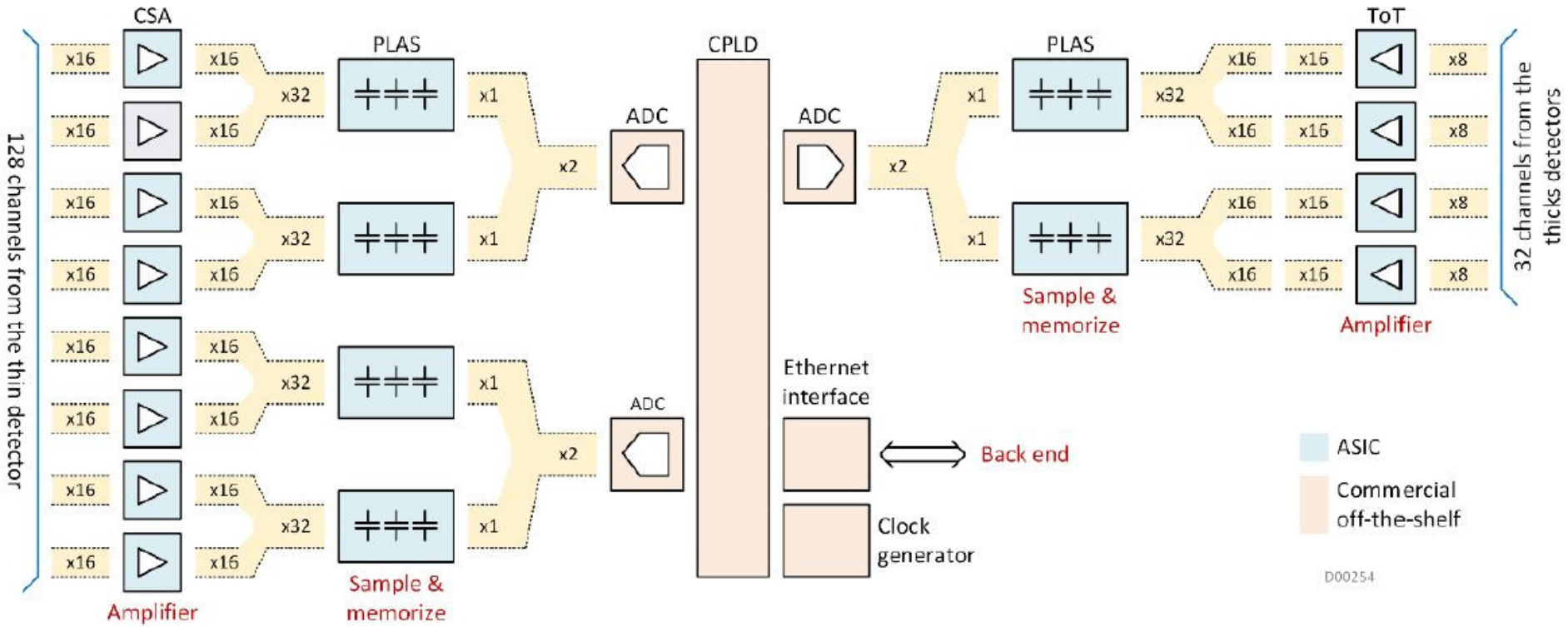
- First physics simulations results presented at the last collaboration technical status meeting (4th May 2023)
- Following meeting planned on 8th June 2023 with physicists, mechanicians and electronicians
- Goal: Finalize 1rst layer annular specifications by end of June

Design undergoing



From C.Soulet

GRIT Front-end Electronics



GRIT Electronics: external review

Report on electronics for the GRIT project.

10th-11th April 2024. Orsay IJCLAB

David Baudin (CEA/IRFU/SACLAY),

Ian Lazarus (STFC/DARESBURY),

E. Delagnes (CEA/IRFU/SACLAY)

b. Manpower and schedule

- For most of the elements, the team appears to be reasonably well sized (excepted for FEB and PLAs) and to possess the necessary skills.

Actions to reinforce the manpower

- PLAS : Ph.D position in electronics – financed (50%-50%) by Region Normandie & GANIL
- Front end Boards: Request for an engineer at Univ. of Padova/INFN

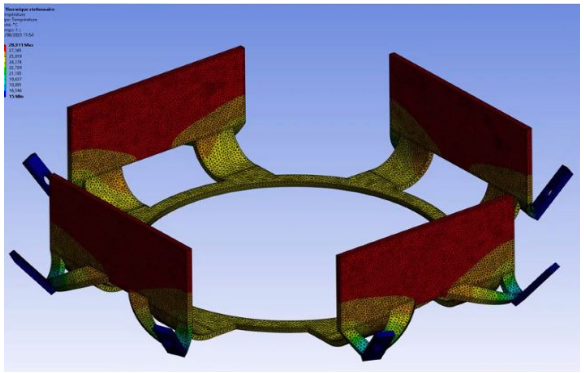
New workplan under elaboration

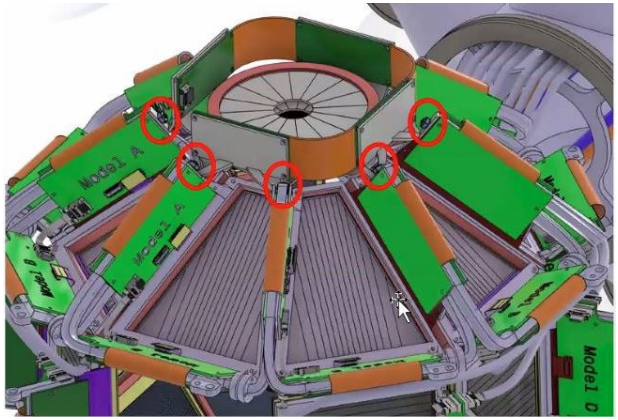
GRIT Mechanical studies in 2024

Y.Peinaud, P.Rosier IJCLab

- **Initial plan:**

  Mockup of
  - ✓ 4 trapezoid cooling blocks
  - ✓ 1 Annular



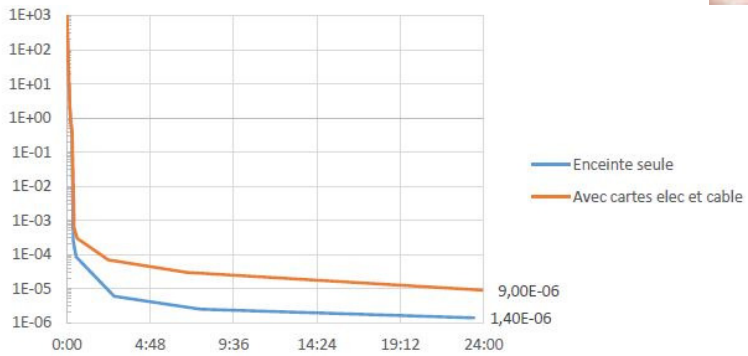


- **Problem of galvanic corrosion identified**

  2024 Budget for mecha. will be used to purchase stainless and titanium cooling blocks

  Simulations ongoing to test effect on g-ray absorption/scattering

- **Vacuum tests are ongoing at IJCLab**



Requests for 2025: Pumping system

AGATA at GANIL 2

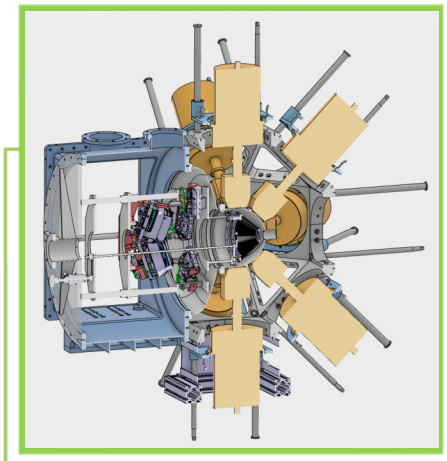
mercredi 22 mai 2024, 11:00 → 18:30 Europe/Paris

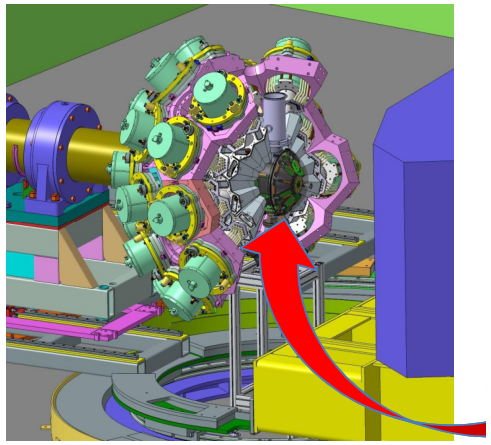
Maison d'Hotes (GANIL)

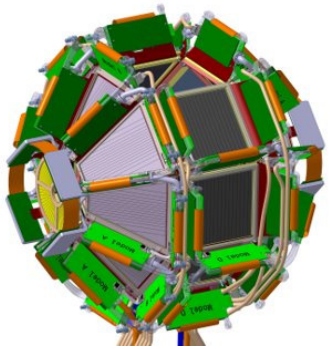
11:00	1 - Introduction	*Emmanuel CLEMENT*
	3 - SPIRAL1 Beam R&D *Maison d'Hotes, GANIL*	*Pierre Chauveau* 11:20 - 12:05
12:00	2 - GANIL Management *Maison d'Hotes, GANIL*	*Direction GANIL* 12:05 - 12:45
	Lunch *Maison d'Hotes, GANIL*	12:45 - 13:30
13:00	16 - Spectroscopy of unbound states in light nuclei	*Dr Gheorghe STEFAN*
	5 - Coulomb excitation of 44Ti and 62Zn - a need for the beam development at GANIL	*Dr Kasia Hadynska-Klek*
14:00	13 - Spectroscopy of proton-rich nuclei using charge-exchange reactions with a 3He target	*Beatriz Fernandez Dominguez*
	6 - Attacking the quasi-continuum with AGATA: Study of super-deformed and hyper-deformed nuclei	*Amel KORICHI*
	9 - Study of neutron-proton pairing in fp-shell through two-nucleon addition reactions (3He,p)	*Marlene Assie*
15:00	7 - Probing mixed-spin np pairing in the super-collective Z~60 and A~130 region	*Dr Jérémie Dudouet*
	8 - Can AGATA extract an average lifetime of multiple states?	*Dr Shuya Ota*
	Break	
16:00	10 - Clustering in medium-mass proton-rich nuclei studied through Li-induced stripping reactions	*Didier Beaumel*
	11 - Studying X-ray Bursts with the AGATA-GRIT-VAMOS Setup	*Gavin Lotay*
	17 - Study of the Heavy Fragment survival in Multi Nucleon Tranfer reaction	*Dr Gheorghe STEFAN*
17:00	4 - Lifetime measurements of excited states in 24Ne populated by direct nucleon transfer	*Emmanuel CLEMENT*
	15 - Spectroscopic prospects of 19Ne above the alpha-particle threshold	*François de Oliveira*
	14 - Conclusion	*Emmanuel CLEMENT*

bid to host AGATA in 2028-2030 (3 years) was sent by GANIL direction to AGATA SC chair

MUGAST / GRIT – Timelines







MUGAST-AGATA-VAMOS @GANIL

MUGAST-EXOGAM-LISE @GANIL

GRIT Phase0 AGATA-VAMOS @GANIL ?

GRIT AGATA zero deg @SPES ?

2019-2021 | **2023-2026** | **2028-2030** | **2031 -**

Today

GRIT MoU renewal

Memorandum of Understanding
For the GRIT array
Granularity, Resolution, Identification, Transparency
2020 - 2024

Preamble

The GRIT international collaboration is aiming to build and operate a new detector, GRIT, conceived for optimal study of reactions using low and intermediate energy radioactive ion beams. The device consists in a new type of compact, highly segmented Silicon array, optimized for integration in gamma detector arrays such as AGATA, EXOGAM2, GALILEO, and PARIS. It is also meant to offer state-of-the art particle identification for improved reaction channel separation hence physical background reduction. Native integration of special targets such as the Orsay Helium cryogenic target or the pure and windowless hydrogen target production system CHYMENE is also

- New collaboration structure
- New workplan under elaboration

GRIT Budget request 2025

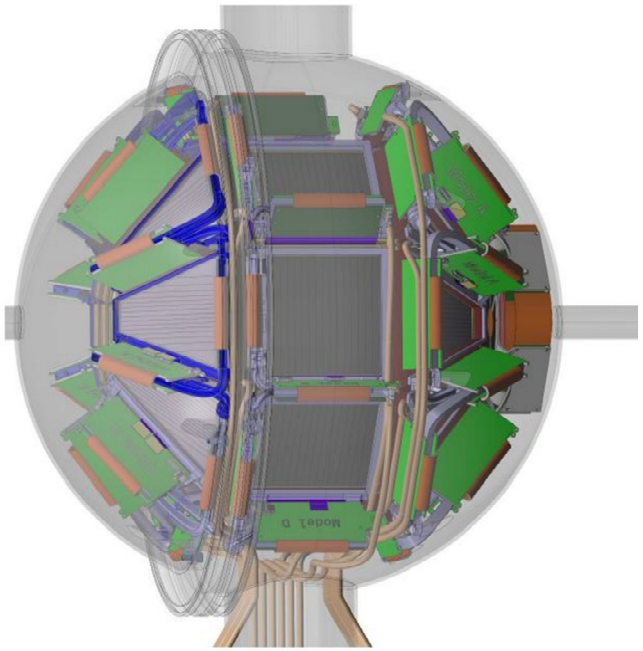
MECHANICS **15k€**

- Pumping system

Electronics&Mechanics **3k€**

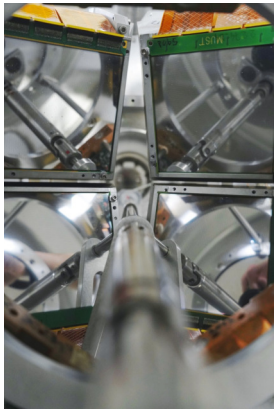
- Small items

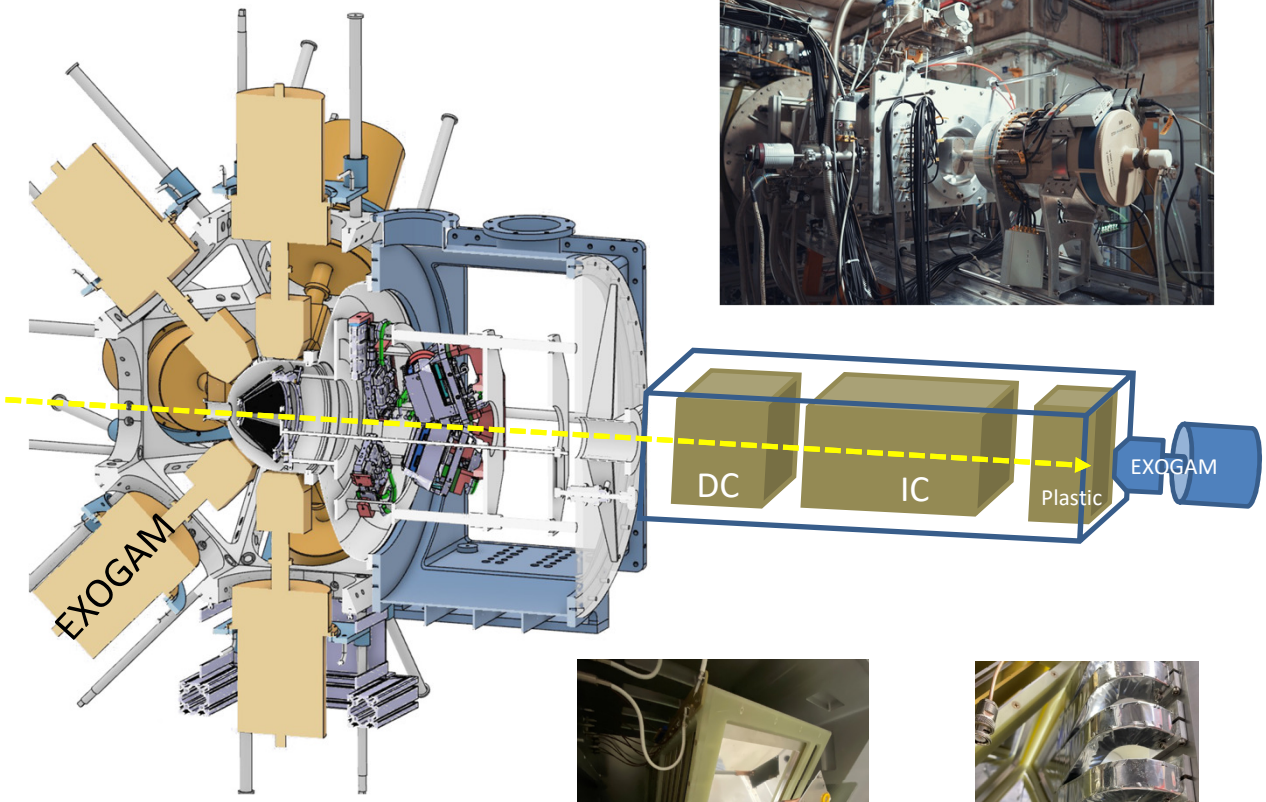
TOTAL EQUIPEMENT : 18k€



Missions (meetings LPC-IJCLab, Sejour a LNL, conference) : 5k€

2023: start of MUGAST-EXOGAM@LISE





- 5 trapezoidal DSSD (backward)
- 4 MUST2 telescopes (forward)
- 12 EXOGAM Ge det. @14cm
  8% effic. after add-back
- 0º Detection: ZDD from LISE
- Solid Target

Campaign coordinator: Valerian Girard-Alcindor