



CAMIL

The GANIL scientific campaign

Caterina Ciampi

26th AGATA Week and ACC meeting

Warsaw, 7-11 September 2026

Outline

Part 1: Towards a new AGATA campaign at GANIL: building the physics case

- Highlights from the first AGATA campaign in GANIL
- Inputs from the scientific community: Lols for the next campaign
- The VAMOS-GRIT-AGATA campaign

Part 2: The experimental resources at GANIL

- Beams: Status and developments of SPIRAL1
- Targets: Development of the ATRACT cryogenic target
- The VAMOS-GRIT-AGATA setup

Timeline and Conclusions

- Host Laboratory Agreement
- Proposed timeline

Towards a new AGATA campaign at GANIL: building the physics case

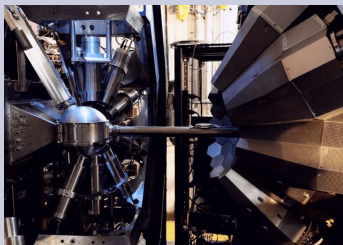
Part 1

First AGATA campaign at GANIL (2015-2021)

First campaign AGATA@GANIL ⇨ Various sub-campaigns employing different sets of detectors

2015 - 2017

AGATA +
VAMOS, FATIMA, PARIS



MNT and fission reactions
*Spectroscopy of neutron rich
exotic nuclei*

2018

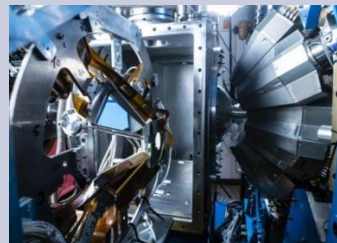
AGATA +
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2019 - 2021

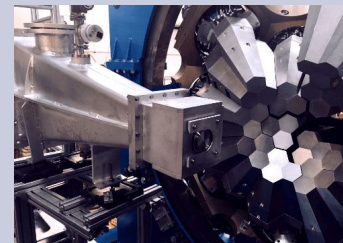
AGATA +
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Transfer reactions w/ RIB
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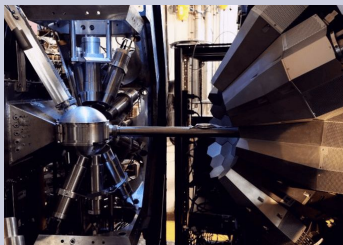
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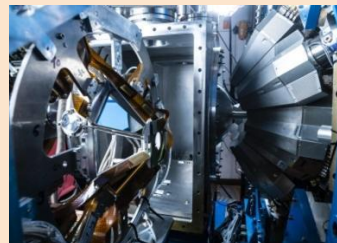
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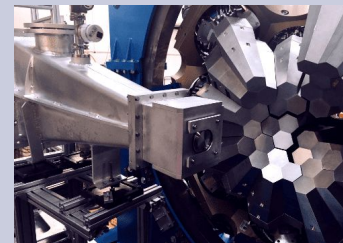
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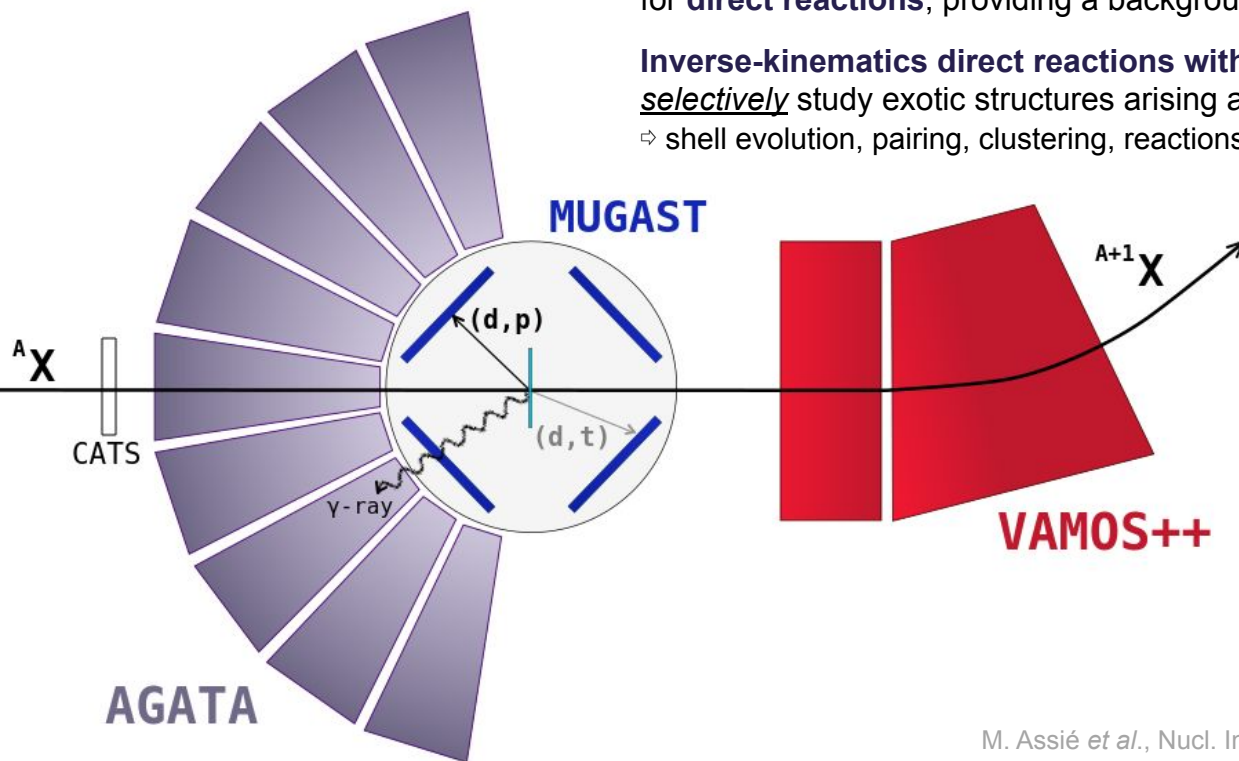
AGATA@GANIL 1 (2015-2021)

The MUGAST-AGATA-VAMOS campaign

MUGAST-AGATA-VAMOS combination $\Rightarrow$ extremely complete and versatile setup for **direct reactions**, providing a background-free, high-resolution performance.

Inverse-kinematics direct reactions with RIBs from SPIRAL1 allowed to selectively study exotic structures arising away from stability.

$\Rightarrow$ shell evolution, pairing, clustering, reactions of interest for nuclear astrophysics...



VAMOS++: (0° configuration)
detection of heavy beam-like recoil.
 $\Rightarrow$ rejection of parasitic reactions

MUGAST:
identification, energy, angle meas. of the light ejectile of the reaction.
 $\Rightarrow E_x$ reconstruction, β_{recoil} for Doppler correction via 2-body kinematics

AGATA:
high-resolution γ -ray spectroscopy, with tracking algorithms, high efficiency.
 $\Rightarrow$ high resolving power, $E_x - E_{\gamma'}$, corr.

Highlights from MUGAST-AGATA-VAMOS

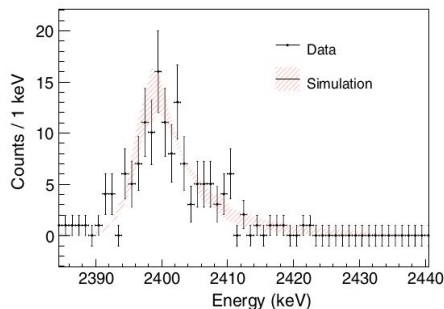
Testing 3N interactions via lifetime measurements in ^{20}O

Lifetime measurement of 2^+_2 and 3^+_1 states as a sensitive probe of the 3N-force contribution in *ab-initio* models.

 $^{19}\text{O}(d,p)^{20}\text{O}$ at 8 AMeV (SPIRAL1 beam on CD_2+Au)

- ♦ VAMOS @0° ⇨ beam-like recoil detection
- ♦ MUGAST ⇨ bw-emitted proton detection ⇨ E_x
- ♦ AGATA ⇨ high-res. γ -ray spectroscopy of ^{20}O

The entry point constrained and initial velocity distrib. for each state measured
 ⇨ **Improved lifetime meas.** in the fs scale via DSAM challenges the performance of *ab-initio* models.

I. Zanon *et al.*, Phys. Rev. Lett. **131**, 262501 (2023)

p-n cross-shell interactions at N=28 with $^{47}\text{K}(d,p)^{48}\text{K}$

Single-neutron transfer on ^{47}K exploits its unusual gs configuration to probe πsd - νfp cross-shell interactions, key to describe nuclear structure around N=28.

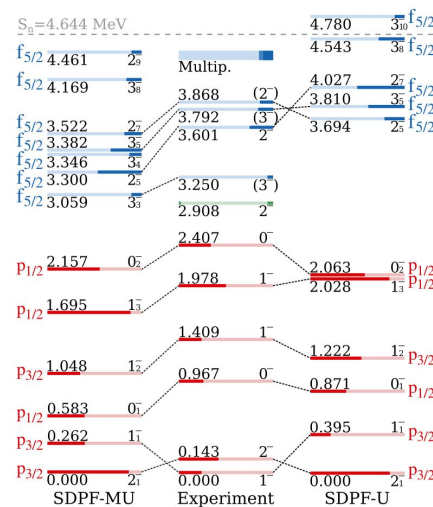
$^{47}\text{K}(d,p)^{48}\text{K}$ at 7.7 A MeV
(SPIRAL1 beam on CD_2)

Particle- γ coincidence crucial to resolve doublets.

Nine new bound states
identified and spectroscopic
factors deduced.

Small spectr. factors point to p
conf. mixing affecting n transf.
Models fail to reproduce 1^- q.s.

New benchmark for $\pi s_{1/2}-\nu$ fp
interaction in theoretical models.

C. J. Paxman *et al.*, Phys. Rev. Lett. **134**, 162504 (2025)

Towards a new AGATA campaign at GANIL



AGATA at GANIL 2

 Wednesday May 22, 2024, 11:00 AM → 6:30 PM Europe/Paris

 Maison d'Hotes (GANIL)

Description The goal of this one day meeting organized at GANIL (GuestHouse) is to construct the physics case of the second AGATA campaign at GANIL by the end of the present decade.

The participants are invited to post during their registration Letters of Intents for the use of AGATA phase 2 at GANIL, which will be used to define the physics objectives and framework of this second campaign.

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GRIT AGATA VAMOS 2029-2030 Campaign

 Jun 11, 2025, 2:00 PM → Jun 13, 2025, 12:30 PM Europe/Paris

 GuestHouse (GANIL)

Description

The AGATA European Tracking array will be hosted at the GANIL Facility in 2029 and 2030 with a possible extension in 2031. The primary objective is an experimental campaign using a 2 π AGATA coupled to GRIT, a 4 π silicon array for light charged particle spectroscopy, and the high acceptance VAMOS magnetic spectrometer.

The present meeting aims at defining more precisely the physics objectives with the goal of editing a white book to prepare the campaign. The workshop will also include technical aspects with discussion on the detection systems geometries, constraints, front end electronic and softwares. The management of the campaign will be also introduced.

The campaign will benefit of the existing SPIRAL1 beams but development of new beams will be encouraged.



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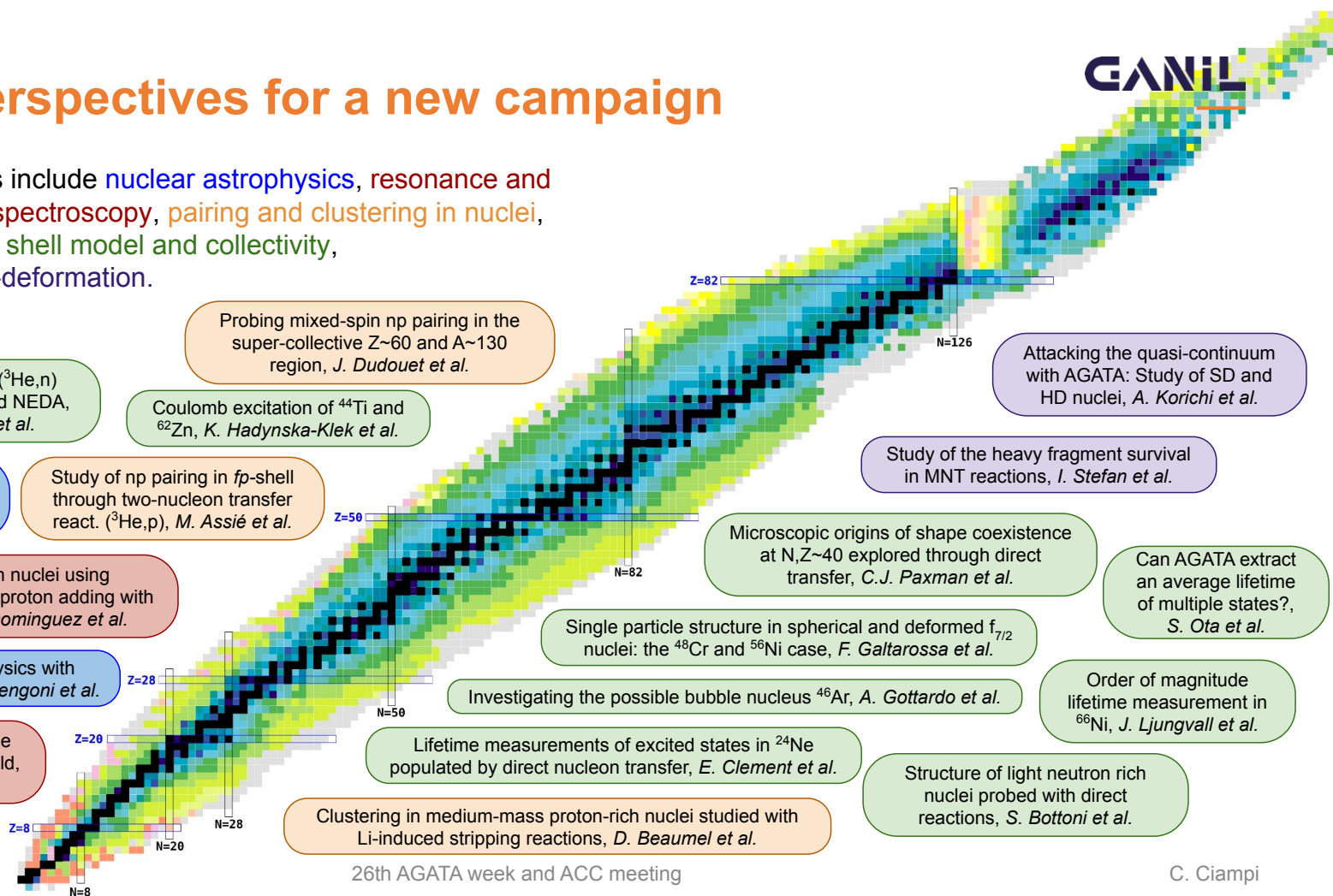
The campaign will benefit of the existing SPIRAL1 beams but development of new beams will be encouraged.

- Exploit high-quality beams available at GANIL: RIBs from SPIRAL1 and high-intensity stable beams from CSS complex
- Exploit state-of-the-art existing instrumentation, such as the VAMOS++ spectrometer
- Collaborate with groups working on particle detectors (MUGAST/GRIT) and active and cryogenic targets (ATRACT)

... for a large number of proposed topics.

Some perspectives for a new campaign

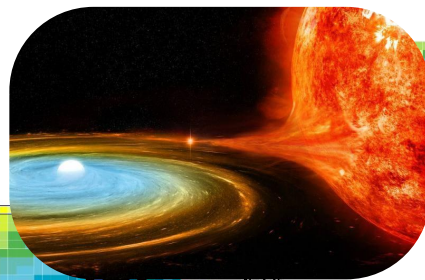
Proposed topics include nuclear astrophysics, resonance and near-threshold spectroscopy, pairing and clustering in nuclei, ab-initio testing, shell model and collectivity, SHE and hyper-deformation.



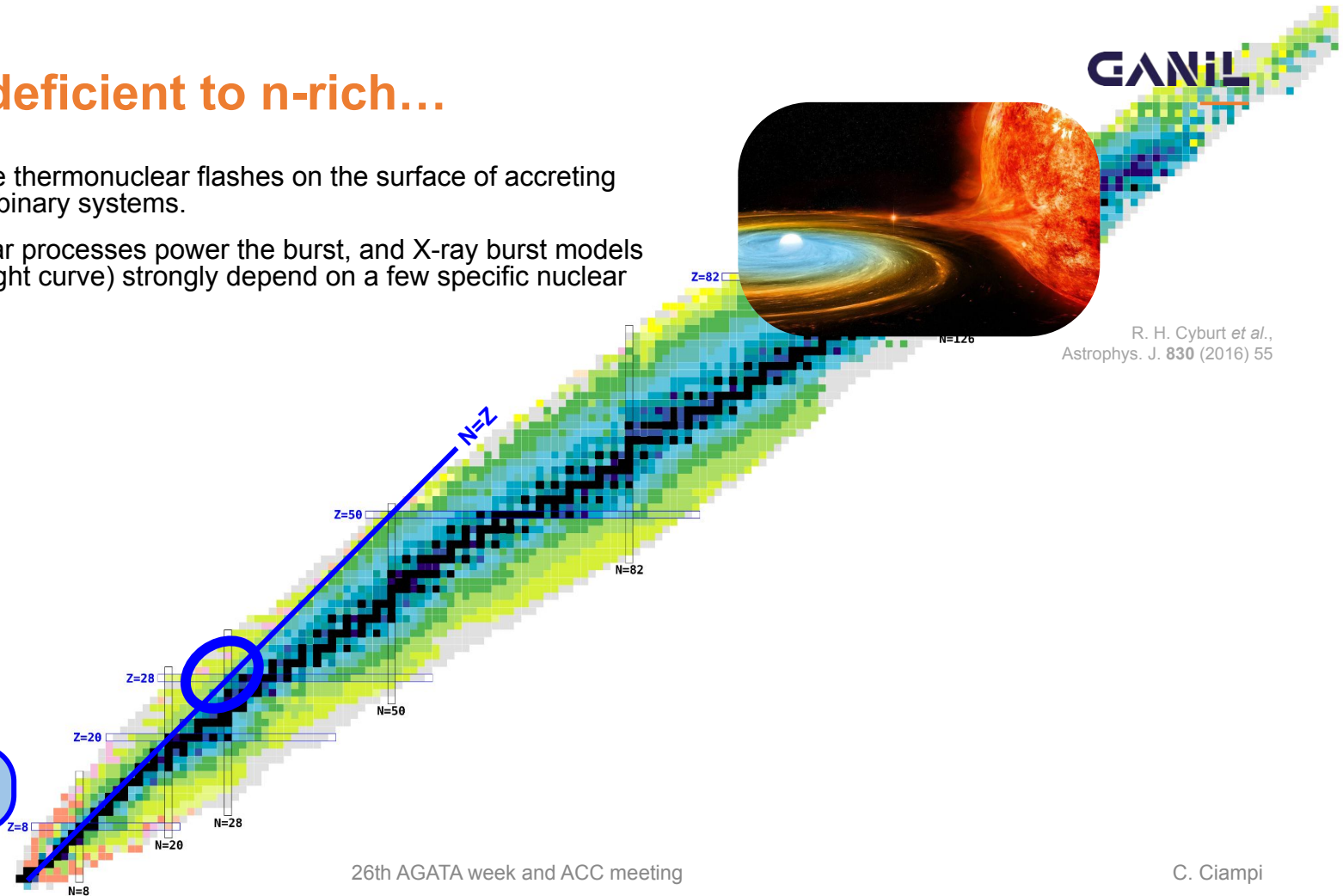
From n-deficient to n-rich...

X-ray bursts are thermonuclear flashes on the surface of accreting neutron stars in binary systems.

Two main nuclear processes power the burst, and X-ray burst models (predicting the light curve) strongly depend on a few specific nuclear reaction rates:



R. H. Cyburt *et al.*,
Astrophys. J. 830 (2016) 55



Studying X-ray bursts with
the AGATA-GRIT-VAMOS
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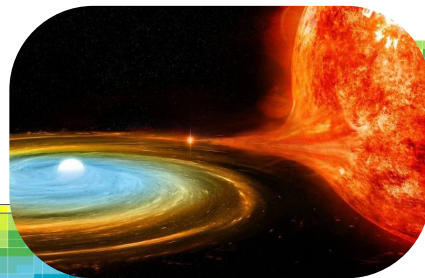
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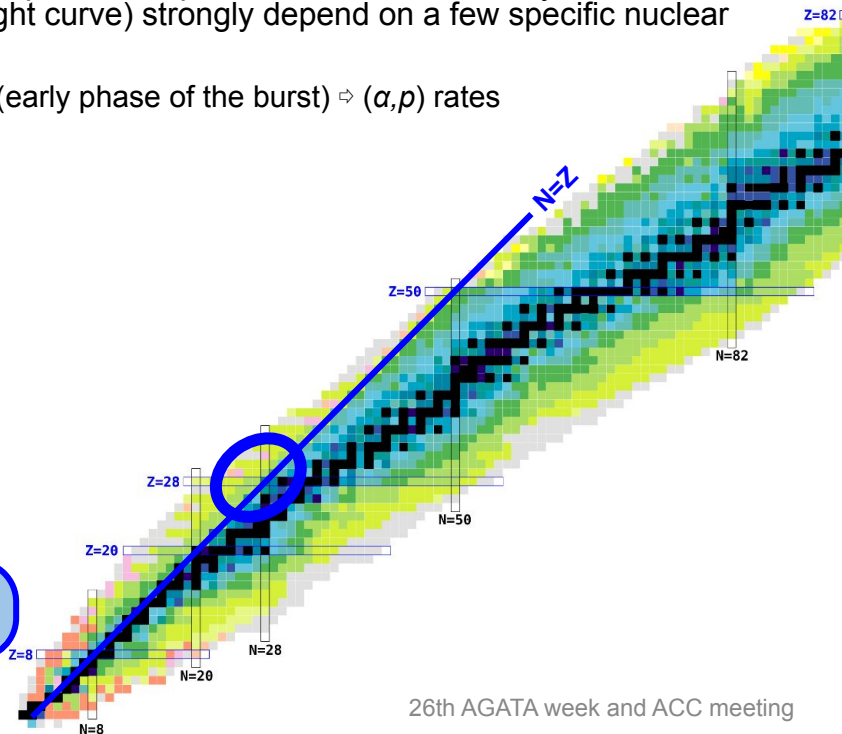
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- αp -process (early phase of the burst) $\Rightarrow (\alpha, p)$ rates

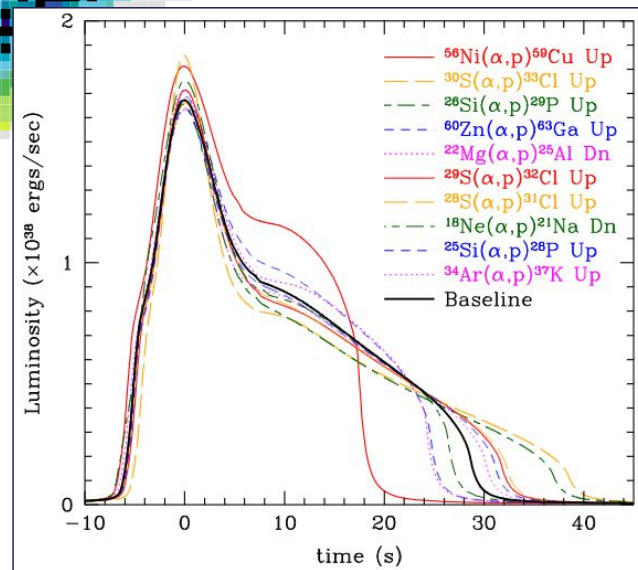
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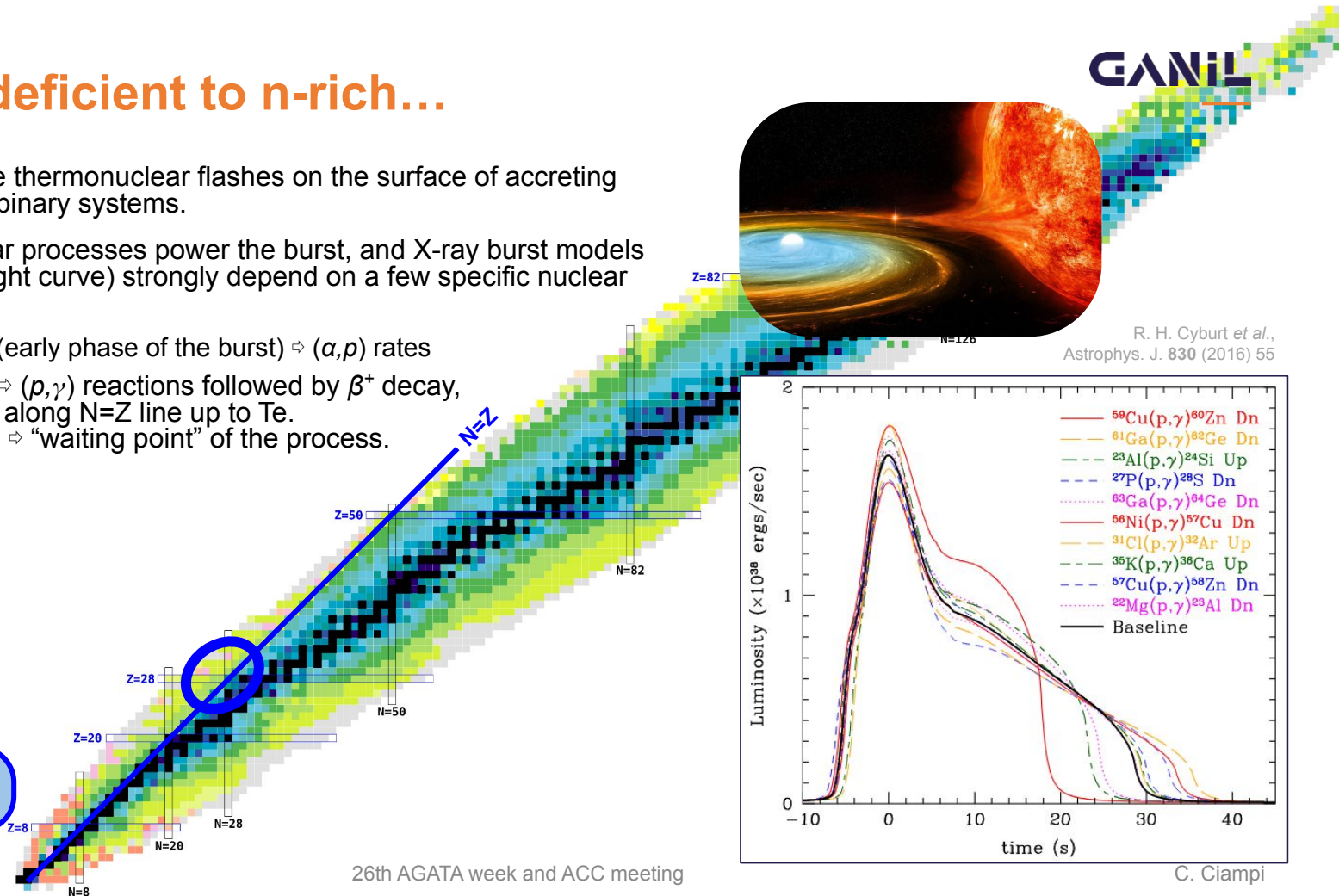
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- *ap*-process (early phase of the burst) $\Rightarrow$ (α, p) rates
- *rp*-process $\Rightarrow$ (p, γ) reactions followed by β^+ decay, proceeding along $N=Z$ line up to Te.
Ni-Cu cycle $\Rightarrow$ “waiting point” of the process.

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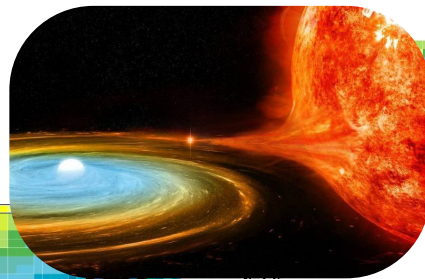
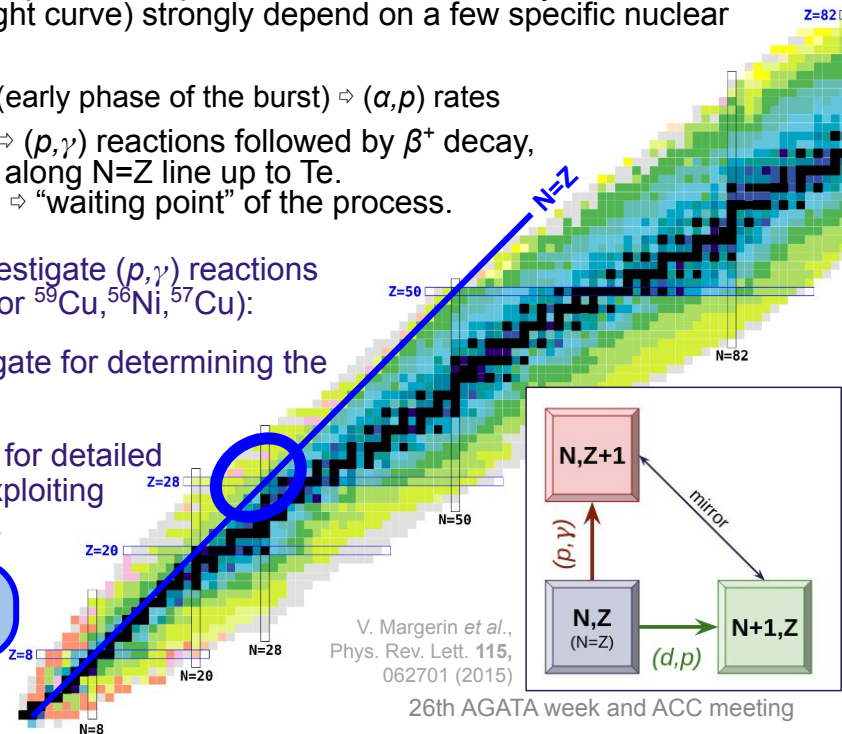
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Strategies to investigate (p, γ) reactions of interest (e.g. for ^{59}Cu , ^{56}Ni , ^{57}Cu):

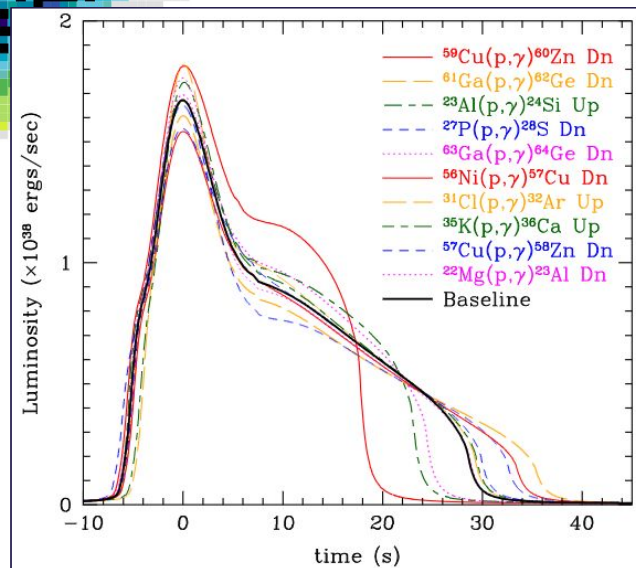
$\Rightarrow$ $(^3\text{He}, d\gamma)$ surrogate for determining the reaction rate

$\Rightarrow$ (d, p) reactions for detailed spectroscopy, exploiting mirror symmetry.

Studying X-ray bursts with the AGATA-GRIT-VAMOS setup, G. Lotay *et al.*



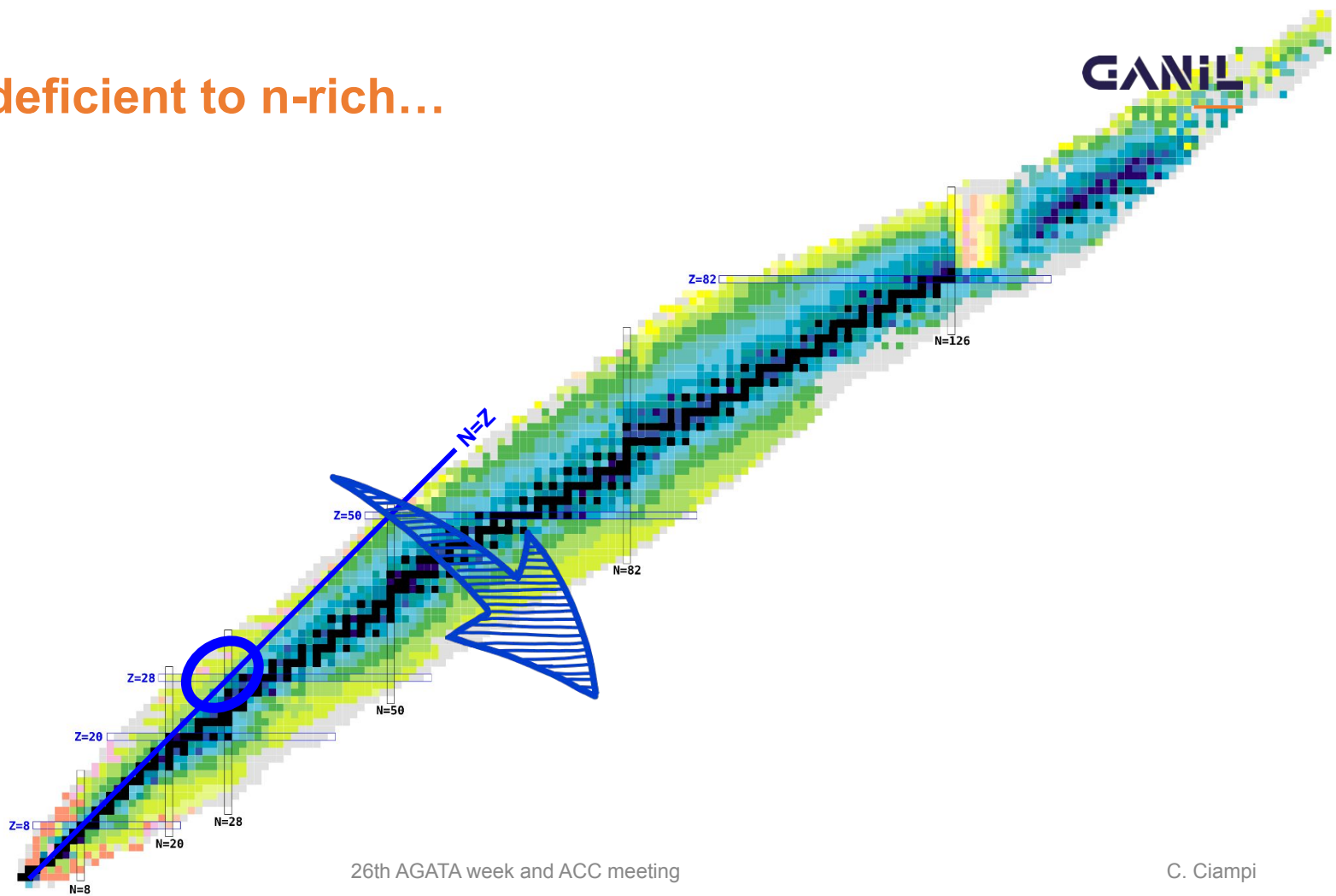
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C. Ciampi

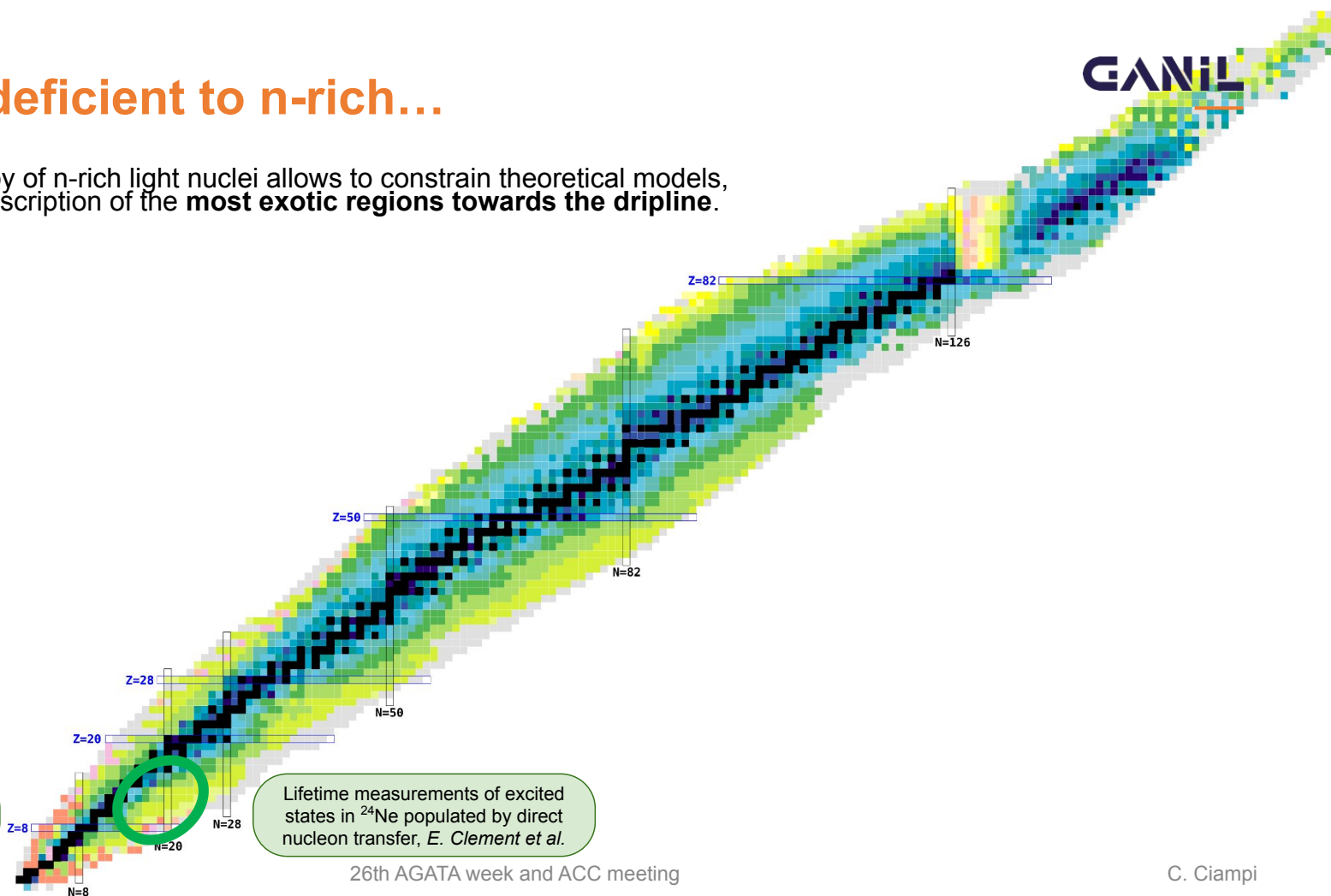
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GANIL



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The spectroscopy of n-rich light nuclei allows to constrain theoretical models, impacting the description of the **most exotic regions towards the dripline**.

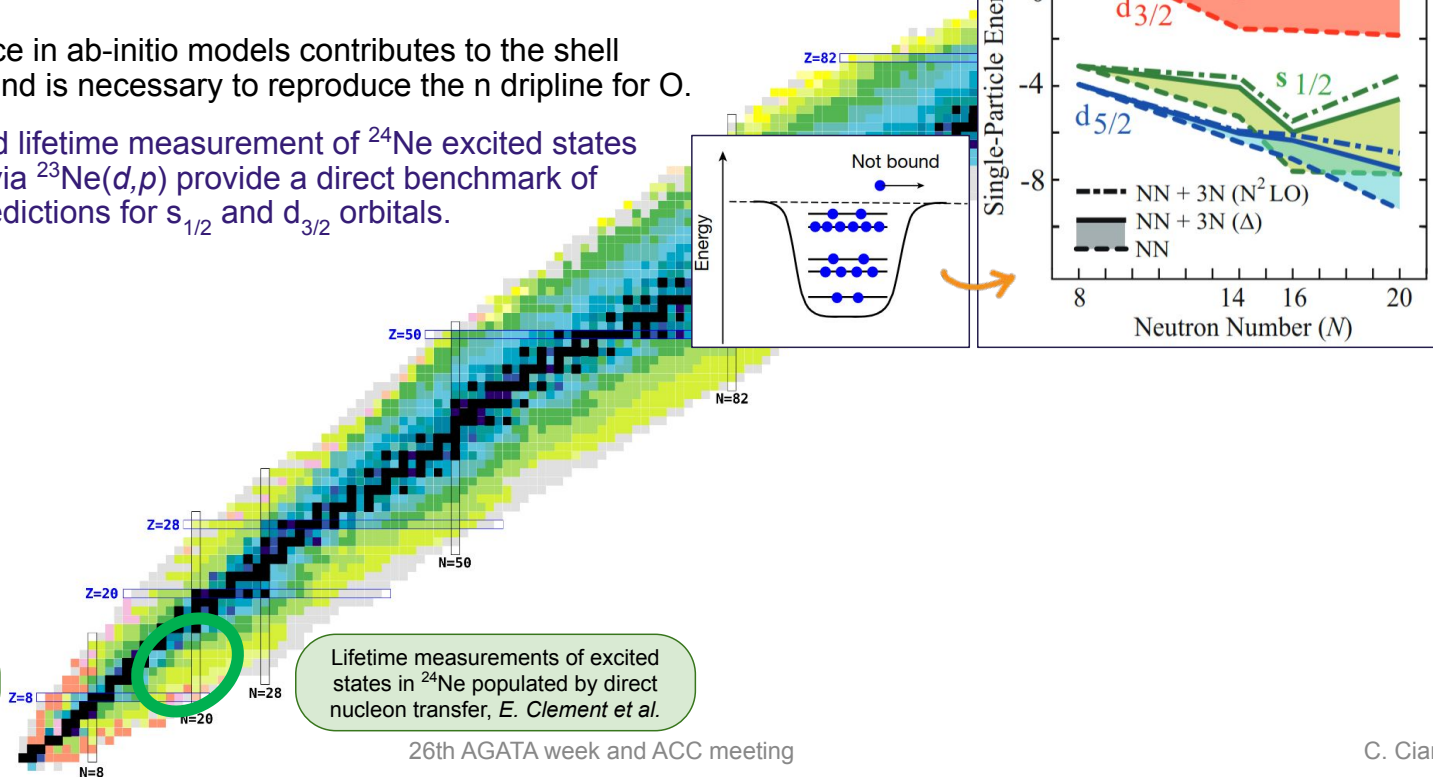


From n-deficient to n-rich...

The spectroscopy of n-rich light nuclei allows to constrain theoretical models, impacting the description of the **most exotic regions towards the dripline**.

- The 3N-force in ab-initio models contributes to the shell evolution, and is necessary to reproduce the n dripline for O.

⇒ Controlled lifetime measurement of ^{24}Ne excited states populated via $^{23}\text{Ne}(d,p)$ provide a direct benchmark of ab initio predictions for $s_{1/2}$ and $d_{3/2}$ orbitals.



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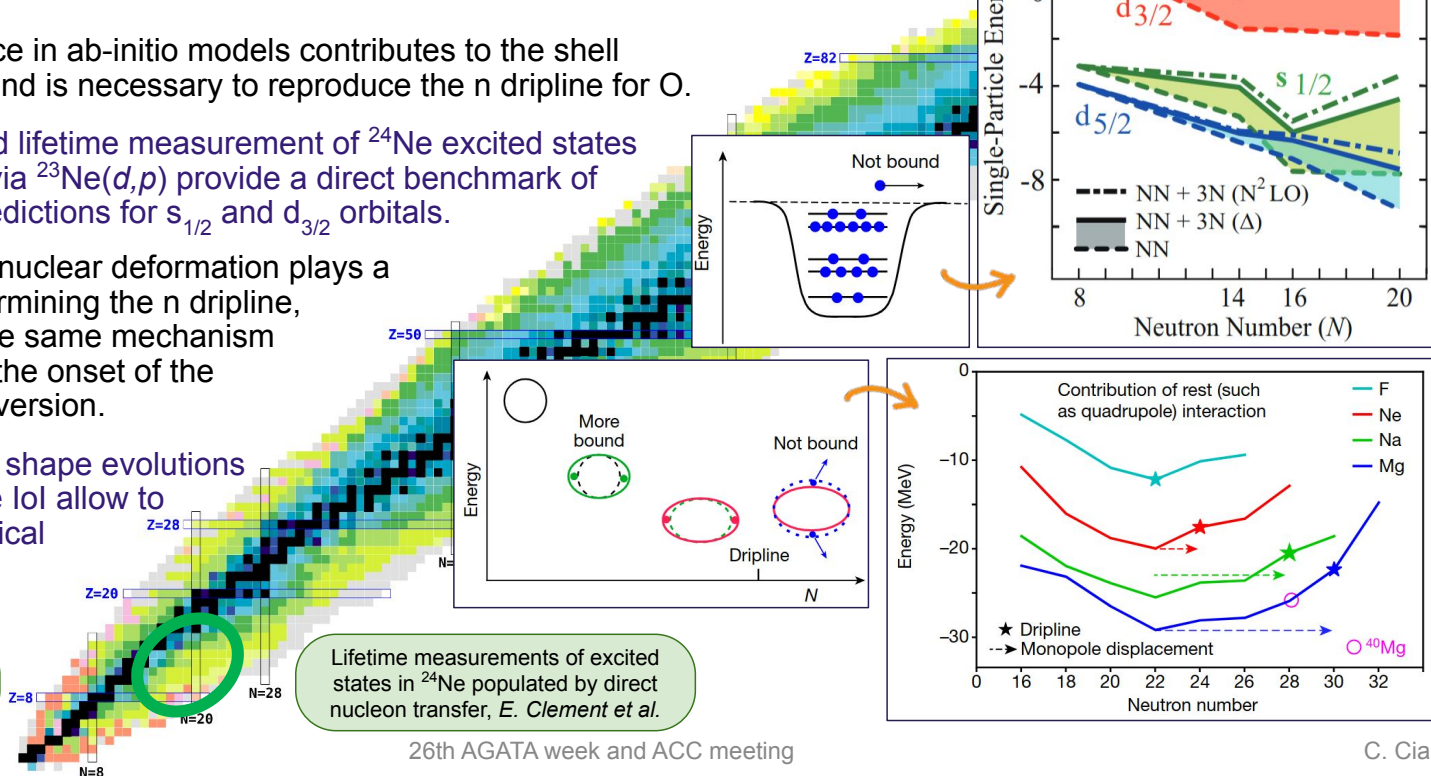
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- Beyond O, nuclear deformation plays a role in determining the n dripline, rooted in the same mechanism that drives the onset of the Island of Inversion.

⇨ Shell and shape evolutions towards the Iol allow to test theoretical models.

Structure of light neutron rich nuclei probed with direct reactions, *S. Bottoni et al.*

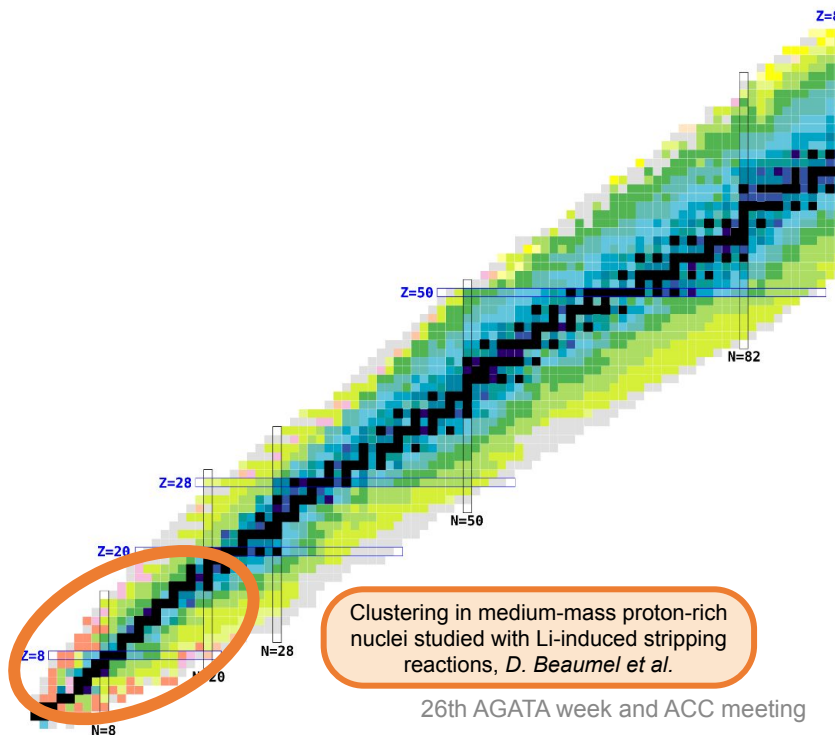
Lifetime measurements of excited states in ^{24}Ne populated by direct nucleon transfer, *E. Clement et al.*



... And from light to heavier nuclei

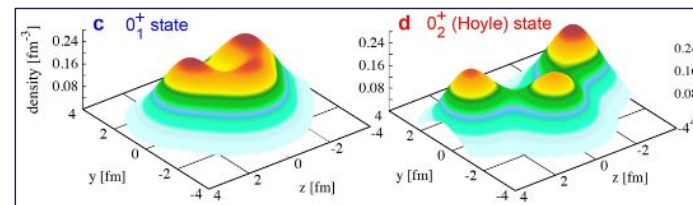
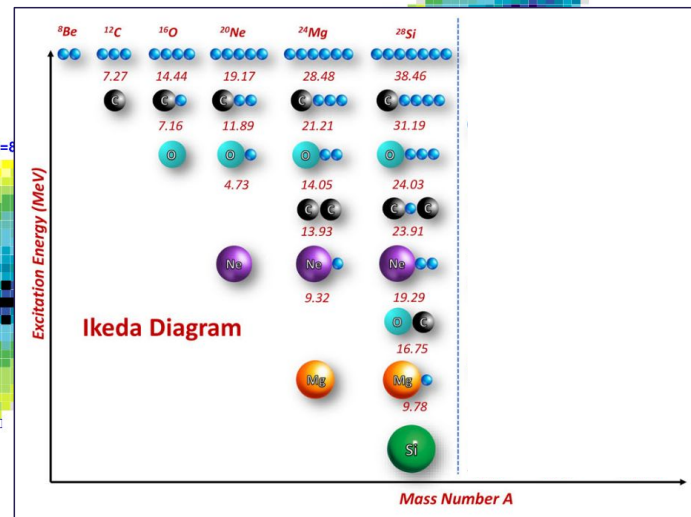
Clustering phenomena arise as an effect of correlations among nucleons.

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Clustering in medium-mass proton-rich nuclei studied with Li-induced stripping reactions, *D. Beaumel et al.*

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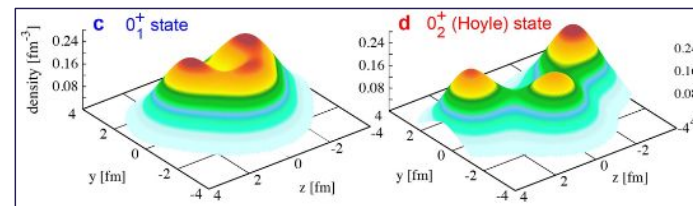
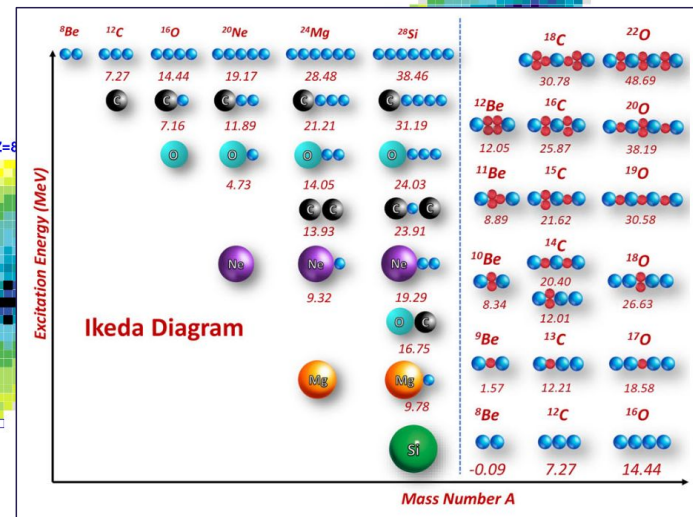
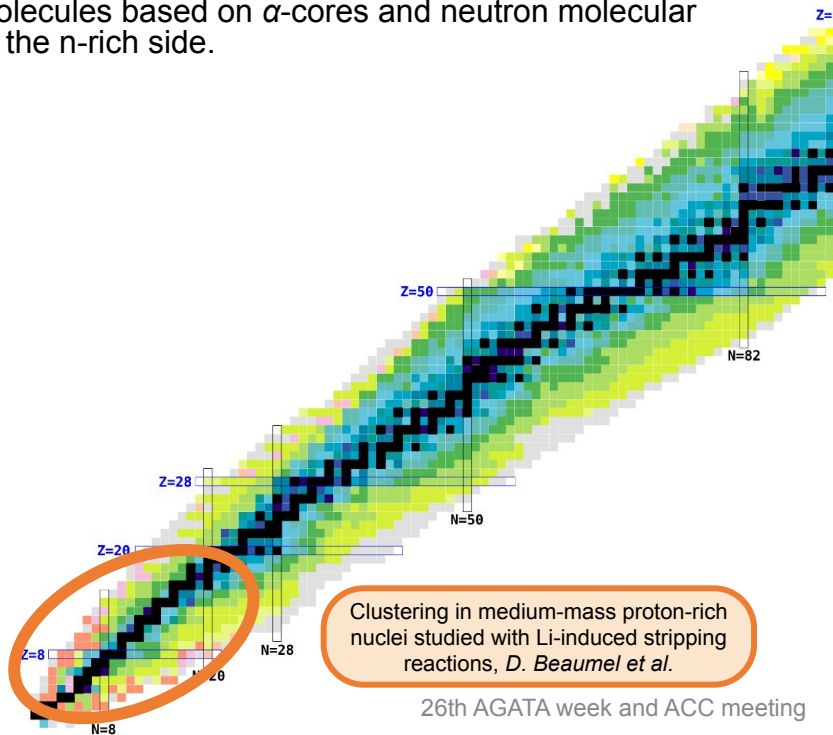


T. Otsuka *et al.*, Nature Comm. 13 (2022) 2234

... And from light to heavier nuclei

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- Nuclear molecules based on α -cores and neutron molecular orbitals on the n-rich side.



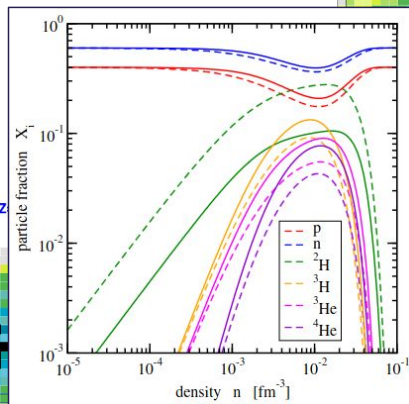
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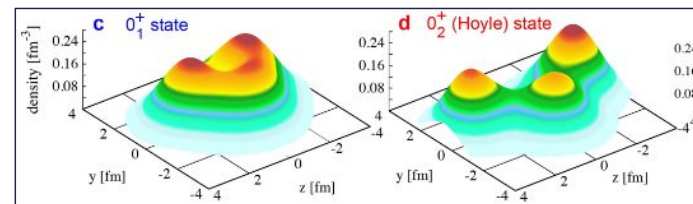
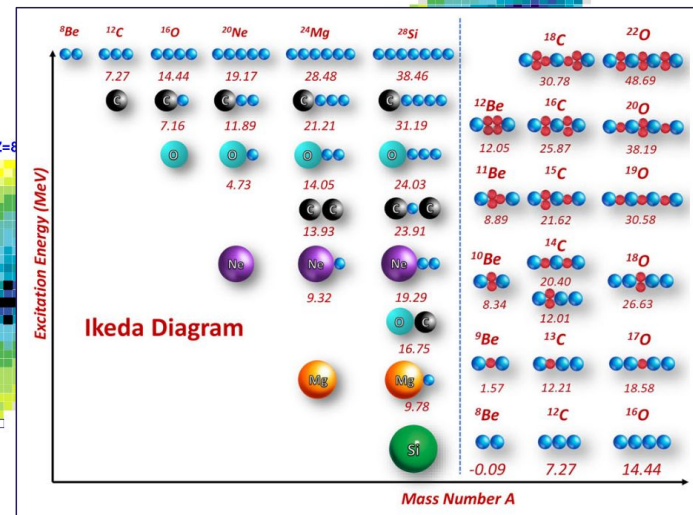
- α -clustering structures are well established (Ikeda conjecture).
- Nuclear molecules based on α -cores and neutron molecular orbitals on the n-rich side.
- *Exotic clustering*: away from $N=Z$, introduce clusters more weakly bound than α , such as t (n-rich side) and ${}^3\text{He}$ (n-deficient side).
 - ⇒ recent experiment on LISE points towards ${}^3\text{He}$ clustering in $N=2$ isotones
 - ⇒ t clustering indication in Be via QFS at RIKEN; new exp. on (p, α) at LISE.

Search for ${}^3\text{He}/t$ clustering states, also in heavy nuclei, via inelastic scattering and transfer reactions (p, α) , $({}^6\text{Li}, {}^3\text{He})$, $({}^6\text{Li}, t)$.



S. Typel *et al.*, J. Phys. Conf. Ser. 420 (2013) 012078

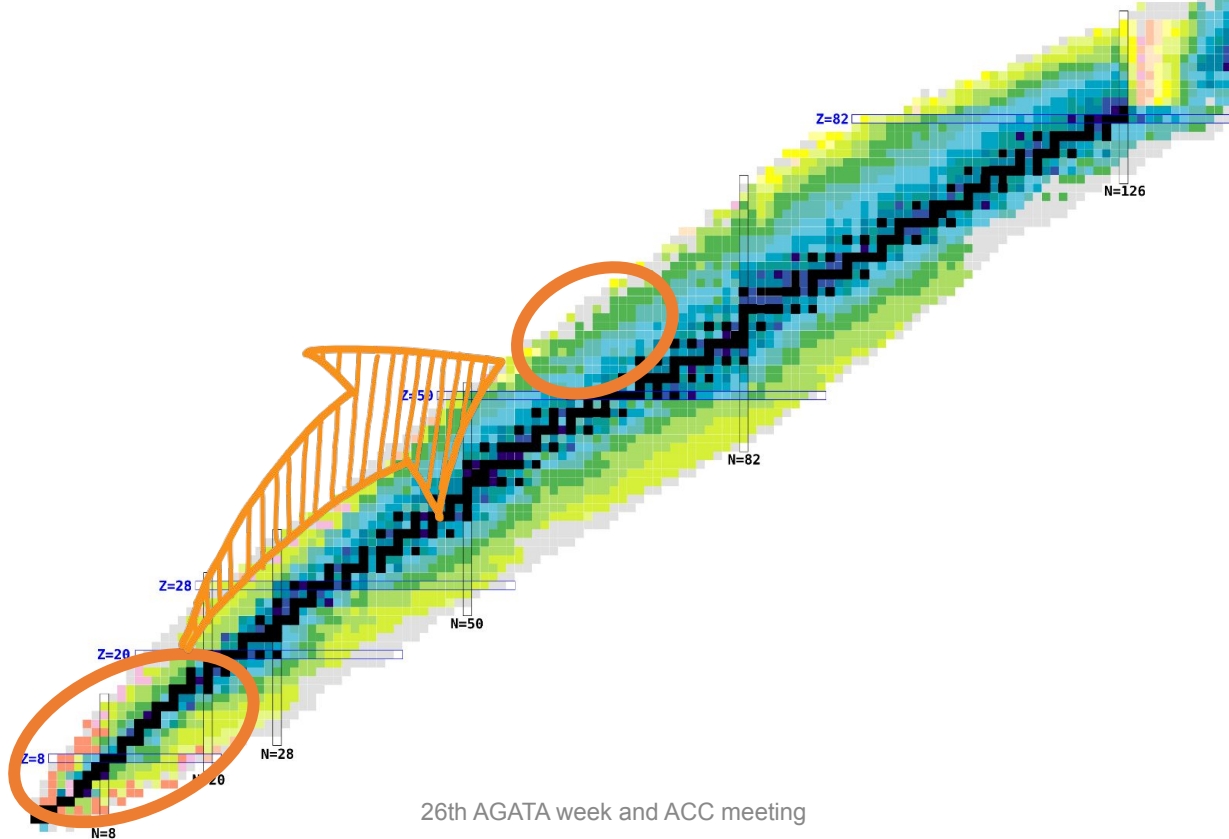
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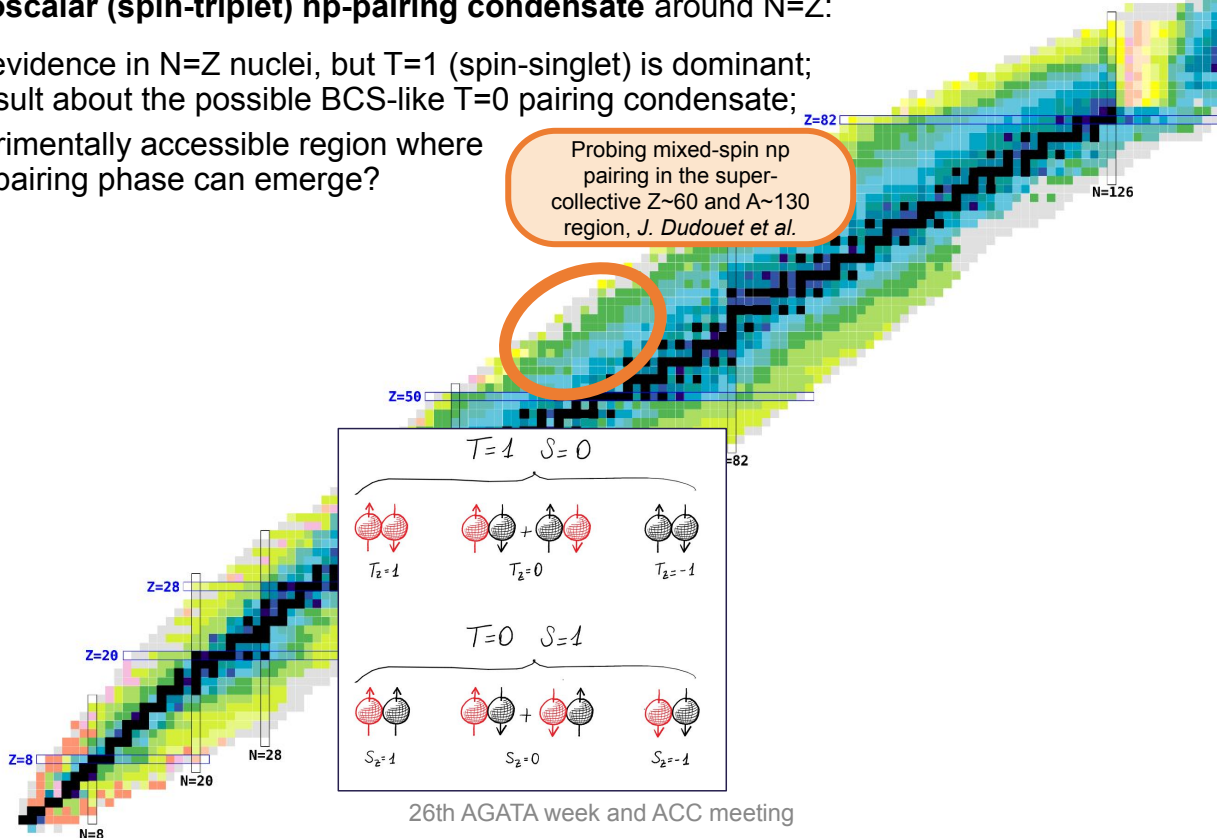
... And from light to heavier nuclei

Quest for the **isoscalar (spin-triplet) np-pairing condensate** around $N=Z$:

- np-pairing evidence in $N=Z$ nuclei, but $T=1$ (spin-singlet) is dominant;
- No clear result about the possible BCS-like $T=0$ pairing condensate;

Is there an experimentally accessible region where a spin-triplet np pairing phase can emerge?

Probing mixed-spin np pairing in the super-collective $Z \sim 60$ and $A \sim 130$ region, *J. Dudouet et al.*



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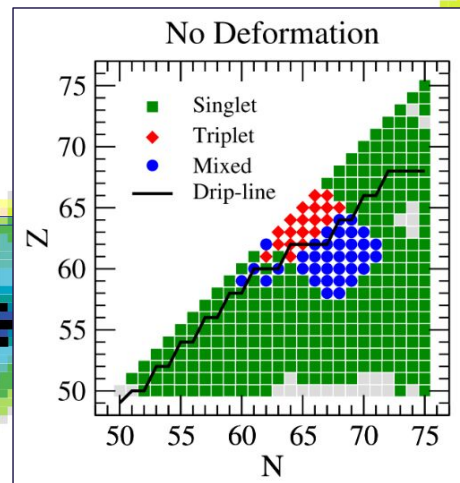
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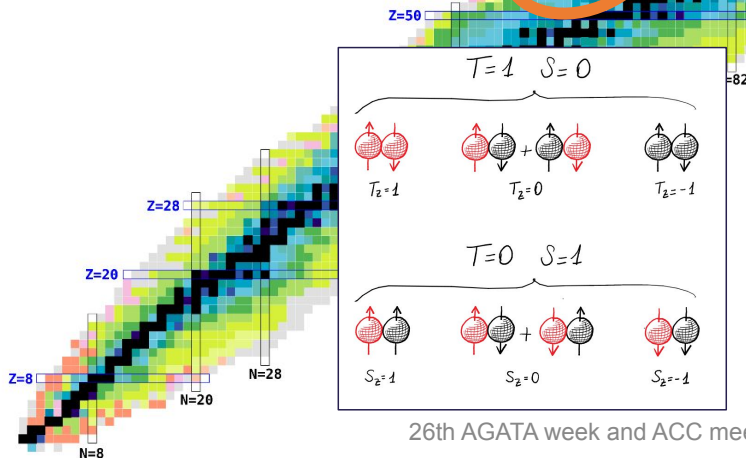
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G. Palkanoglou et al.,
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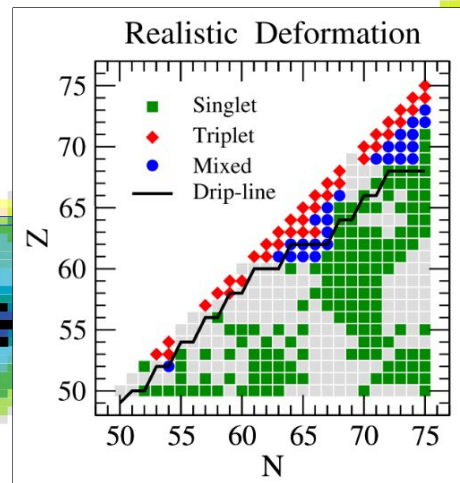
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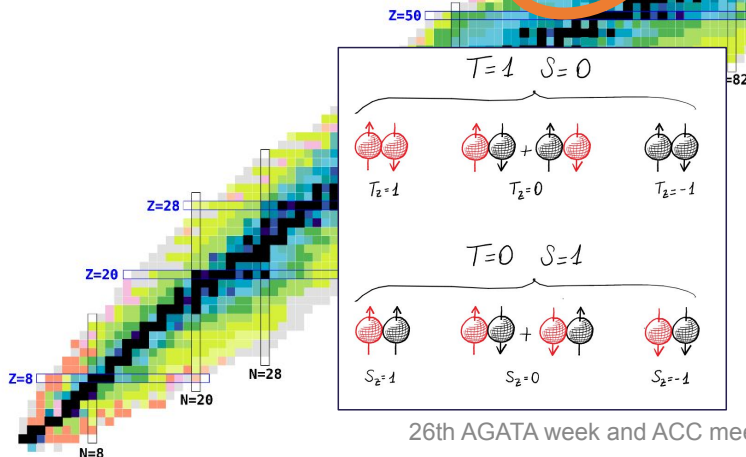
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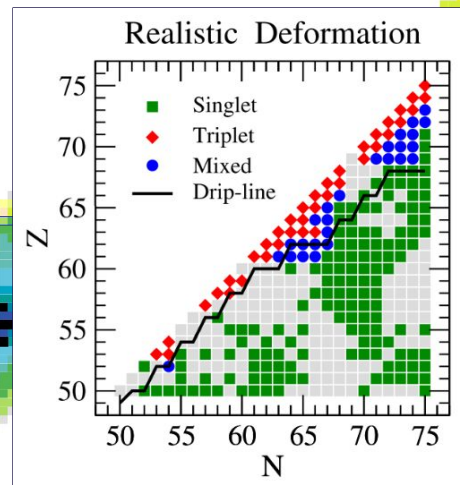
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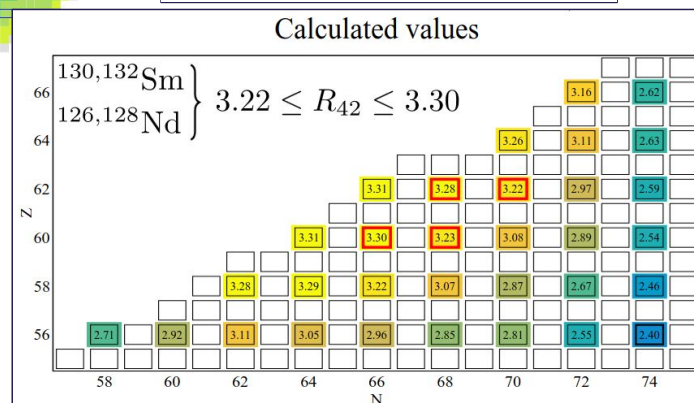
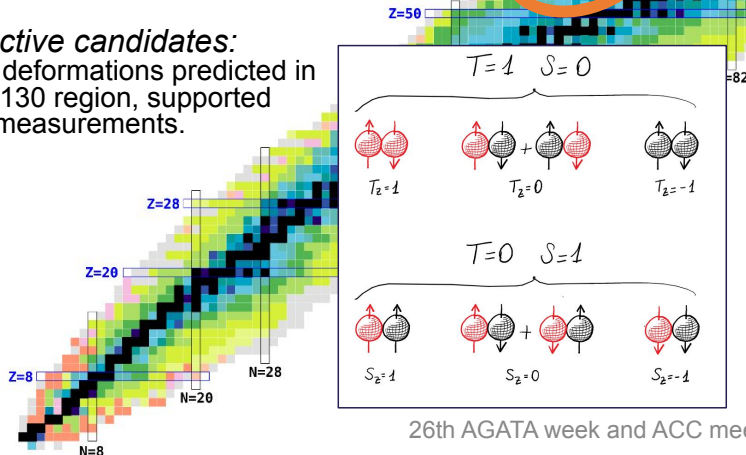
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- **Super-collective candidates:**
Strongest gs deformations predicted in the $Z\sim 60$, $A\sim 130$ region, supported by available measurements.

Probing mixed-spin np pairing in the super-collective $Z\sim 60$ and $A\sim 130$ region, J. Dudouet et al.



G. Palkanglou et al., Phys. Rev. Lett. 134, 032501 (2025)



... And from light to heavier nuclei

Quest for the **isoscalar (spin-triplet) np-pairing condensate** around $N=Z$:

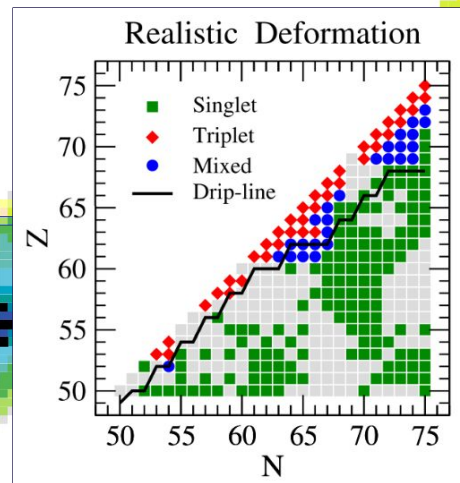
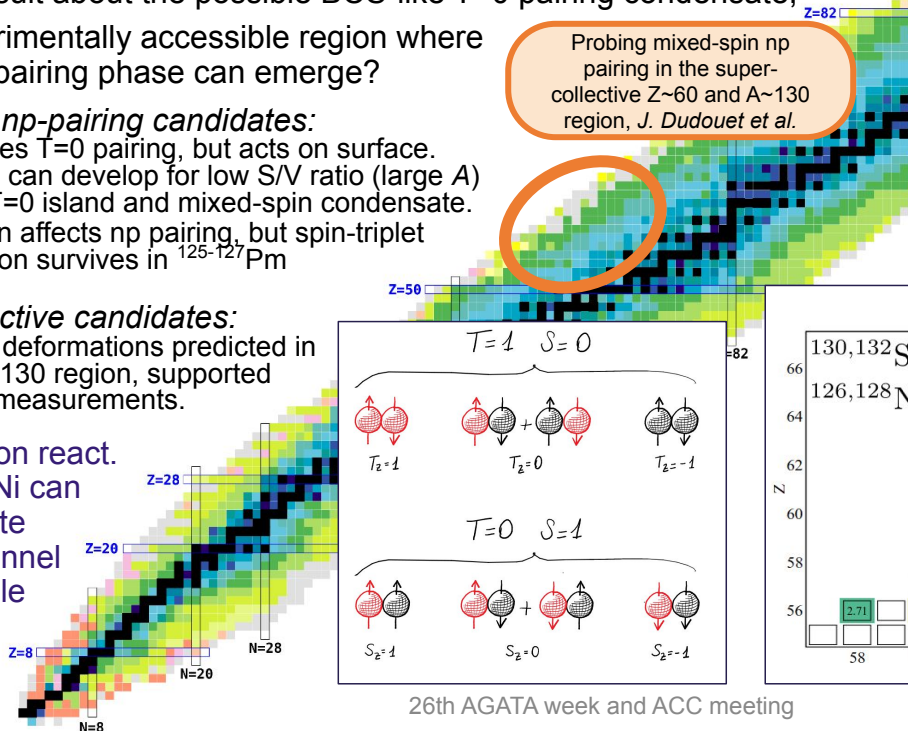
- np-pairing evidence in $N=Z$ nuclei, but $T=1$ (spin-singlet) is dominant;
- No clear result about the possible BCS-like $T=0$ pairing condensate;

Is there an experimentally accessible region where a spin-triplet np pairing phase can emerge?

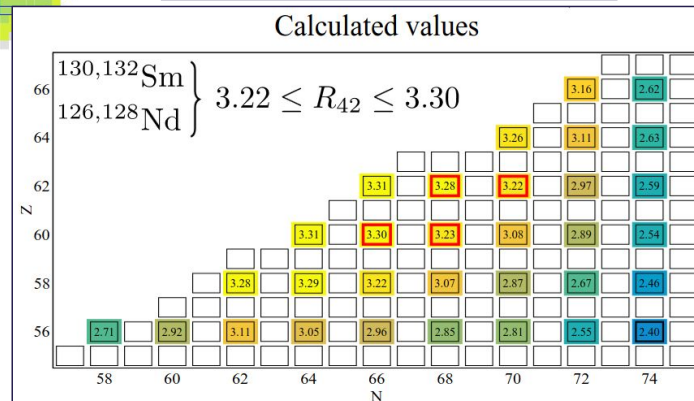
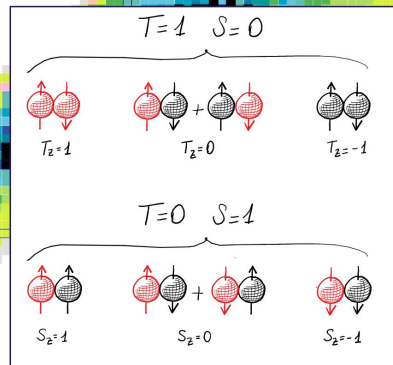
- **Mixed-spin np-pairing candidates:**
SO suppresses $T=0$ pairing, but acts on surface.
⇒ $T=0$ pairing can develop for low S/V ratio (large A)
⇒ Predicted $T=0$ island and mixed-spin condensate.
⇒ Deformation affects np pairing, but spin-triplet configuration survives in $^{125-127}\text{Pm}$

- **Super-collective candidates:**
Strongest gs deformations predicted in the $Z\sim 60$, $A\sim 130$ region, supported by available measurements.

Fusion-evaporation react. with RIB $^{74}\text{Kr} + ^{58}\text{Ni}$ can populate candidate nuclei. Clean channel selection with triple coincidence.



G. Palkanglou et al., Phys. Rev. Lett. 134, 032501 (2025)



The VAMOS-GRIT-AGATA campaign

Approval of a zero-degree campaign of VAMOS-GRIT-AGATA using SPIRAL1 beams for 2029-2030.

Formal decision on location after 2030 to be taken in 2027 by the AGATA Steering Committee.

Commitment of the GANIL management to allocate:

- 2 weeks for in-beam commissioning;
- at least 50% of CYCLO beam time (subject to PAC approval and rules for non-commercial users)
 - ⇒ ~100 UT per year, i.e. ~2500 hours of beam on target.

SPIRAL1 beams:

- Availability of already operational gas beams (He, N, O, F, Ne, Ar, Kr) up to ~20A MeV.
- New beams developed during the upgrade started in 2014. Several commissioning tests performed in 2021-2023 were successful, demonstrating intensities compatible with reacceleration in CIME.
- Further R&D are being discussed

VAMOS-GRIT-AGATA combined setup:

- **AGATA:**
2 π configuration at 23cm from target.
Provides high resolution and peak-to-total ratio, high resolving power.
High efficiency (13% with tracking for 1.3MeV-⁶⁰Co with P/T=42%)
- **GRIT Phase0:**
BW configuration, compact assembly ensuring minimal gaps, γ -transparency.
High granularity for good Doppler correction via 2-body kinematics and for an improved E_x resolution. PSA implementation for particle identification.
- **VAMOS++:**
Full background rejection with heavy recoil detection.
Different focal plane configurations optimized for light/heavy ion detection.

The experimental resources at GANIL

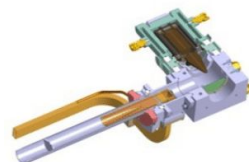
Part 2

Beams: The evolution of SPIRAL1

Original SPIRAL1 beams:

gaseous elements (He, N, O, F, Ne, Ar, Kr) produced by the *Nanogan ECR source*, after fragmentation of high-energy projectiles in a thick graphite target, re-accelerated by CIME up to ~20AMeV.

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Nanogan-3 ECR
for gaseous elements

Beams: The evolution of SPIRAL1

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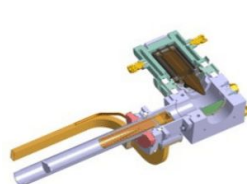
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➤ New TISS (Target Ion-Source Systems):

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Nanogan-3 ECR
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MonoNaKe
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Beams: The evolution of SPIRAL1

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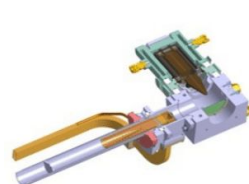
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Beams: The evolution of SPIRAL1

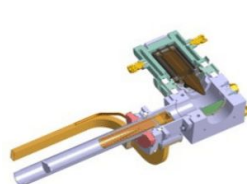
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 - *TULIP* for n-deficient isotopes, via in-flight fusion-evaporation through a thin target.
- Charge breeder extension (2021):
Improved control over charge-state distribution at the charge breeder output, extending the CIME post-acceleration energy range.

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3 Li	4 Be															5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg															13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
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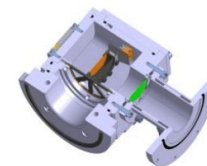
Nanogan-3 ECR
for gaseous elements



MonoNaKe
for alkali elements



FEBIAD
for condensable elements



TULIP
for neutron-deficient isotopes

FEBIAD developments:

- $^{48,49}\text{Cr}$ produced for the first time in 2023;
- n-deficient Fe/Co/Ni produced for the first time in 2024;
- test of purification of ^{56}Ni to be performed

P. Chauveau *et al.*, J. Phys.: Conf. Ser. **2743**, 012068 (2024)
P. Chauveau *et al.*, J. Phys.: Conf. Ser. **3237**, 012071 (2026)

Open discussion on the required beam R&D:

e.g. ^{55}Co , ^{57}Ni , ^{44}Ti technically feasible, the latter possibly in batch mode.

Developments to be supported by Lol and proposals.

1 H																	2 He	
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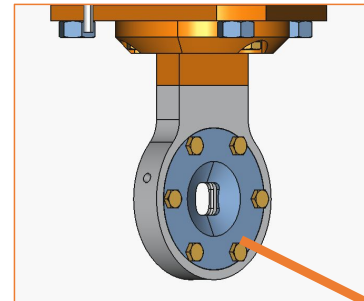
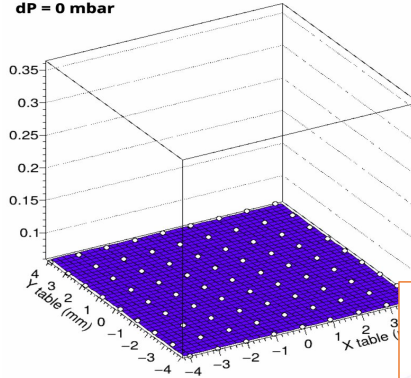
Consult the available beams: <https://u.ganil-spiral2.eu/chartbeams/>
For further inquiries and requests defining minimum purity, rate and energy, contact: chartbeams-spiral1@ganil.fr

ATRAOT : a new cryogenic ^3He target

*M. Assié, M. Pierens, S. Blivet,
M. Le Bihan, A. Barrière (IJCLAB)*

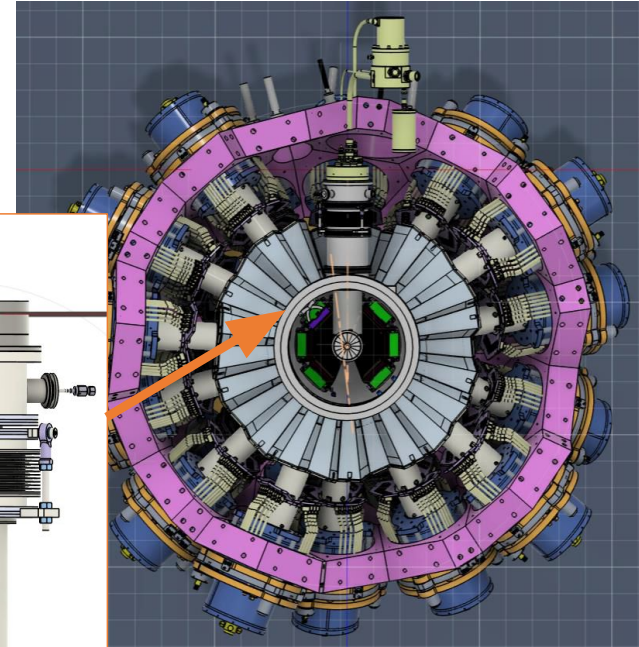
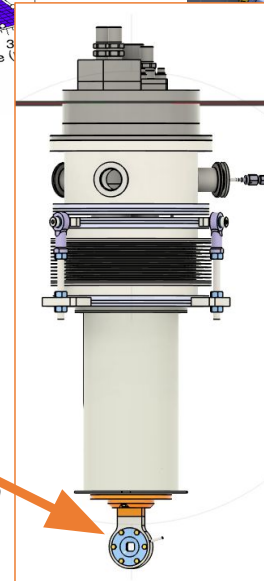
- Based on cryocooler
- **R&D on new material for target windows:**
 - test of pressure deformation
 - modeling of deformation
+ NPTool simulations
 - gluing protocol
 - test at cryogenic temperatures
- De-icing protocol to be defined
- **Integration into AGATA-GRIT-VAMOS**
 - top AGATA clusters moved on the side
 - limited space for dependencies
- Beam test in 2027/2028 at GANIL for the first prototype of the target.

dP = 0 mbar



Target thickness : 1.5 to 2 mm
Windows size : 10x10 mm²
(14x14 mm² to be tested)

26th AGATA week and ACC meeting



Courtesy of M. Assié
and A. Barrière

C. Ciampi

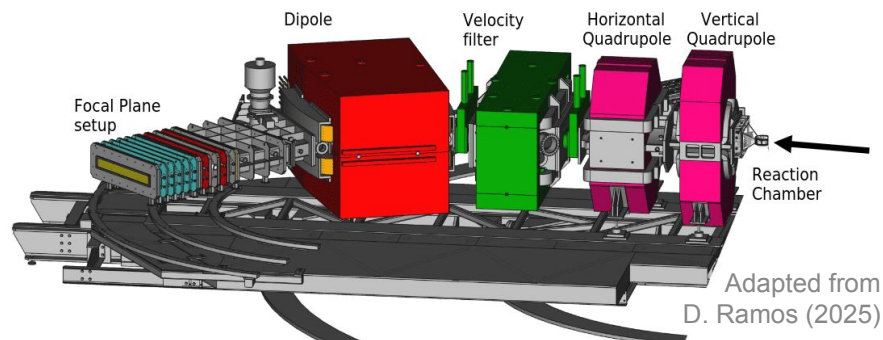
The setup: VAMOS++ spectrometer

The large-acceptance magnetic spectrometer **VAMOS++** provides reaction-product detection and identification.

Multiple technical and software developments since 2021 improved the performance opening a range of possibilities. Further developments (e.g. beam blocker@0deg) are ongoing.

A. Lemasson *et al.*, NIM A **1054** (2023) 168407

M. Rejmund *et al.*, NIM A **1076** (2025) 170445



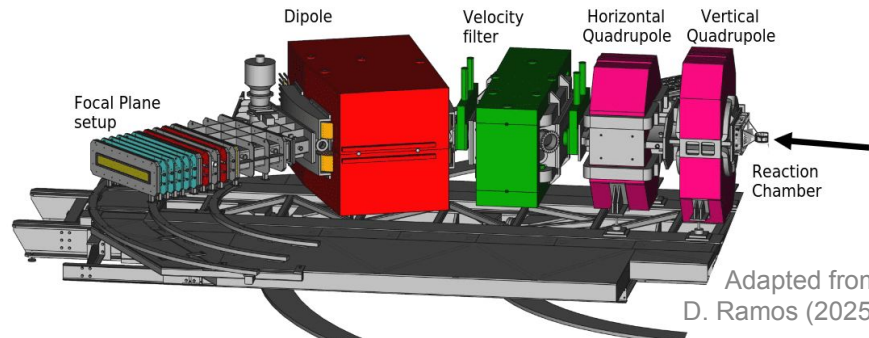
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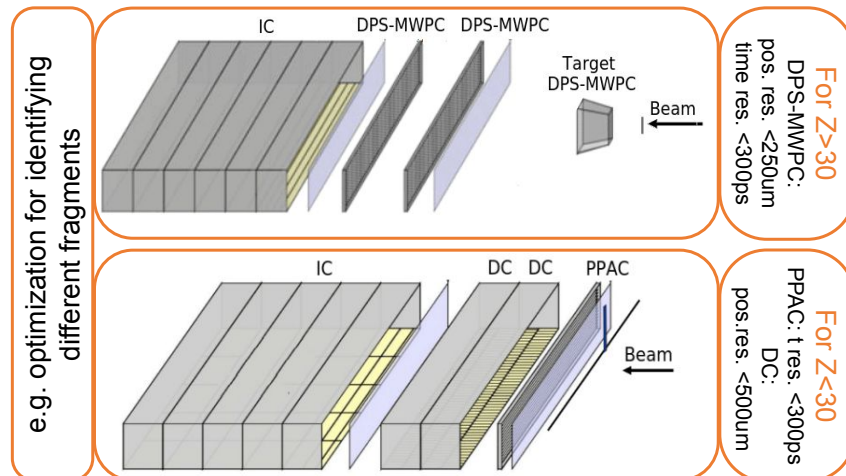


Adapted from
D. Ramos (2025)

Different experiments may have different requirements, *which must be discussed in advance*:

- Heavy recoil detection (ToF coincidence) for spurious reaction rejection $\Rightarrow$ higher intensities reached.
- Heavy fragment identification, e.g. for unbound states decaying through different open channels.
FP configuration to be properly adapted to the (Z,A).
- Light recoil detection in inverse-kinematics inelastic scattering reactions, e.g. (p,p').
Possible, but FP design for p or He detection needed.

Further details can be found [here](#) and [here](#). Contact D. Ramos and A. Lemasson for further discussions on the possible optimizations.



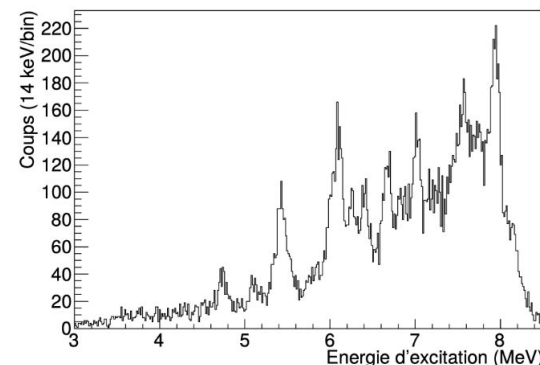
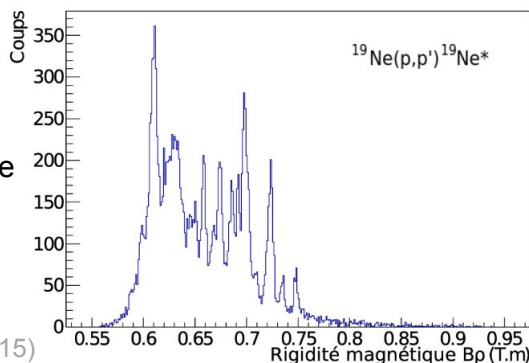
Some possibilities offered by VAMOS++

Light charged particles in VAMOS:

1st campaign inelastic scattering experiment $^{19}\text{Ne}(p,p')^{19}\text{Ne}^*$, followed by p , α or γ decay.

VAMOS detects the p' , while the p , α from the decay were detected by a Si telescope. The excitation energy of ^{19}Ne has been reconstructed from the magnetic rigidity in VAMOS.

F. Boulay, PhD thesis (2015)



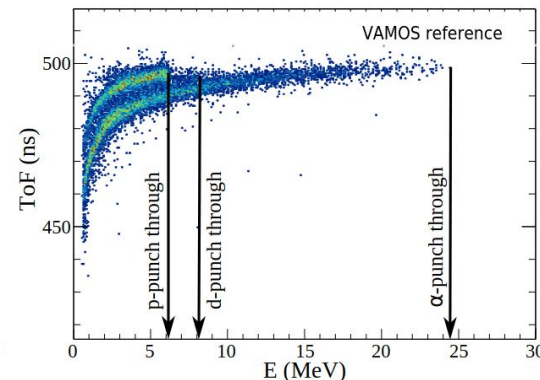
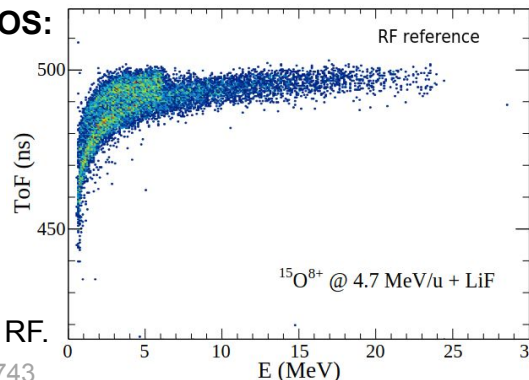
Particle identification via ToF with VAMOS:

Tested during 1st campaign to use when no ToF start can be provided by upstream tracking device.

VAMOS has been used to provide the time reference, tracing back the identified residue and reconstructing the ToF between VAMOS and the target.

Resolution $\sim 1.4\text{ns}$, compared to $\sim 2.5\text{ns}$ from RF.

M. Assié *et al.*, NIM A 1014 (2021) 165743

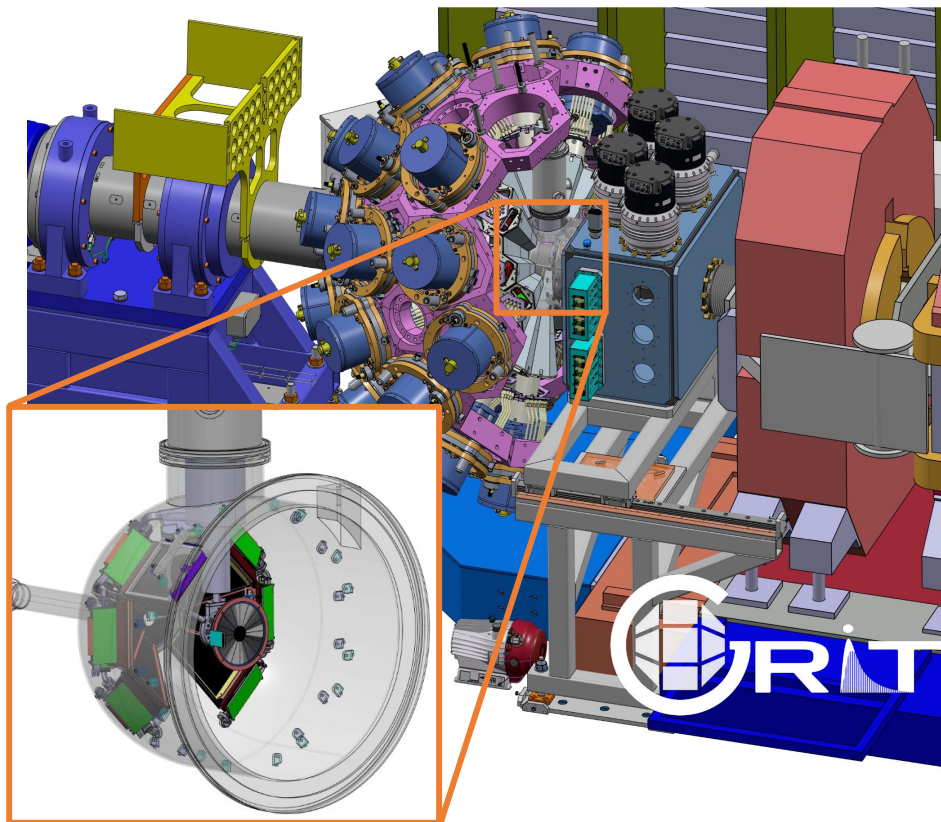


The setup: GRIT Si-detector array development

GRIT Phase0 configuration defined for the VAMOS-GRIT-AGATA campaign, based on the presented physics cases:

- Backward detection:
 - 6 two-stage trapezoidal telescopes
 - 1 single-stage annular detector
- 90 degrees (for normalization purpose):
 - 1 two-stage square detector
- Forward detection:
 - 1 two/single-stage annular detector

Vacuum chamber design defined by GRIT collaboration: main react. chamber w/ GRIT and standard/cryo target + second chamber with all utilities.

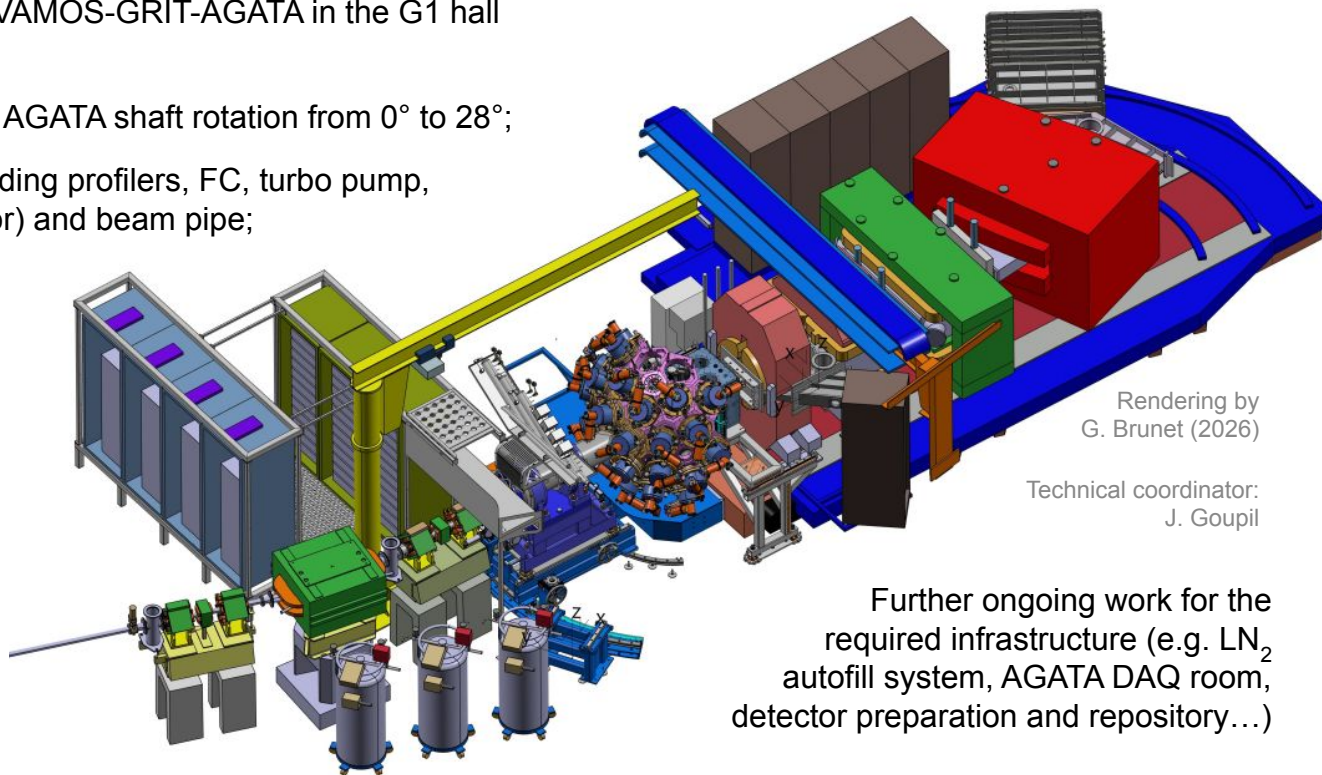


VAMOS-GRIT-AGATA: Mechanical integration

The mechanical integration of VAMOS-GRIT-AGATA in the G1 hall requires new tailored designs:

- Installation of two rails for AGATA shaft rotation from 0° to 28° ;
- New diagnostic box (including profilers, FC, turbo pump, flange for tracking detector) and beam pipe;
- Cable management and LN_2 manifold structure;
- Redesigned rack platform placement in G1;
- Integration of cryogenic ^3He target;

*More details on
Wednesday and
on Friday.*



Rendering by
G. Brunet (2026)

Technical coordinator:
J. Goupil

Further ongoing work for the
required infrastructure (e.g. LN_2
autofill system, AGATA DAQ room,
detector preparation and repository...)

The campaign: Host Laboratory Agreement

Draft of the Host Laboratory Agreement for the VAMOS-GRIT-AGATA campaign at GANIL.

- Definition of the budget sharing among collaborations, including the allocation of the GANIL Hosting Lab installation funds for both AGATA and GRIT, as well as of the respective operational costs
- Beam time: - 2 weeks for in-beam commissioning
- 50% CYCLO beam time (~ 100 UT/y), subject to PAC approval and non-commercial users rules
- Common VAMOS-GRIT-AGATA Data Management Plan drafted

⇒ Draft of the Host Agreement currently discussed within the ASC and within the GANIL management.



**Host Laboratory Agreement between GANIL
and the AGATA and GRIT Collaborations for
the Installation and Deployment of AGATA and
GRIT at the GANIL facility –
Campaign Phase 2**

Roadmap to the 2029 campaign

An overall timeline until the start of the campaign:

- Mechanical designs are complete and are being validated. Manufacturing by the end of 2027.
- Last G1 experiments in spring 2028, followed by installation starting in June-July 2028.
- Commissioning of the setup is planned for late 2028 / early 2029
- The campaign is expected to start in 2029

<i>VGA implementation</i>	2026				2027				2028				2029				...
	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	
Design + manufacture																	
Preparation																	
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Exploitation																	

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Pre-PAC meeting to be organized in 2027 for a more detailed evaluation of the campaign.

Local teams are available for further information and discussions on possible technical adjustments to fulfill the experimental requirements.

VGA implementation	2026				2027				2028				2029				...
	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	1 trim.	2 trim.	3 trim.	4 trim.	
Design + manufacture																	
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Zoom on the final preparation timeline

A proposed timeline from the Host Laboratory Agreement:

- Transfer of AGATA items from LNL by end of June 2028
- Transfer of the GRIT items by end of June 2028
- Mechanical installation completed by end of July 2028
- Electronic installation and test completed by end of September 2028
- Cooling of the detectors in November 2028
- Source tests completed by November 2028
- In-beam commissioning in December 2028 if possible with respect to the GANIL director plans.

<i>VGA implementation</i>	2028									2029					
	...	M	J	J	A	S	O	N	D	J	F	M	A	...	
Transfer of AGATA + Installation				m		e									
Detector cooling and source tests															
In-beam commissioning															
Exploitation															

Zoom on the final preparation timeline

A proposed timeline from the Host Laboratory Agreement:

- Transfer of AGATA items from LNL by end of June 2028
- Transfer of the GRIT items by end of June 2028
- Mechanical installation completed by end of July 2028
- Electronic installation and test completed by end of September 2028
- Cooling of the detectors in November 2028
- Source tests completed by November 2028
- In-beam commissioning in December 2028 if possible with respect to the GANIL director plans.

Thank you for listening

GANIL

Merci pour votre attention

Backup slides

Beam productions tests at SPIRAL1

^{58}Ni at 74.5 AMeV $\simeq$ 600W		
Isotope	$T_{1/2}$	Measured rate (pps)
^{59}Cu	82 s	5.03E+05
^{58}Cu	3.205 s	1.60E+05
^{57}Ni	35.6 h	2.52E+07
^{56}Ni	6.081 d	1.99E+06
^{58}Co	70.883 d	9.40E+07
^{57}Co	271.8 d	2.21E+08
^{56}Co	77.236 d	1.11E+08
^{55}Co	17.53 h	2.33E+07
^{54m}Co	1.48 min	2.39E+05
^{53}Fe	8.51 min	7.80E+06
^{53m}Fe	2.54 min	2.39E+06
^{52}Fe	8.273 h	4.80E+06
^{52m}Fe	45.9 s	6.47E+04
^{57}Mn	85.4 s	4.10E+04
^{56}Mn	2.5788 h	1.09E+06
^{52}Mn	5.591 d	1.19E+08
^{52m}Mn	21.4 min	3.10E+07
^{51}Mn	45.84 min	3.90E+07
^{50m}Mn	1.75 min	1.80E+06

^{129}Xe at 50 AMeV $\simeq$ 200W		
Isotope	$T_{1/2}$	Measured rate (pps)
^{122m}Cs	3.70 min	5.40E+05
^{119m}Cs	30.4 s	2.10E+04
^{119}Cs	43.0 s	9.51E+04
^{118}Cs	17.0 s	1.40E+04
^{117}Cs	8.4 s	1.96E+03
^{116m}Cs	3.85 s	2.27E+01
^{117}Xe	61 s	8.72E+03
^{117}I	2.22 min	3.41E+05
^{117}Te	62 min	1.64E+05
^{117}Sb	2.8 h	7.42E+05
^{109}Sn	18.1 min	4.30E+04
^{117}In	43.2 min	1.05E+04
^{109}In	4.159 h	7.00E+05
^{109m}In	1.34 min	3.33E+04
^{109m}Pd	4.694 min	8.86E+02

Results of the beam production tests carried out in 2024 with the FEBIAD TISS.

Rates measured in the low energy beamline.
(n.b. post-accelerable intensities $>1\text{e5pps}$)

Planned tests on the post-acceleration and purification of ^{56}Ni .
(the main problem is the ^{56}Co , ^{56}Fe contamination, that could be removed by full-stripping + dipole)

Ongoing characterization for a thermal simulation of the TISS, to optimize the parameters of its geometry based on primary beam properties.

Ongoing studies on target fragmentation.

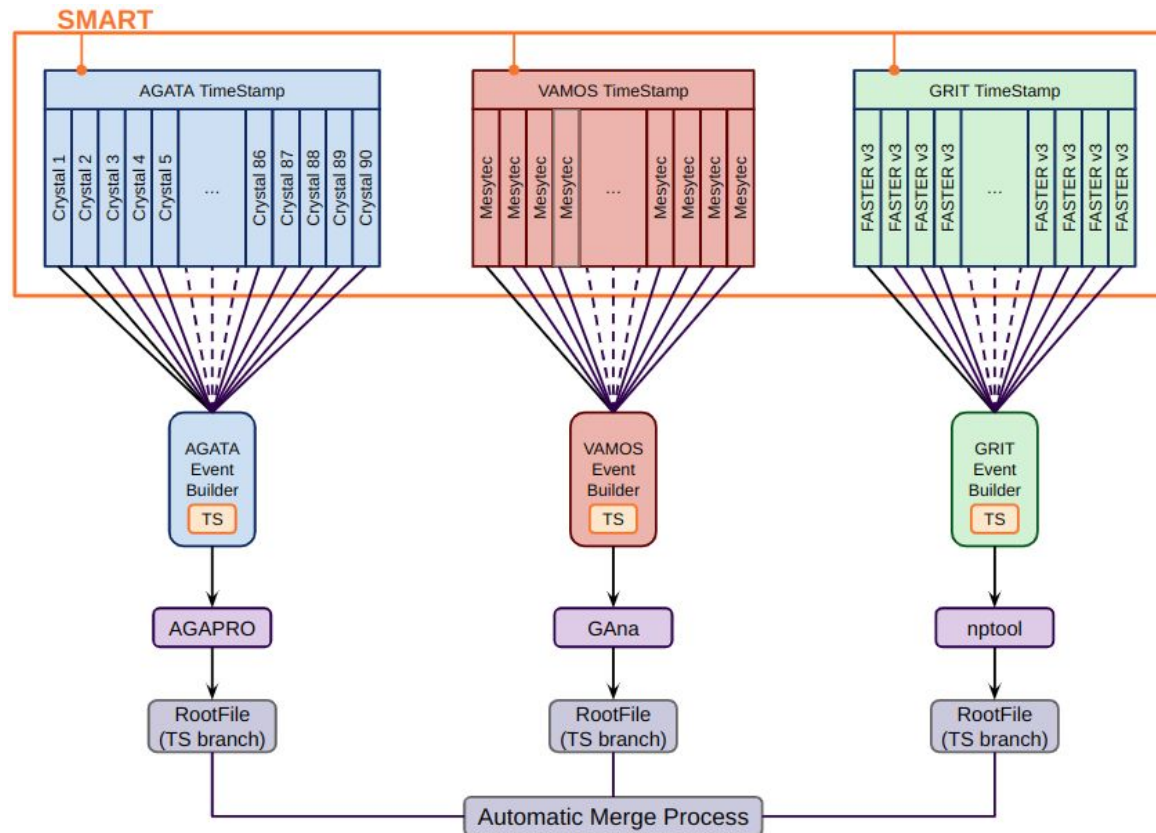
VAMOS-GRIT-AGATA: Data Flow and Analysis

Global Run Control: provided by GANIL, based on ssh scripts to the subsystems.

Synchronization via SMART.

Data flow: each sub-system uses its dedicated software suites for detector control, calibration, simulation, and physics analysis. Global event merge done at the reconstructed data level.

Common Data Management Plan: defined by the DM responsables of the three collaborations (A. Lemasson, A. Matta, J. Dudouet) focus on the reproducibility of the analysis, ensured by unified metadata, well-documented open source software, clear workflow.



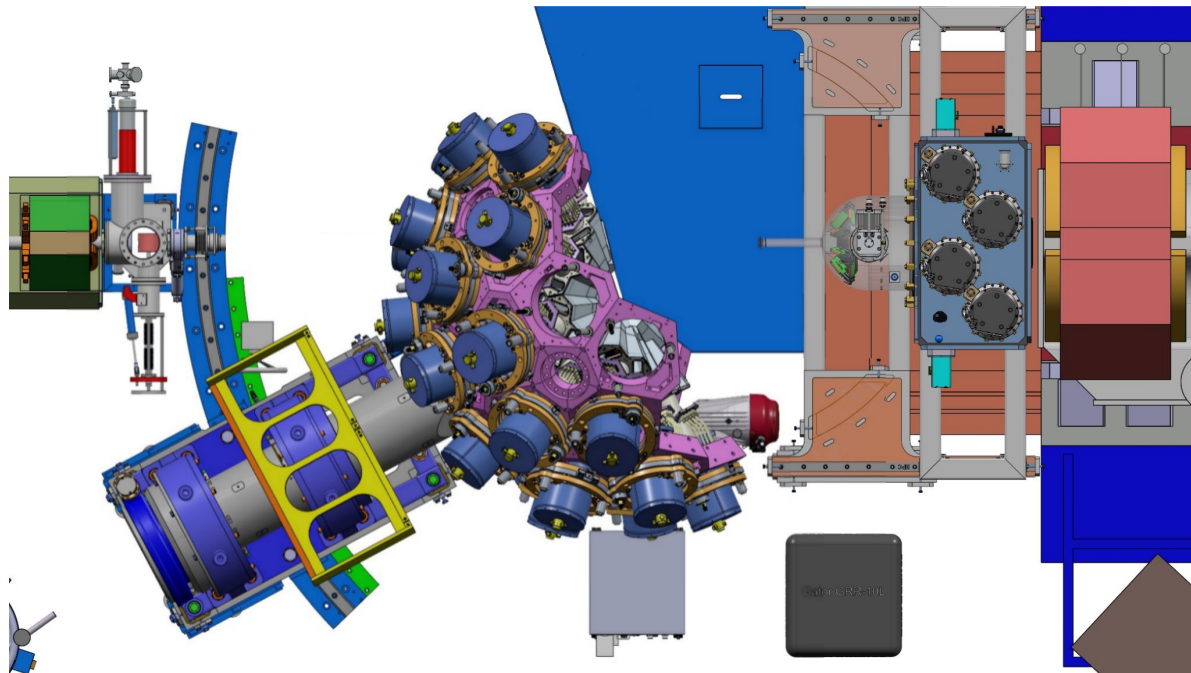
Mechanics: accessing the target area

Accessing the target area:

- Retract VAMOS by ~1100mm
- Retract GRIT chamber by ~650mm
⇒ target holder is accessible

Turning AGATA:

- Disconnect beam pipe
- Turn AGATA at 28°
- Retract AGATA shaft



Adapted from M. Assié (2025)

Mechanics: 28° configuration

Test of the configuration with VAMOS-AGATA at 28°

Beam pipe through the first flange on the left of AGATA support, no problem on the mechanics.

To be considered for experimental campaigns after 2030

