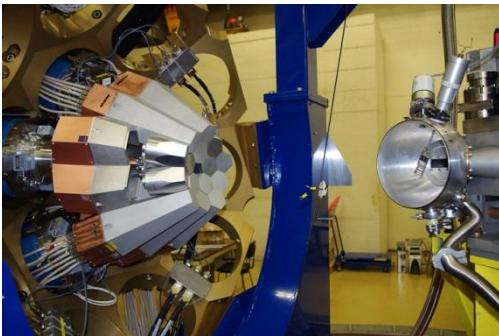


Status of AGATA at GANIL

EGAN 2014 workshop, GSI

2010 → 2011
LNL : 5TC



2012 → GSI/FRS
6TC+3 DC



2014 → GANIL/SPIRAL2
15TC



AGATA D.+PRISMA

Total Eff_{Nominal} ~2.6%

AGATA @ FRS

Total Eff. ($\beta=0.5$) ~ 10%

AGATA @G1 ($\rightarrow \pi$)

Total Eff ~ 8% to 14%

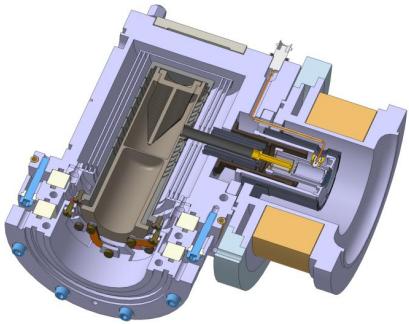


Campaign spokesperson : S. Lenzi (Univ. Padova)

Workshop on the 18th - 20th of February 2013 organized at GANIL, dedicated to the physics of the GANIL Campaign using stable and radioactive beams (SPIRAL1) based on LoI

- Create the basis for defining the priorities for a detailed scientific program of the campaign
- Large communities covering many different topics from Coulex using post-accelerated radioactive beam at SPIRAL1 to in-beam spectroscopy of SHE, n-rich by DIC and fission to N=Z by fusion-evaporation

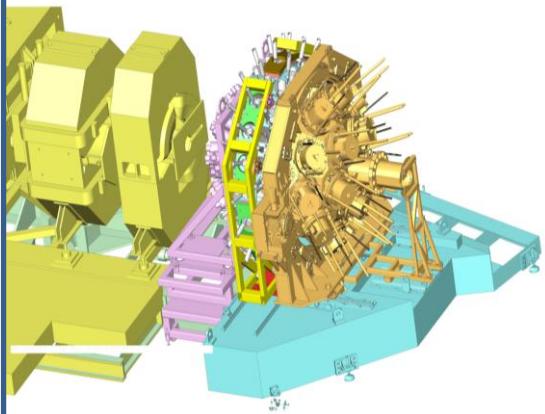
- 47 Letters of Intents
- The equivalent of ~2006 UT are proposed
→ 16048 hours of beam on target (669 days)
- 4 main setups
 - Vamos in magnetic spectrometer
 - Vamos in gas-filled
 - Nwall + Diamant
 - DSSSD (SPIRAL1)



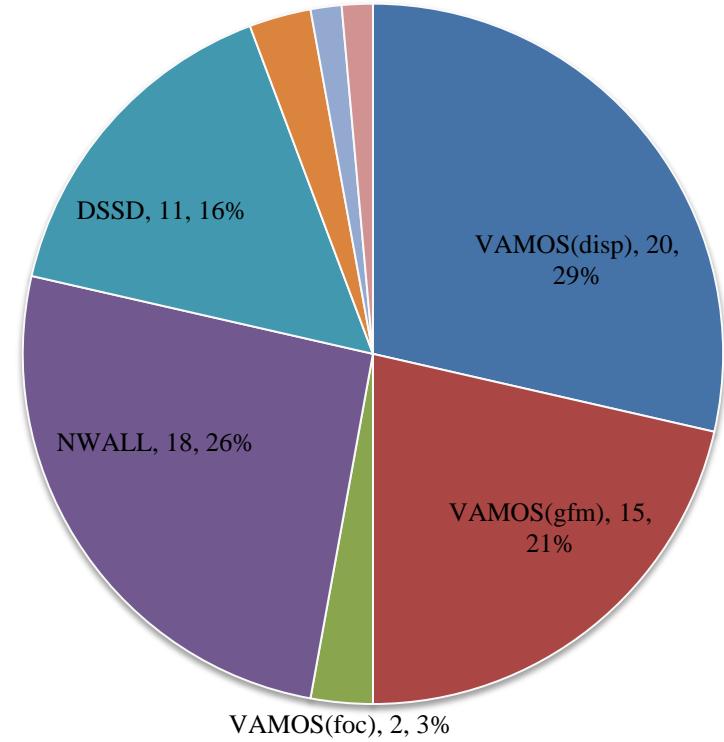
SPIRAL1 upgrade

Shell model studies
in the *sd* shells

In-beam spectroscopy
of N=Z nuclei



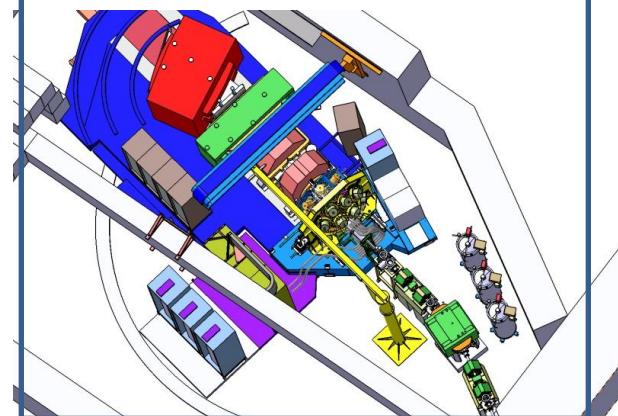
DIAMANT Solo, 2, AGATA solo, 1, 1%
3%
MUST2, 1, 1%



Spectroscopy after MNT and fission



SHE spectroscopy
north ^{100}Sn spectroscopy



Improved VAMOS performances: VAMOS++

M. Rejmund et al, NIM A 646 (2011) 184–191

Full reconstruction over the whole acceptance

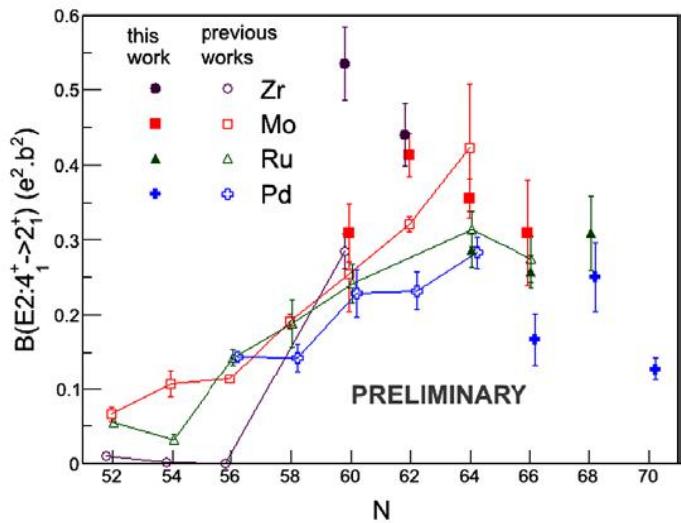
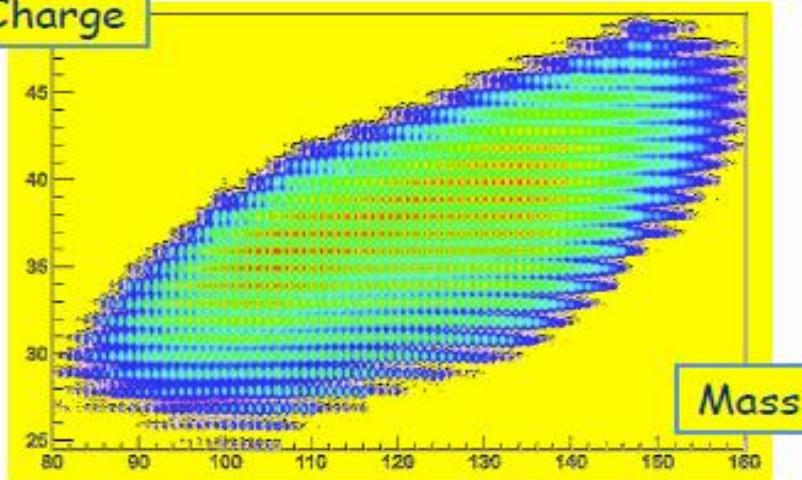
Mass resolution $\sim 1/220$

Z identification up to Z= 62

Using the high quality heavy beams delivered by GANIL:

opportunity for prompt spectroscopy of heavy elements populated in MNT : **Ni, Sn, Pb region**

Atomic Charge



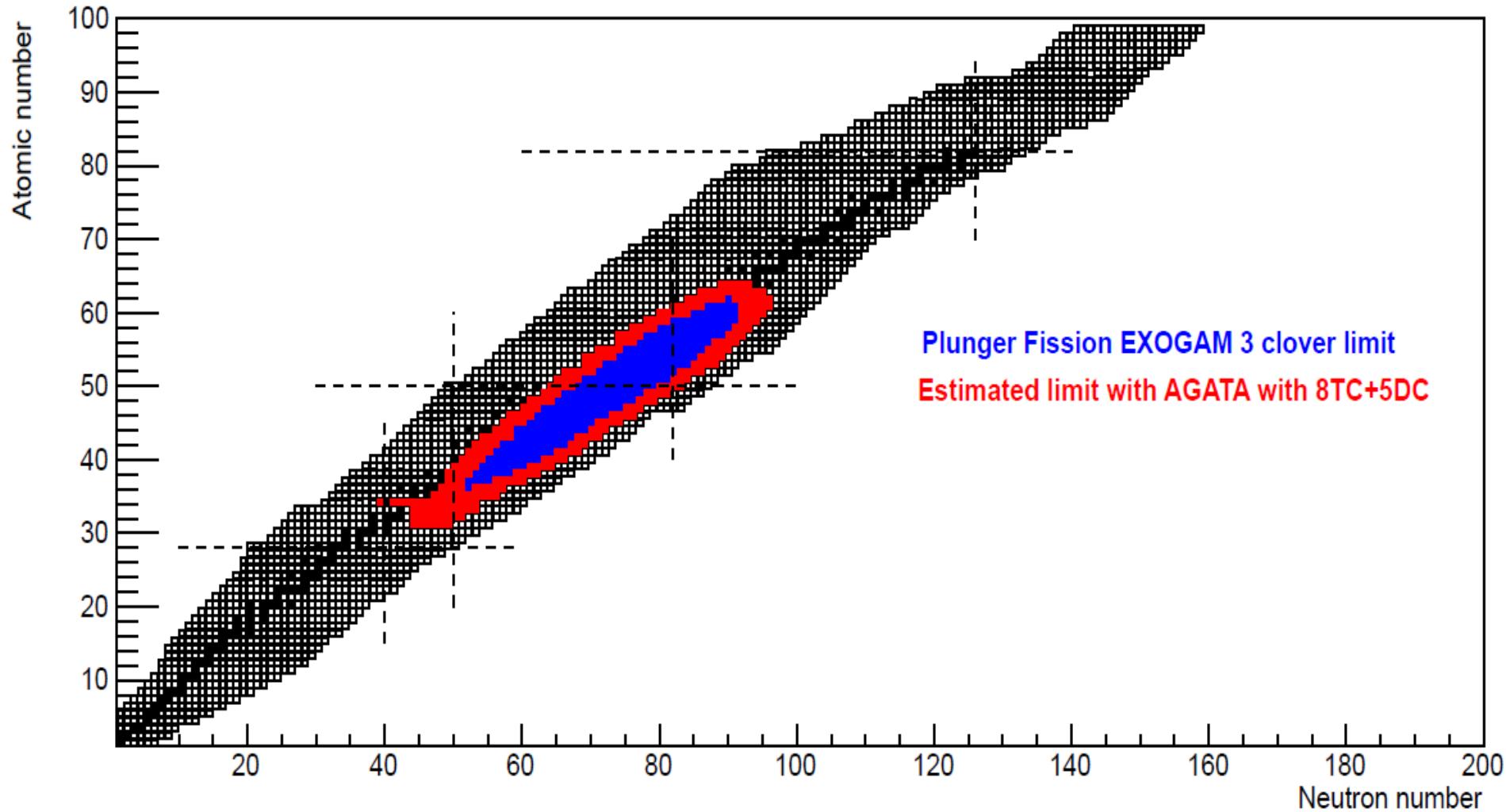
L. Grente et al. EPJ Web of Conferences 62, 01002 (2013)

Performance of the AGATA array

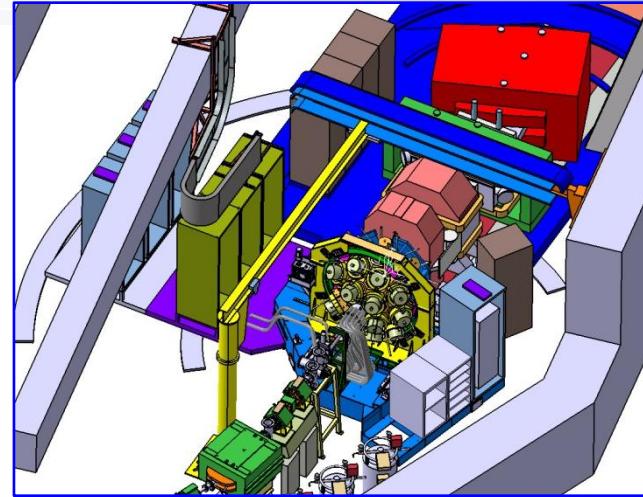
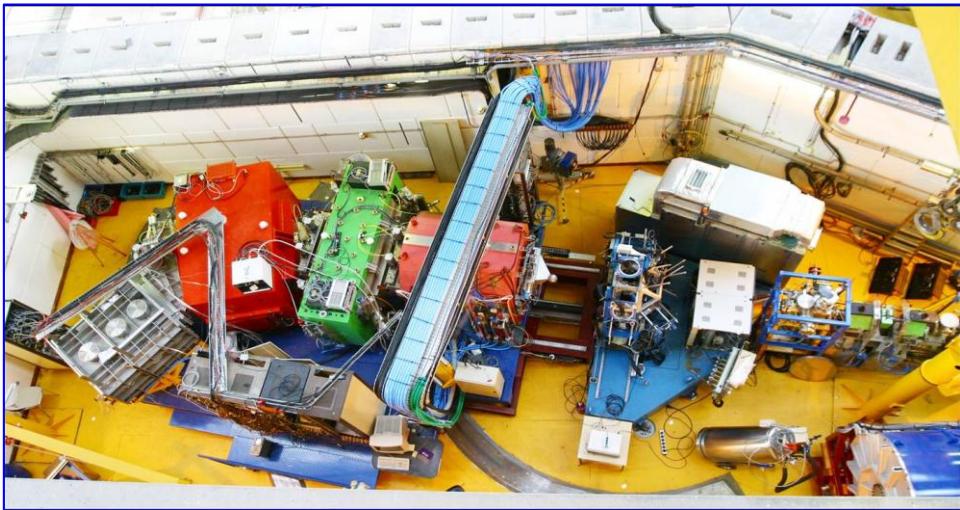


- 32 capsules are expected in early 2015
- Additional detectors will be delivered during the campaign
- End of the campaign : 45 capsules covering 1π

Multi-nucleon transfer $\beta = 12\%$



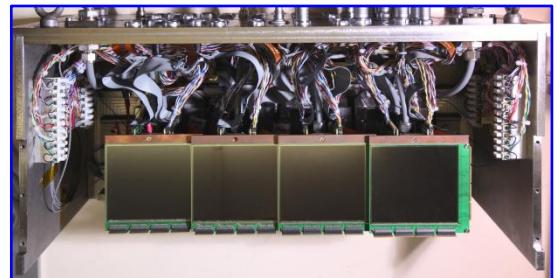
VAMOS in gaz-filled ?



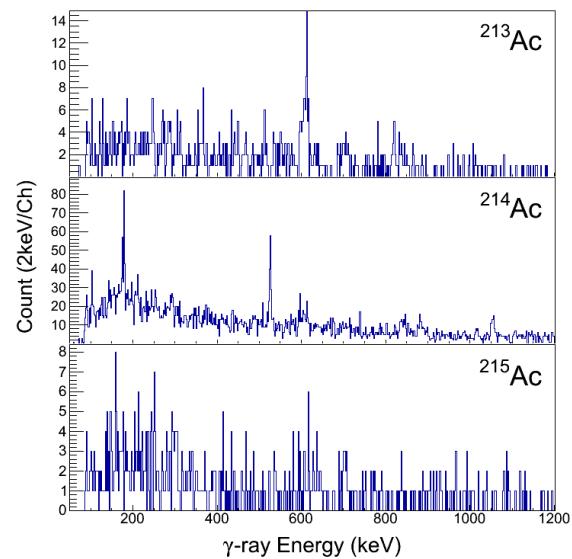
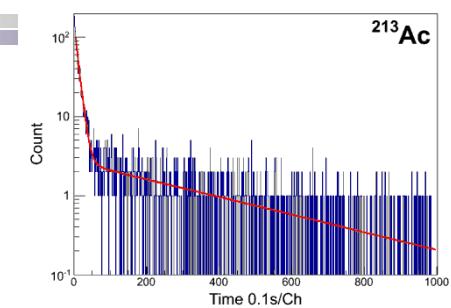
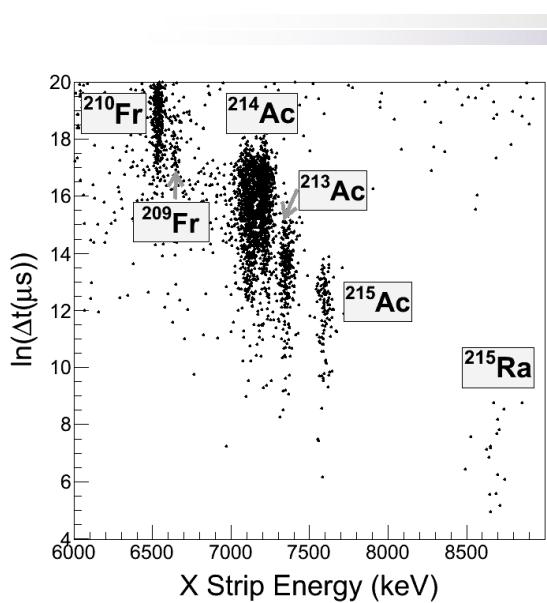
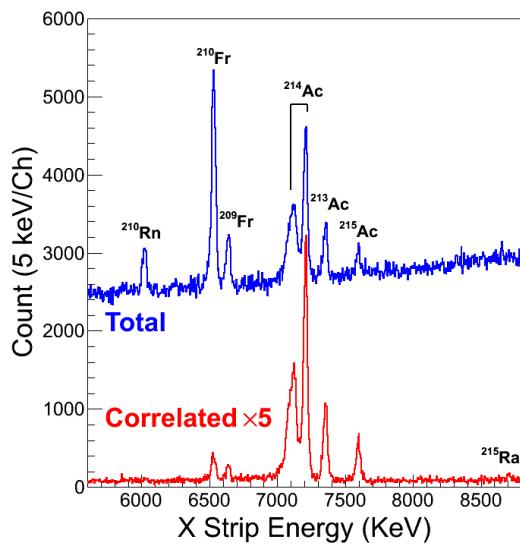
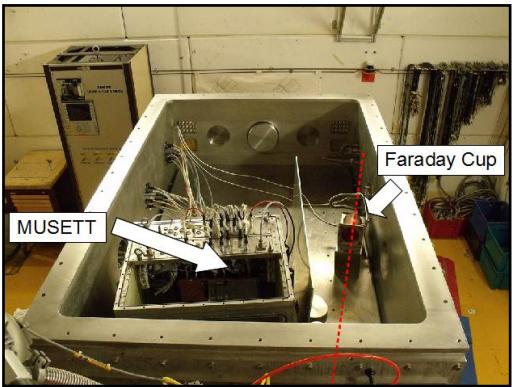
Large acceptance $\Omega \sim 60$ msr
→ Large transmission expected for
fusion-evaporation reactions

EXOGAM2, AGATA
→ Gamma spectroscopy, high efficiency

MUSSETT
→ Focal plane detection, RDT
Unique devices combinations, large physics opportunities

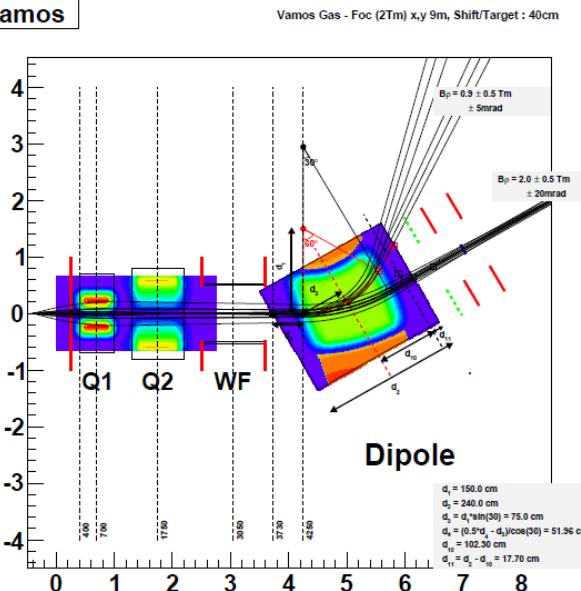


MUSETT commissioning 2010



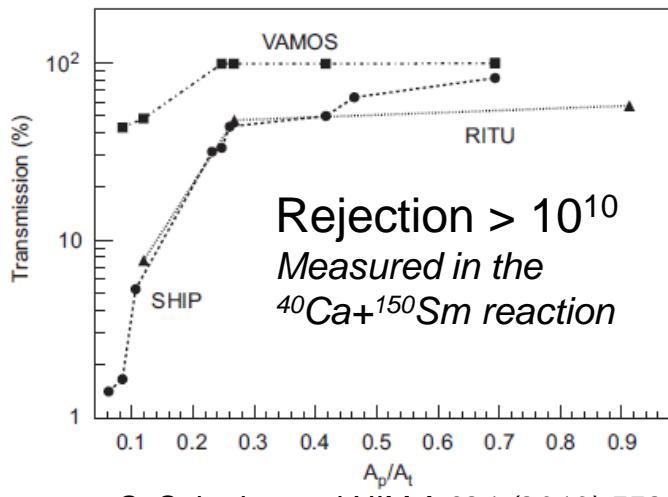
VAMOS in gaz-filled

Vamos



Unique opportunity to couple AGATA - 1π with a separator in fusion induced reaction.

Intense $^{48,40}\text{Ca}$, ^{50}Ti , ^{36}Ar , ^{58}Ni , ^{54}Fe beams



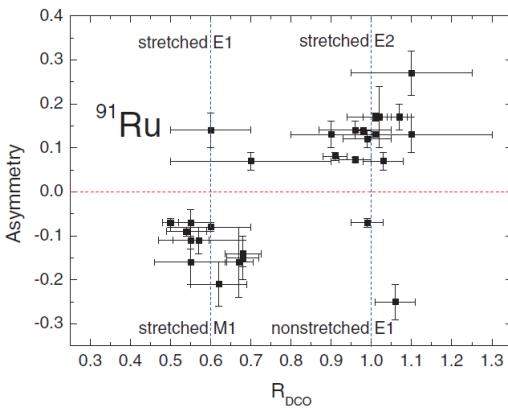
VAMOS-Gas-filled project status:

*The French funding agencies ranked the gaz-filled in the short list

*If green light is obtained in 2014 it is not excluded to be ready mid-2016.



~40 Neda modules
Operational in 2016

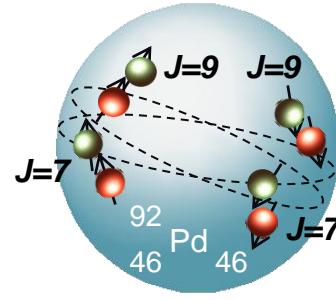


B Cederwall, et al, Nature 469, 68-71 (2011)

Y. Zheng, G. de France, E. Clément et al Phys. Rev. C 87, 044328 (2013)

F. Ghazi Moradi et al Phys. Rev. C 89, 014301 (2014)

F. Ghazi Moradi et al Phys. Rev. C 89, 044310 (2014)



DIAMANT :

- *Detectors operational (in-beam 3 weeks ago)
- *NUMEXO2 modules for the EXOGAM -NEDA/NWALL arrays cover DIAMANT needs
- *Digital signal processing under preparation (1 year of work)

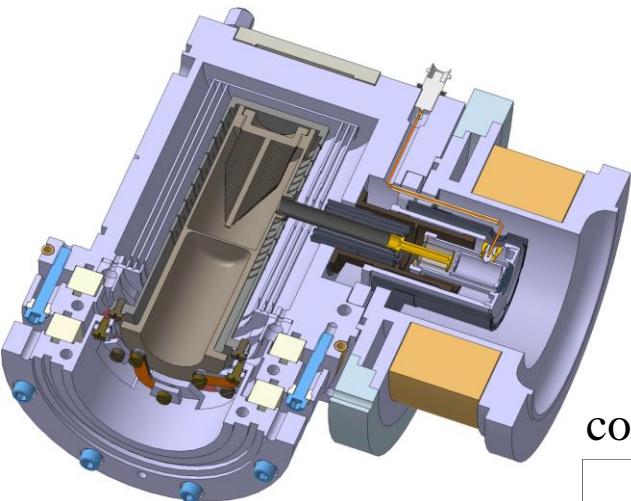
NEDA-NWALL:

- *The collaboration plans to build up around 45 detectors of NEDA. Designs are ready
- *Test for the first prototype
- *Electronics is going in parallel with EXOGAM2 and the production will start in October.
- *Coordination with the GALILEO project at LNL end of 2015

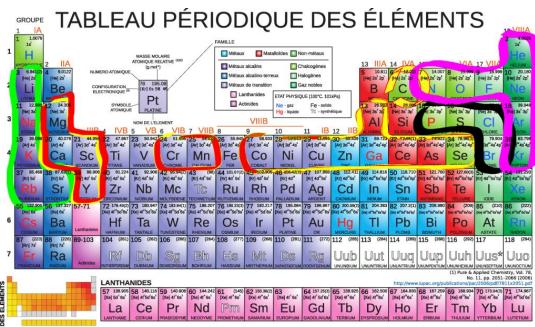
FEBIAD Tests (ISOLDE's VADIS)

Test bench 2011 – 2012

- 9 new radioactive elements
(Na, Mg, Al, P, K, Mn, Fe, Cu)



collaboration



Nanogam - surface - febiad - ecr HD

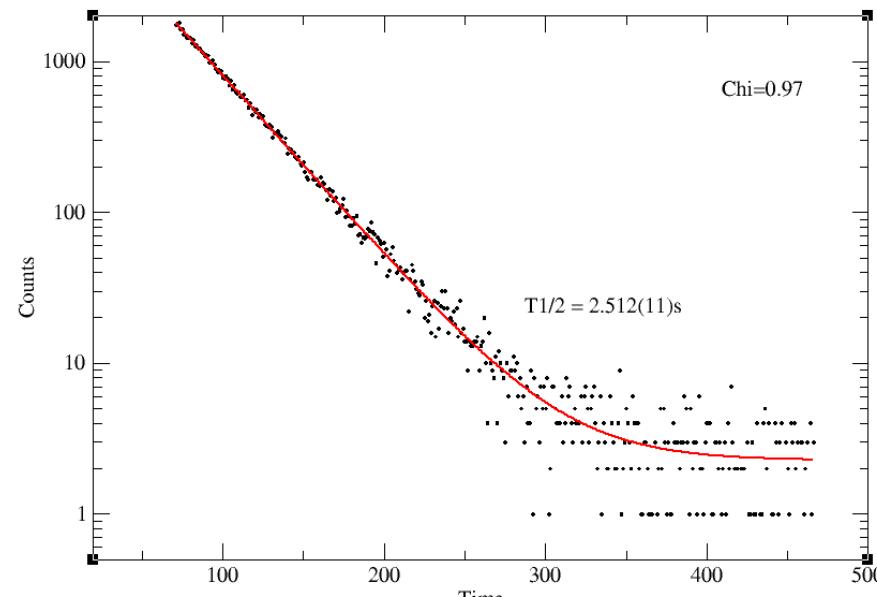
E.Clément

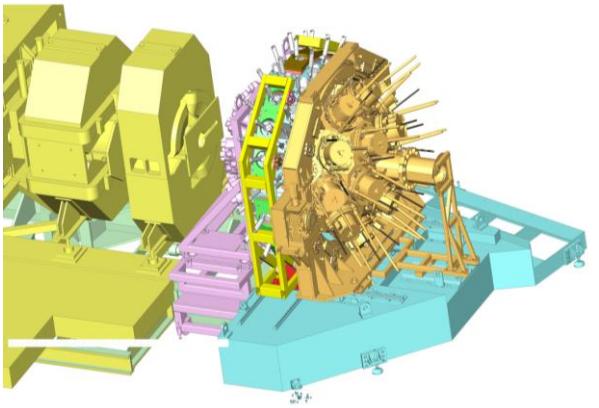
SPIRAL test at nominal power

Preliminary results from last December

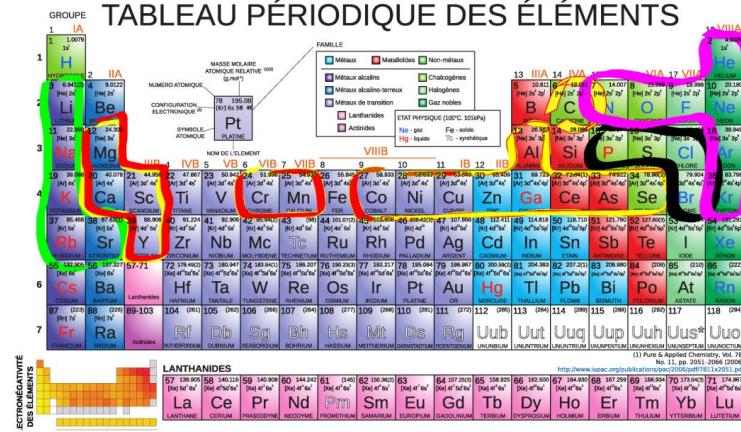
- ^{33}Cl ; ^{29}P , ^{23}Mg , ^{37}K , ^{33}Ar , $^{25,26,29}\text{Al}$, $^{21,25}\text{Na}$, ^{20}F , ^{14}O , $^{38(\text{m})}\text{K}$...

- * On line yields at full power are according to expectation
- * First estimates (LoIs) are therefore still valid
- * Consolidated yields shall come soon

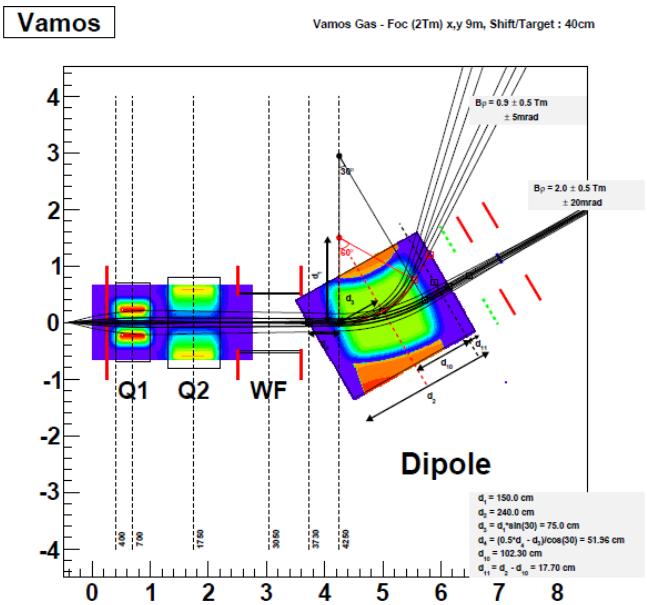




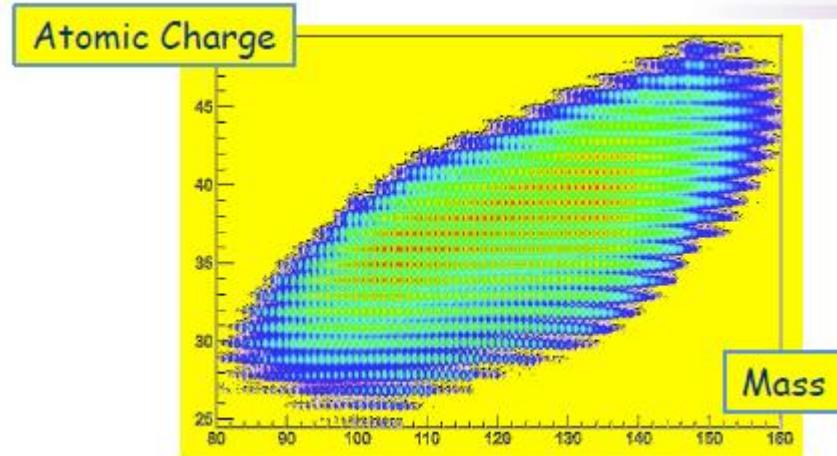
To complete the propose physics program, 2 additional years at GANIL are necessary



-Nanogam -surface = febiaad -ecr HD



The first campaign is AGATA + VAMOS (vacuum)
(+ PARIS/FATIMA)(+ Plunger)(+...) in 2015



11-12th of February at GANIL : **AGATA Collaboration Meeting** to discuss the proposals based on the LoI, eventual new proposals, check the feasibility and eventual overlaps. (~Pre-PAC)

→ 30 Proposals discussed. ~700 UT proposed

25 Proposals using this setup submitted to the last GANIL PAC meeting (3-4th of April 2014).

**10 experiments accepted (325 UT) to be scheduled in 2015-2016
Beam starts next March for 4 months of data taking**

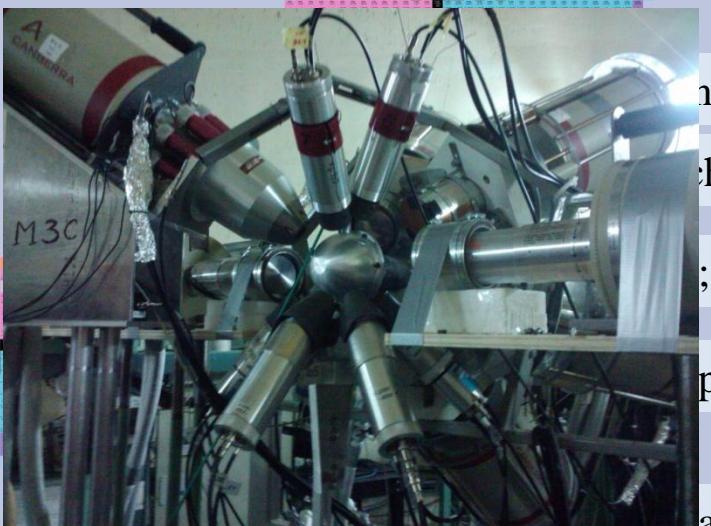
Physics cases for the 1st AGATA run at GANIL



$^{238}\text{U}, ^{208}\text{Pb} \rightarrow \text{n-rich}$

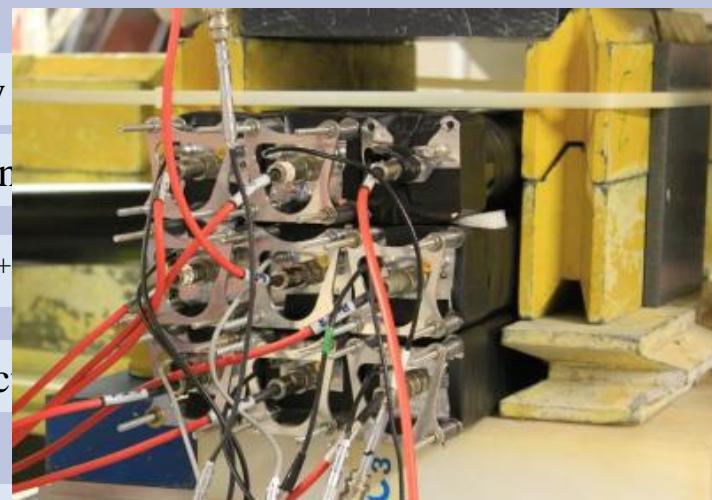
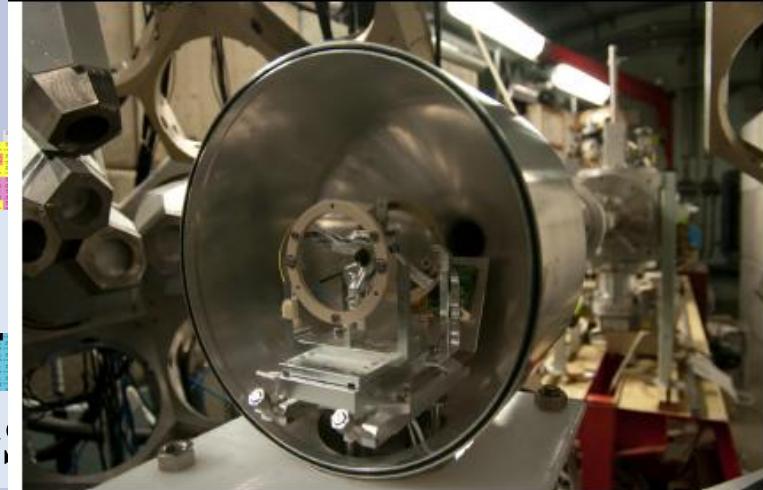
National Nuclear Data Center

J. J. Valie
lifetime in



S. Ecker et al., Exotic in n-rich C and O isotopes: test of the three body forces

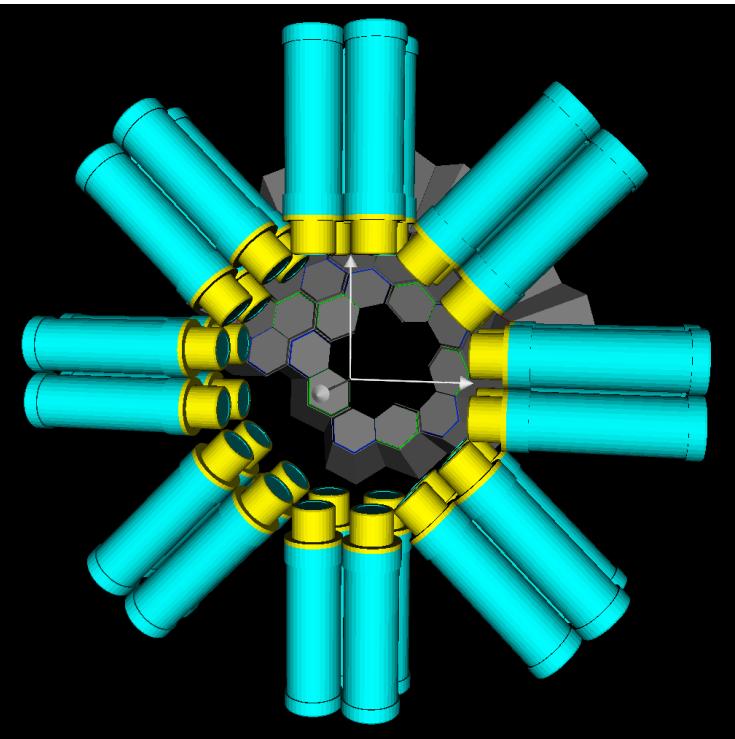
G. Georgiev et al; 2⁺ lifetimes and g



National Nuclear Data Center
Data extracted from the NuDat 2 database,
for this presentation
The information from NuDat 2 (tables
presentations, articles and books.)

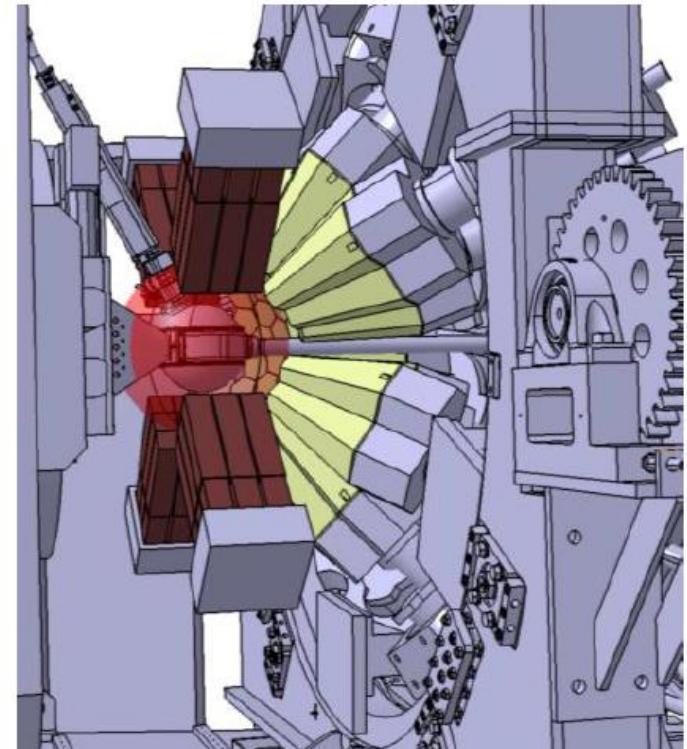
2 experiments accepted to be scheduled late 2015 or beginning of 2016

Courtesy of B. Bruyneel



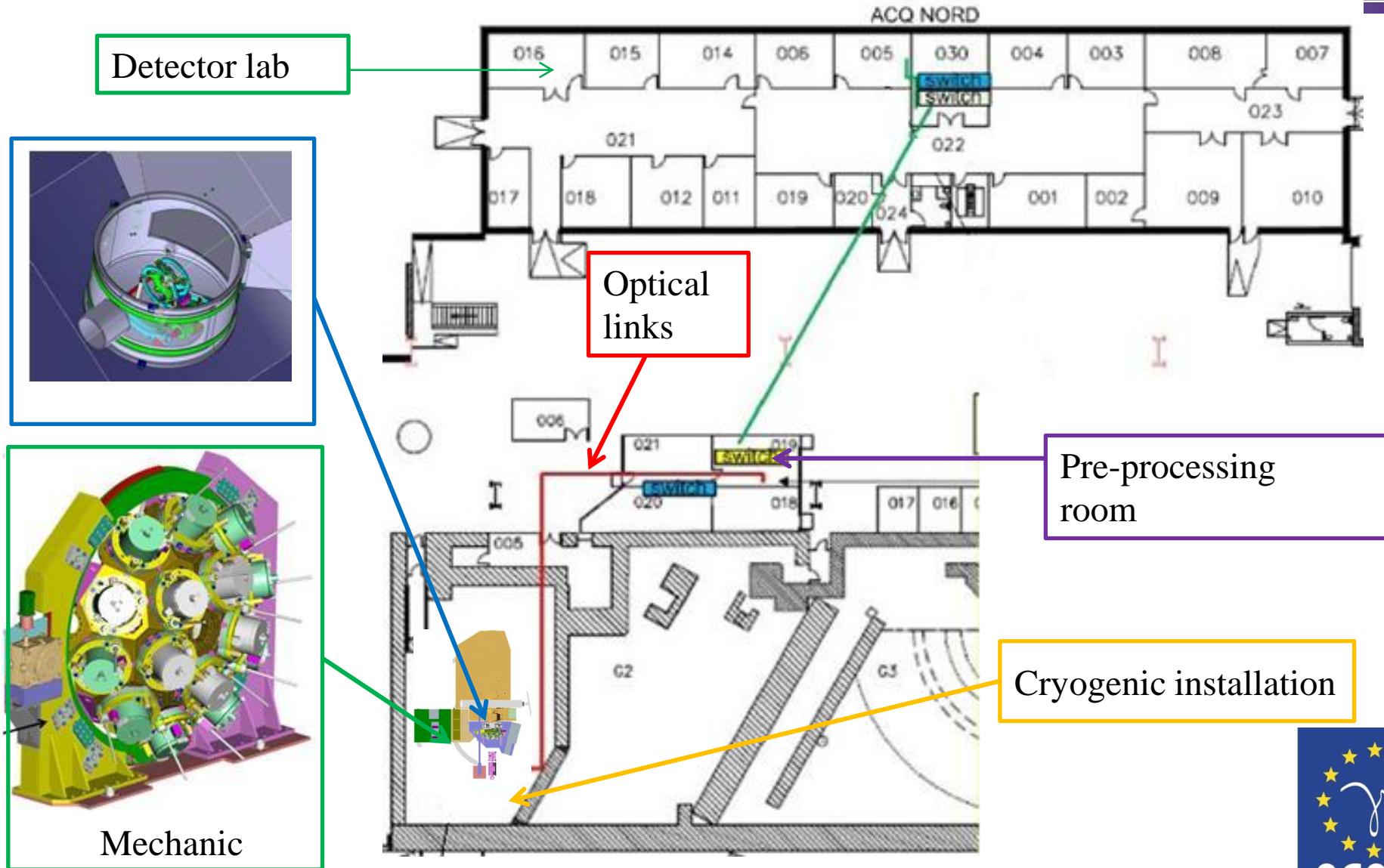
E.Clément

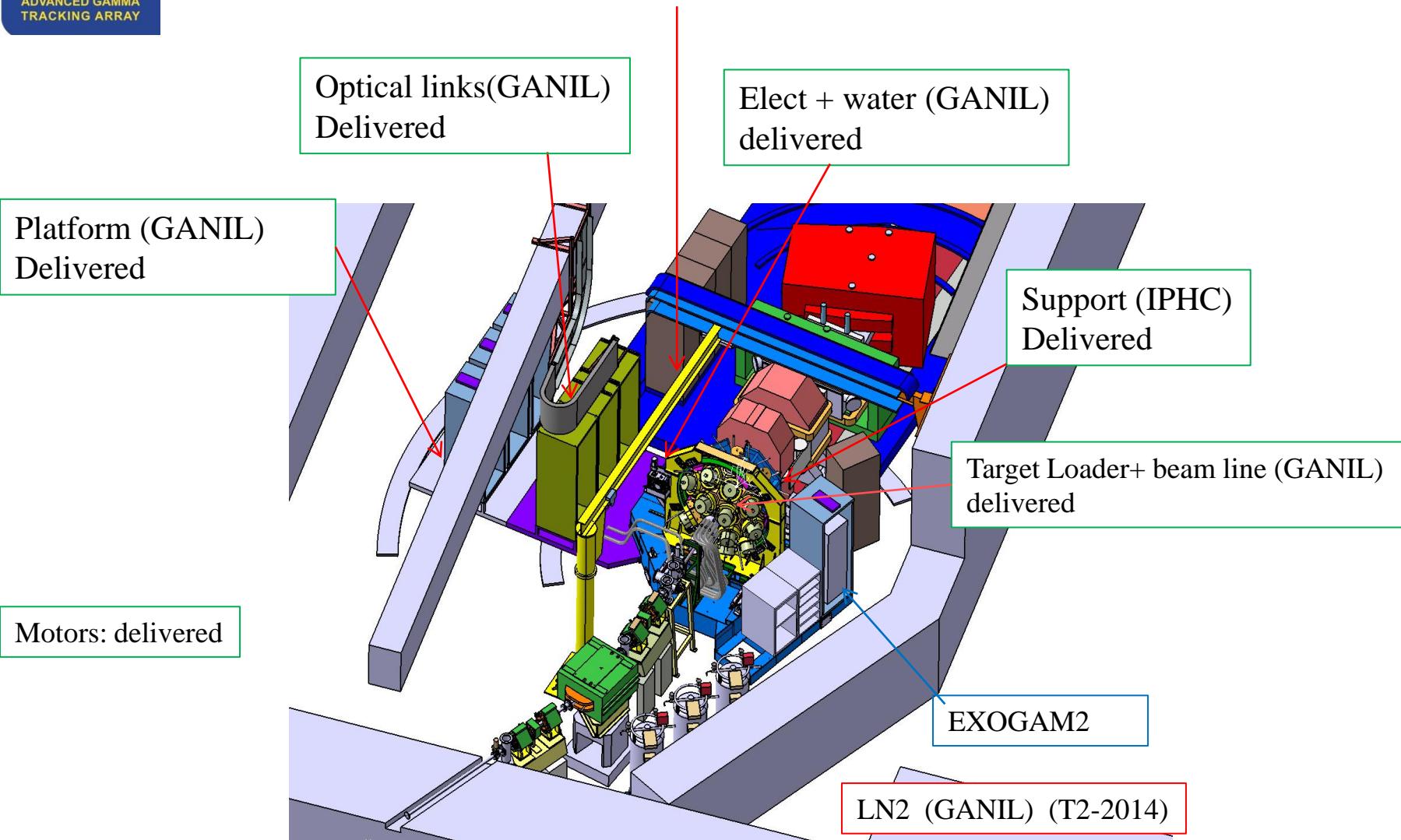
Courtesy of A. Maj

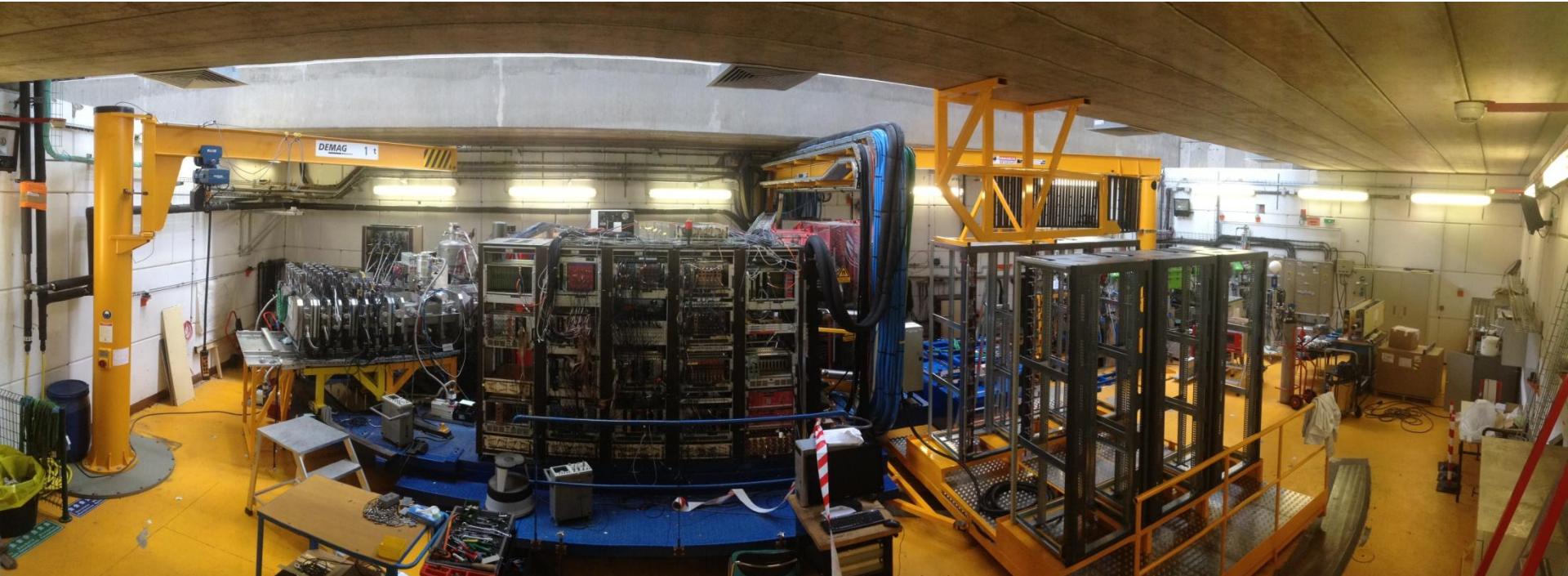


Status of the GANIL installation

Total Budget ~400 k€ / 2 years







- ✓ Additional platform for Infrastructure and Front-End electronic
- ✓ Grounding
- ✓ Optical links (350) and cold water for the cooling of the Front End Electronic
- ✓ Security-Safety
- ✓ Electric distribution
- Cryogenic distribution (LN2)

E pur si muove! (*Galileo Galilei et al.*) up to 46 degrees

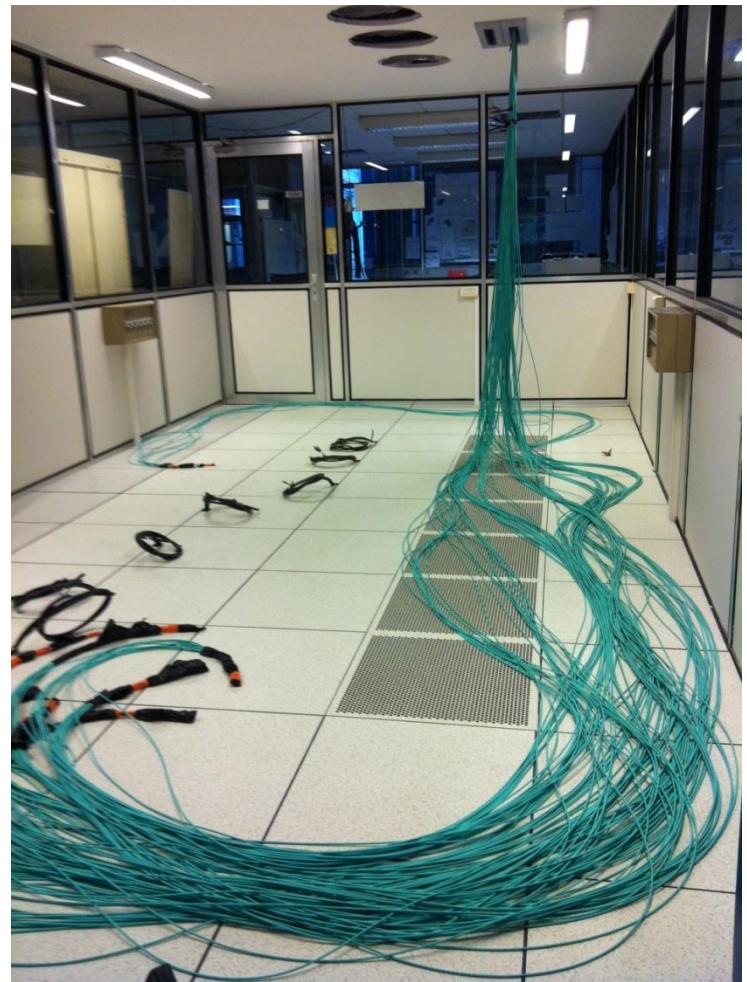
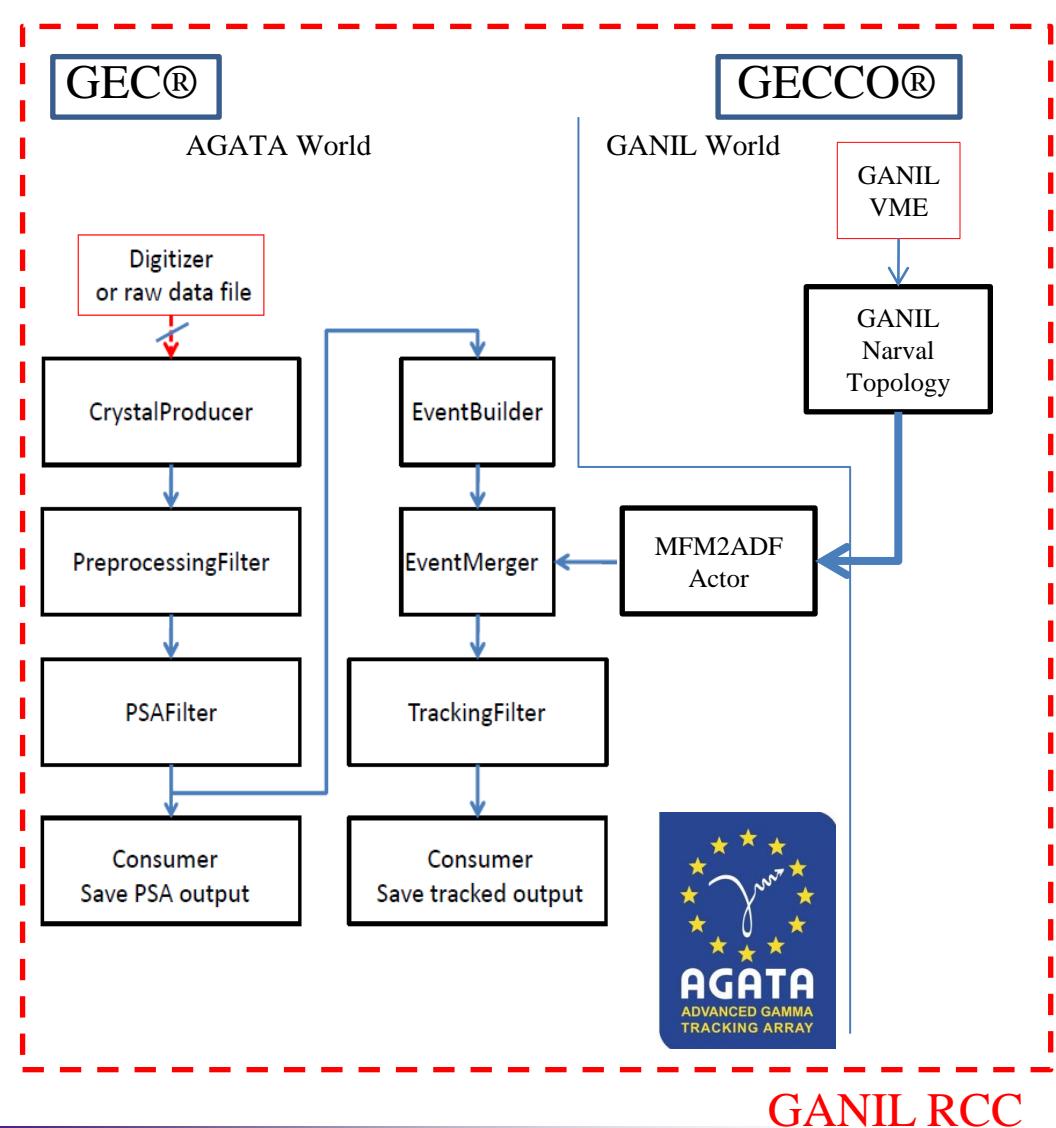




✓



Data Acquisition - Merging



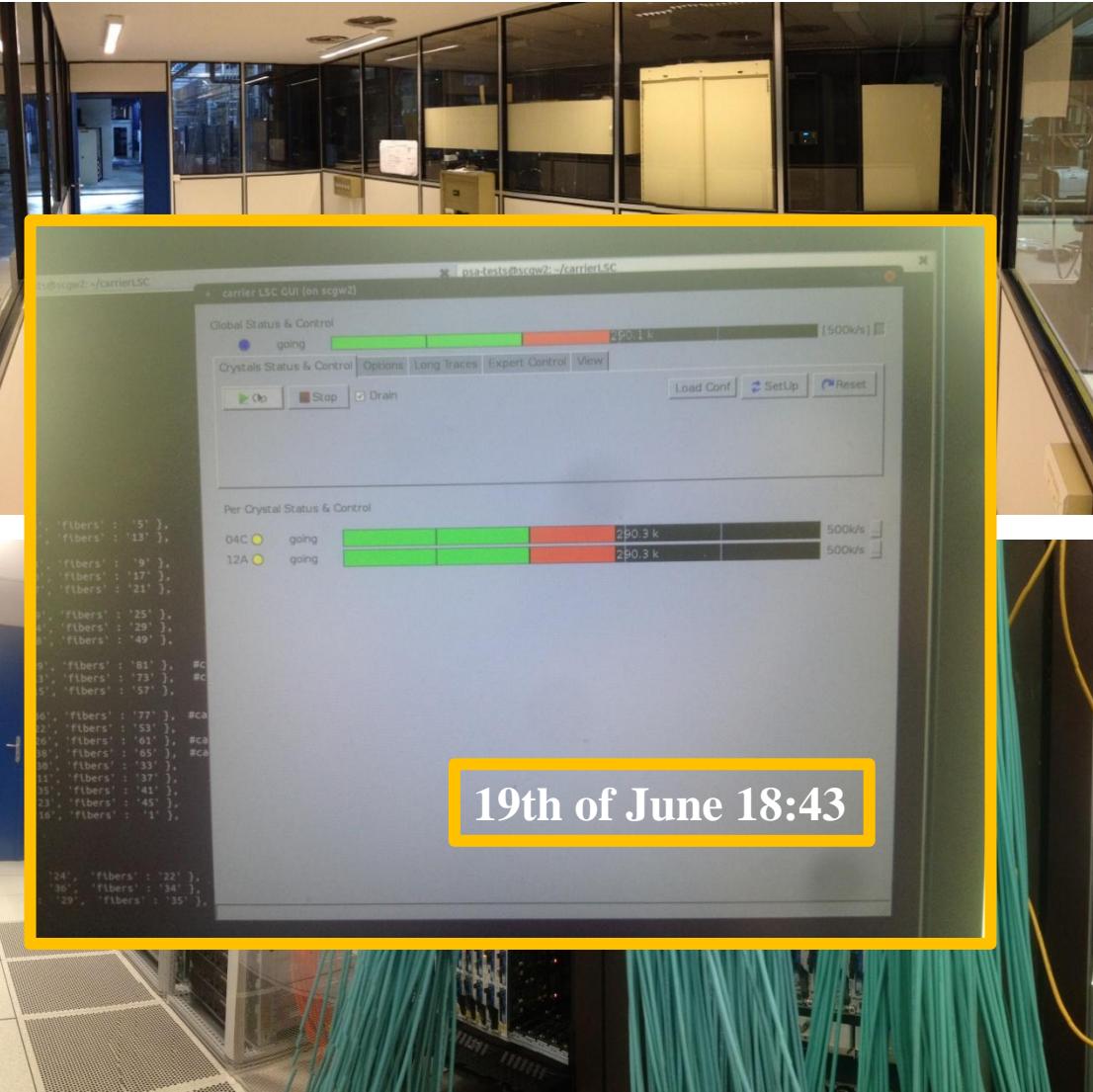
Electronic needed for the VAMOS-AGATA coupling delivered – Operationnal

Coupling the software – Test late July

3rd of last June : our D-Day in Normandy



Electronic and data acquisition installation

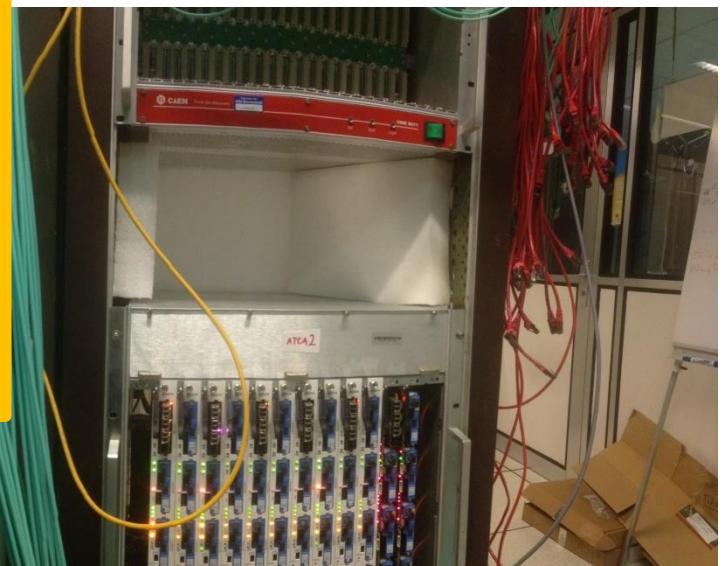


2nd of June

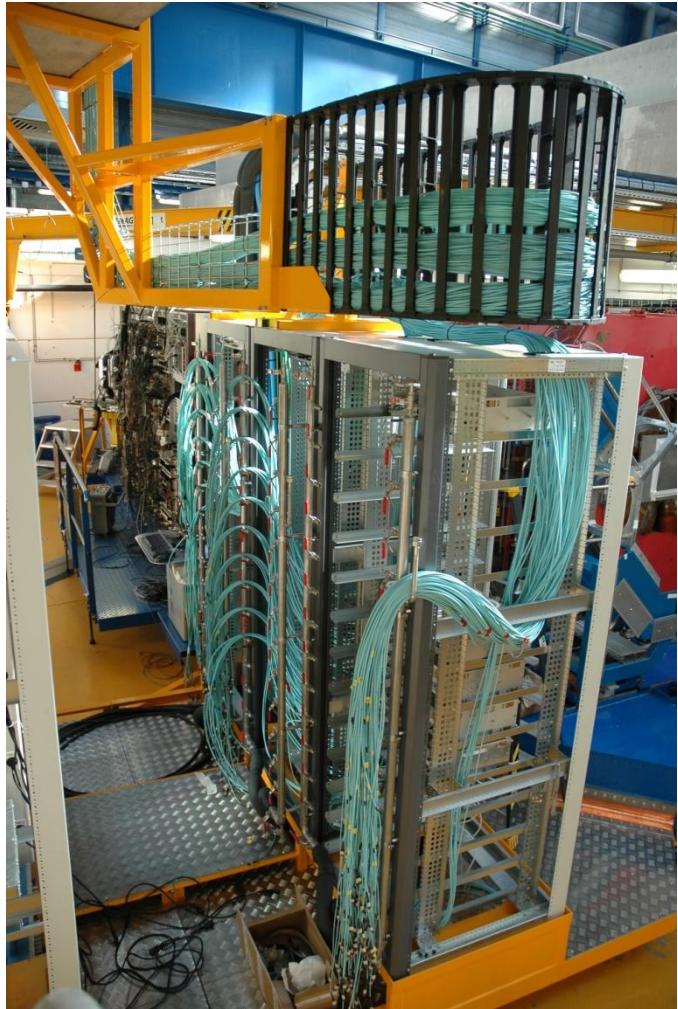


18th of June : full electric power available

lxagata0.gsi.de → lxagata0.ganil.fr



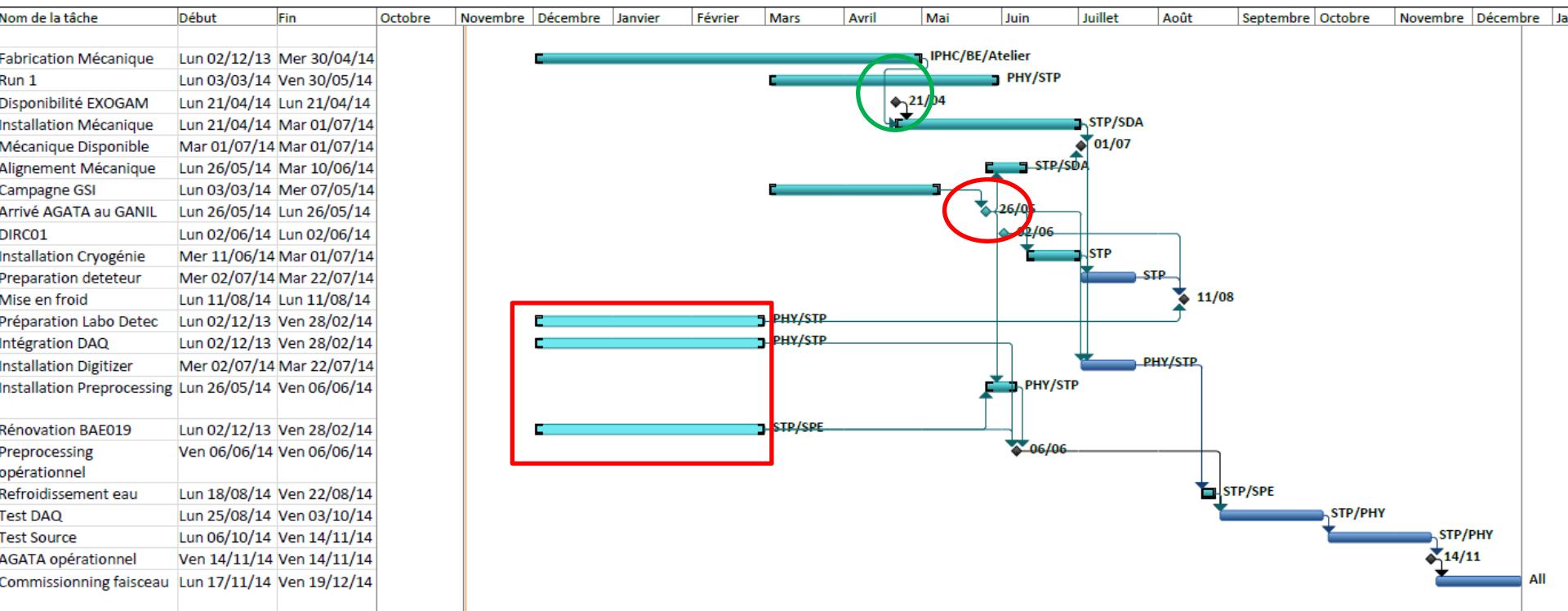
Infrastructure



Planning

March → 16th June 2014 : Run1 GANIL

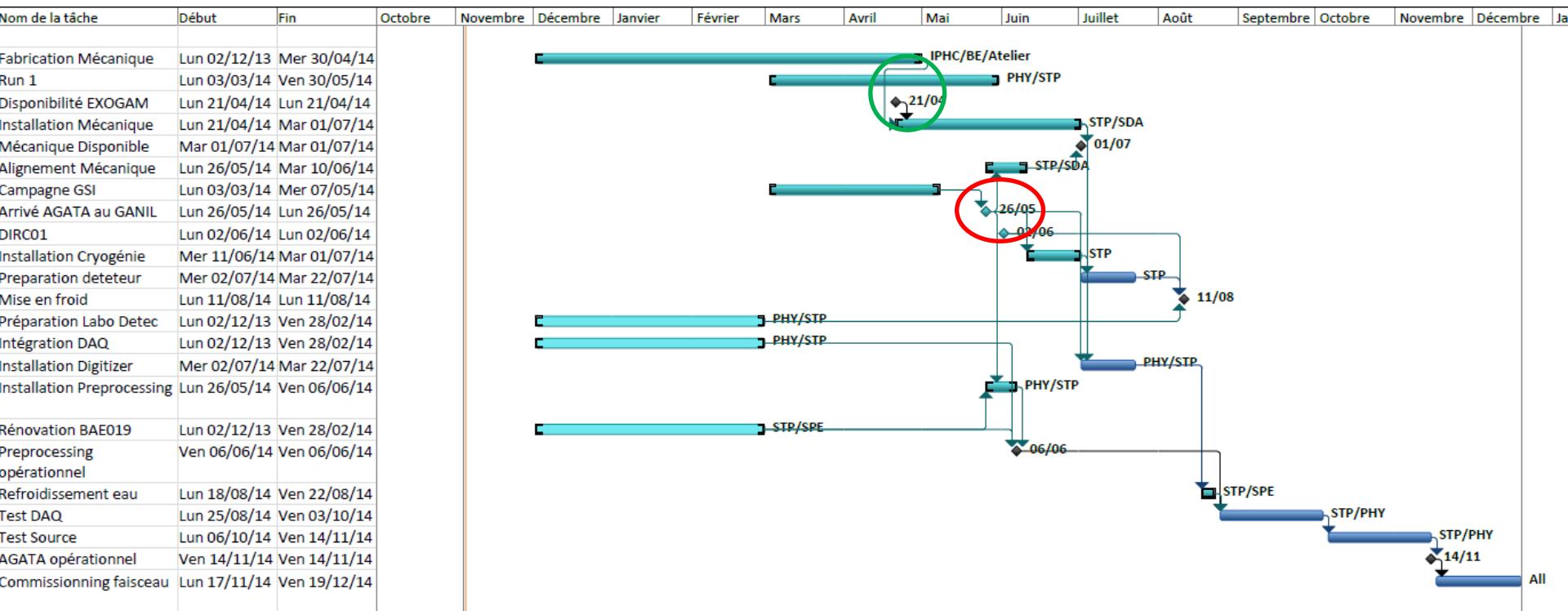
Lot of efforts in January-May at GANIL on the infrastructure
AGATA transferred on the 3rd of June



Planning

- Mechanical installation completed by end of June
- Installation FEE-DAQ end completed by end of July
- AF, DSS, cabling completed by end of July
- First cooling of detectors and installation in August after summer blackout
- Tests September—November

→ AGATA ready for in-beam commissioning



Commissioning runs

In-beam commissioning 12th of November- 22th December 2014

In-beam objectives :

Correlation p- γ

Doppler Correction & P/T

Background



→ Commissioning AGATA solo at high spins: 3 days of $^{40}\text{Ar} + ^{122}\text{Sn}$ @ 170 MeV, (GS-GRETINA) – counting rate, background, absorber

→ Commissioning reference measurement : ^{238}U (6.5 MeV/A)+ ^{64}Ni (DIC)

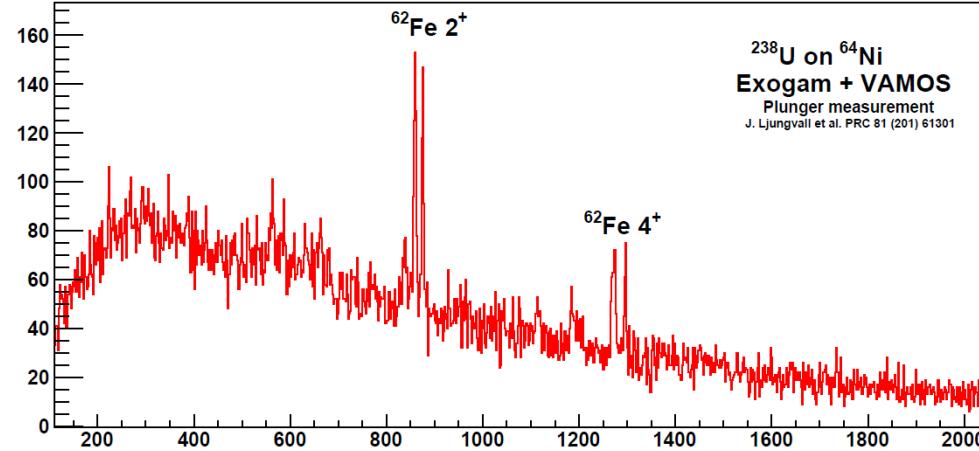
High counting rate with typical background

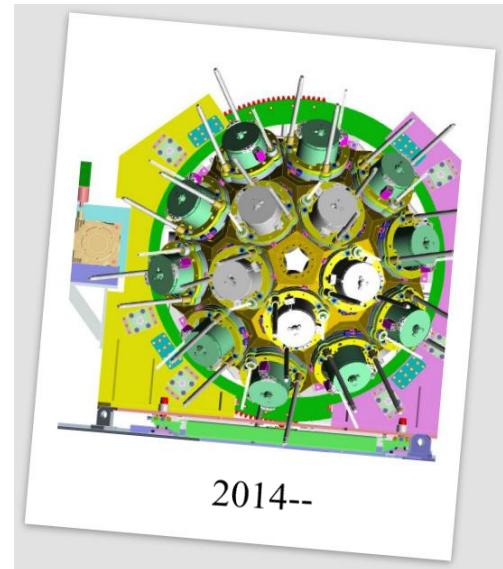
Easier for VAMOS

Can be directly compared with EXOGAM-VAMOS data 2x5 days

→ Commissioning VAMOS fission detectors: ^{238}U (6.2 MeV/A)+ ^9Be

→ Data taking for experiment starting on the 1st of March





VAMOS-GFS : physics case

Short term (2017 -) AGATA, EXOGAM 2

^{256}Rf . J. Piot et al

$^{236,238}\text{Cm}$, $^{244,242}\text{Cf}$ $^{232,230}\text{Pu}$ B. Sulignano et al

Plunger ^{254}No ; J. Ljungvall et al

Spectro ^{239}Bk , ^{256}No . C. Theisen et al

Plunger ^{176}Hg , C. Fransen et al

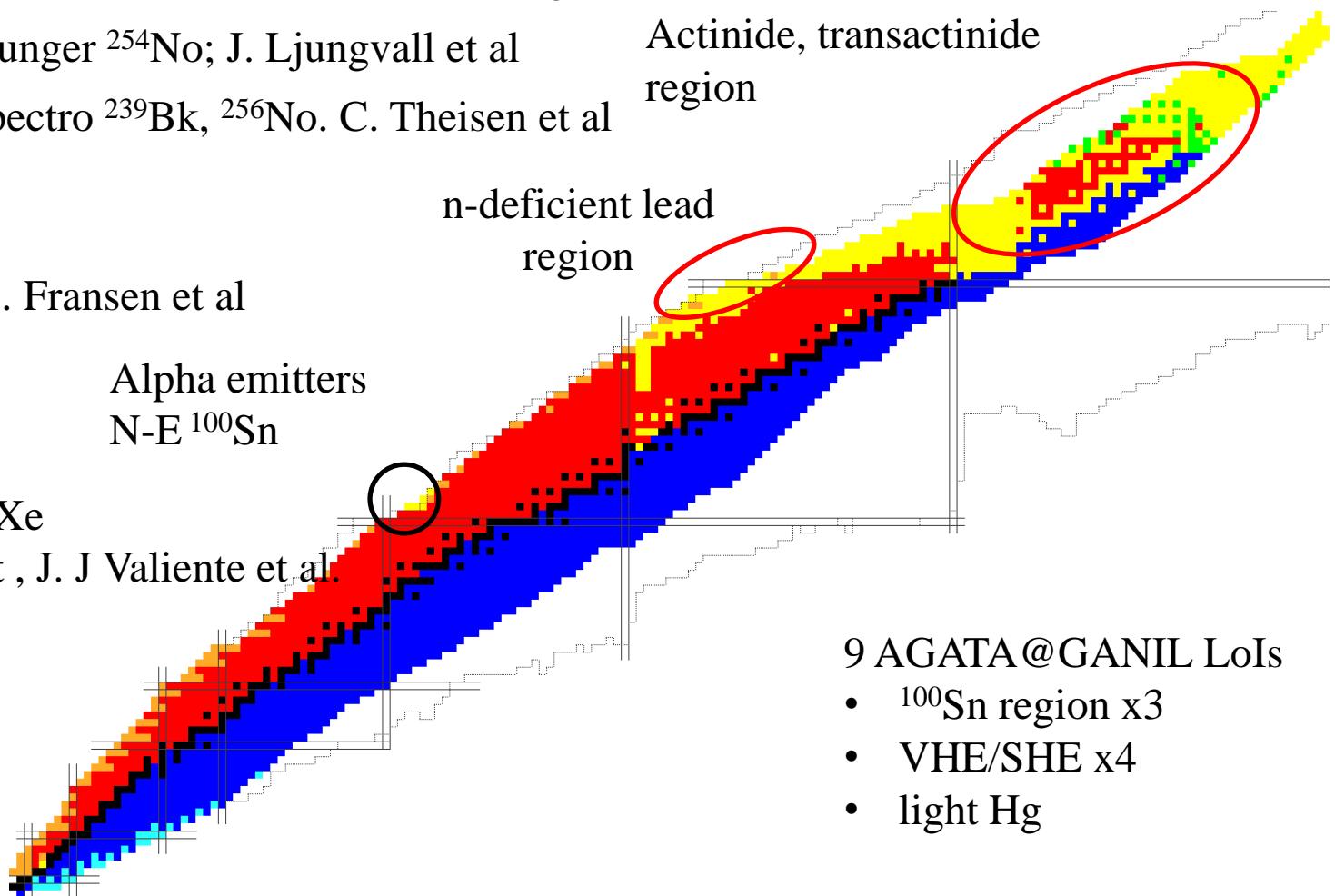
Alpha emitters
 $\text{N-E}^{100}\text{Sn}$

Plunger in ^{106}Te , ^{110}Xe

T. Back, E. Clément , J. J Valiente et al.

Actinide, transactinide
region

n-deficient lead
region



9 AGATA@GANIL LoIs

- ^{100}Sn region x3
- VHE/SHE x4
- light Hg