Installation of AGATA@LNL

Jose Javier Valiente Dobón

Laboratori Nazionali di Legnaro (INFN), Italy.
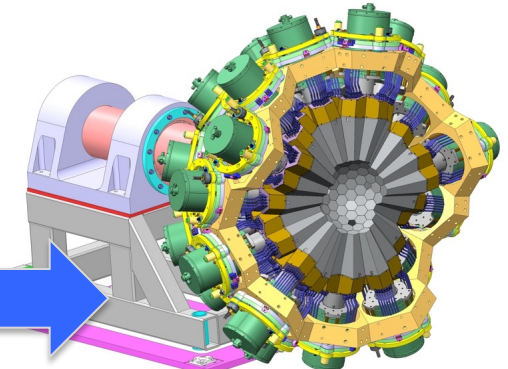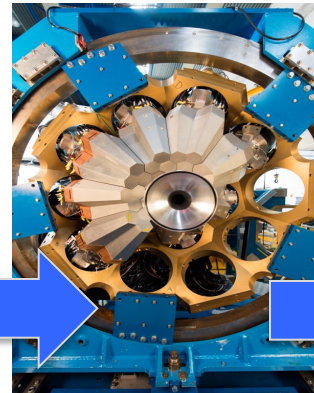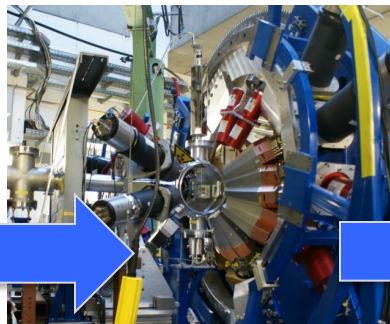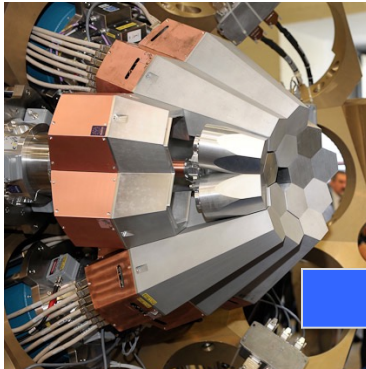
The AGATA time line

AGATA@LNL

AGATA@GSI

AGATA@GANIL

AGATA@LNL

2009

2011

2014

2022 commissioning
2022-2024 Physics campaign

Physics campaign coordinator: M. Zielinska

WG AGATA@LNL

Task 1, Infrastructure: Roberto Menegazzo

Task 2, AGATA Mechanics: Nicola Bez, Loris Ramina, Mirco Rampazzo, Marco Scarcioffolo, Diego Giora

Task 3, Experimentation mechanics: Giovanna Benzoni

Task 4, Safety and Quality: Maria Luisa Allegrini, Daniela Benini, Luca de Ruvo

Task 5, Computing and network infrastructures: Michele Gulmini, Massimo Biasotto, Sergio Fantinel

Task 6, Surveyor: Daniele Scarpa

Task 7, Detectors: Walter Raniero, Davide Rosso

Task 8, DAQ-Electronics: Alain Goasduff, Nicola Toniolo

Task 9, Complementary instrumentation: Daniele Mengoni

Task 10, Performance: Fabio Crespi, Simone Bottoni

Task 11, Exploitation: Andrea Gottardo, Oliver Wieland

Task 12, Data Analysis: Francesco Recchia

Task 13, Logistics: Paolo Cocconi

Task 14, Documentation and data base: Vincenzo Volpe

Task 15, Public exposure of AGATA activities: Andrea Gozzelino

AGATA at LNL: Working Together Guidelines. Version 0.4 2019

AGATA Management Board

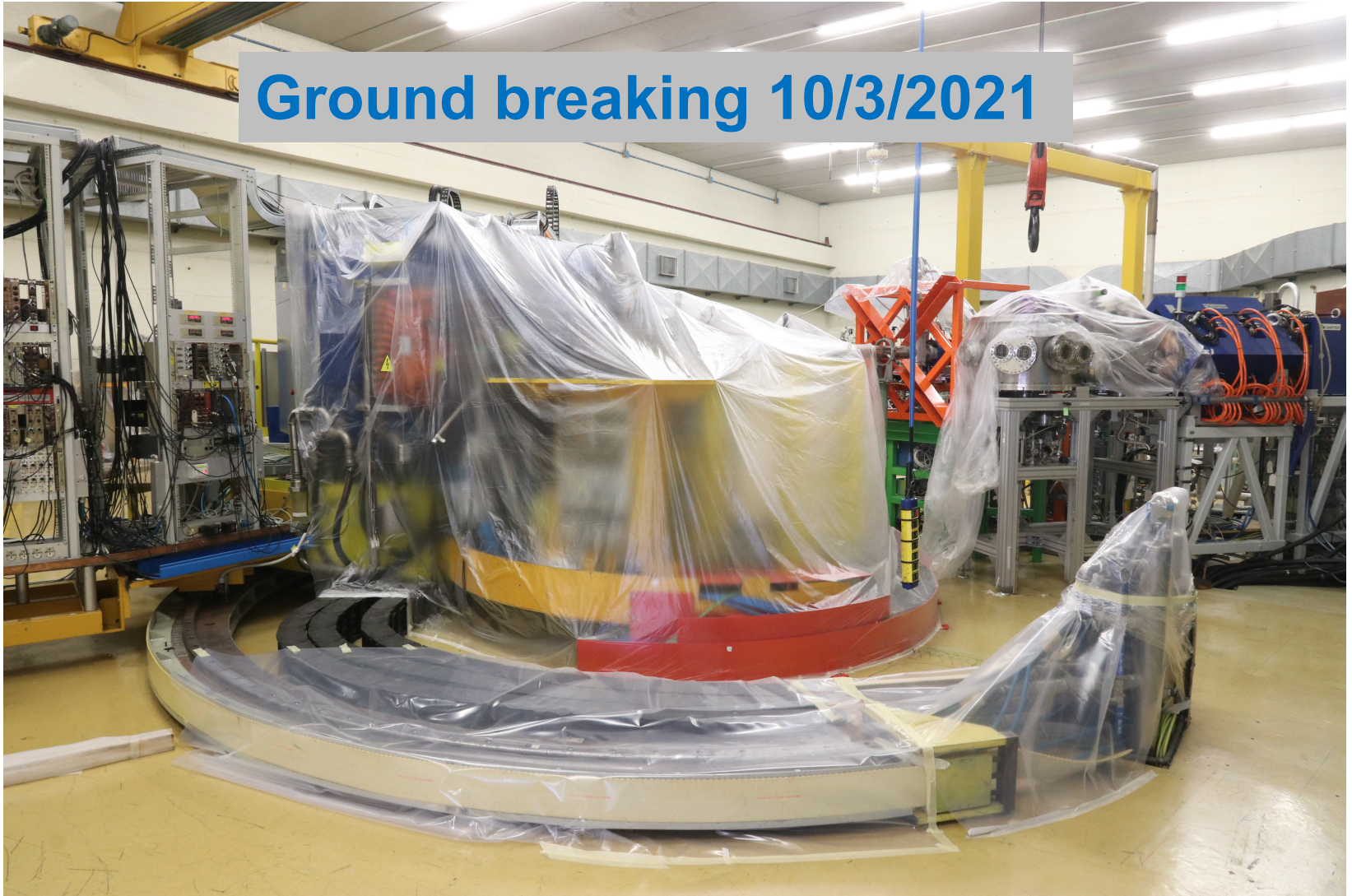**Guidelines for Working Together during the Installation and Deployment of AGATA at LNL.**

APPROVED

Work Document

Version 0.6, 2020

Contributors: A. Gadea, J.J. Valiente-Dobón
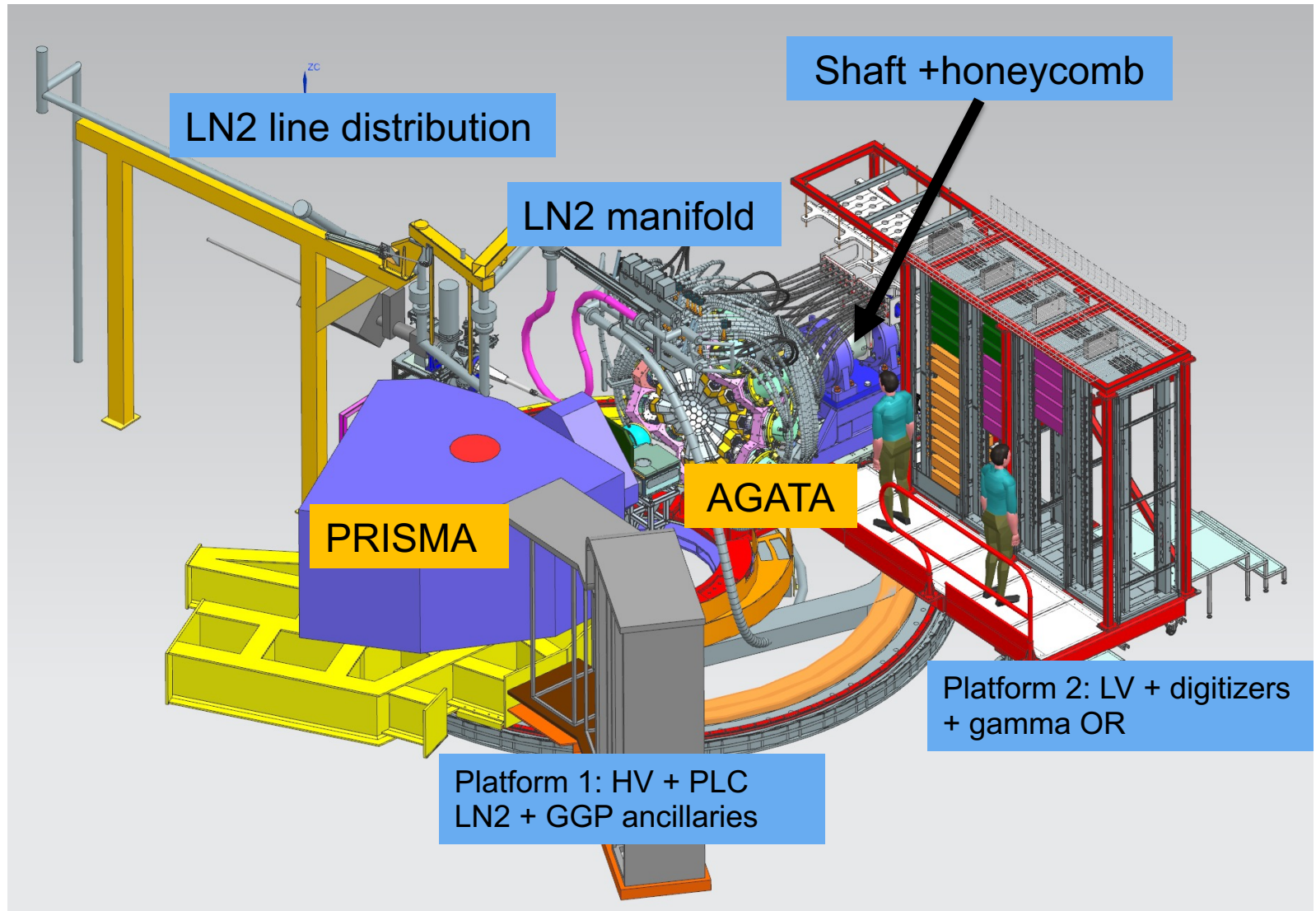
Ground breaking

Ground breaking 10/3/2021

AGATA@LNL

AGATA@LNL

Platform 1: HV + PLC LN2 + GGP ancillaries

PRISMA

Platform 2: LV + digitizers + gamma OR

LN2 manifold

LN2 line distribution
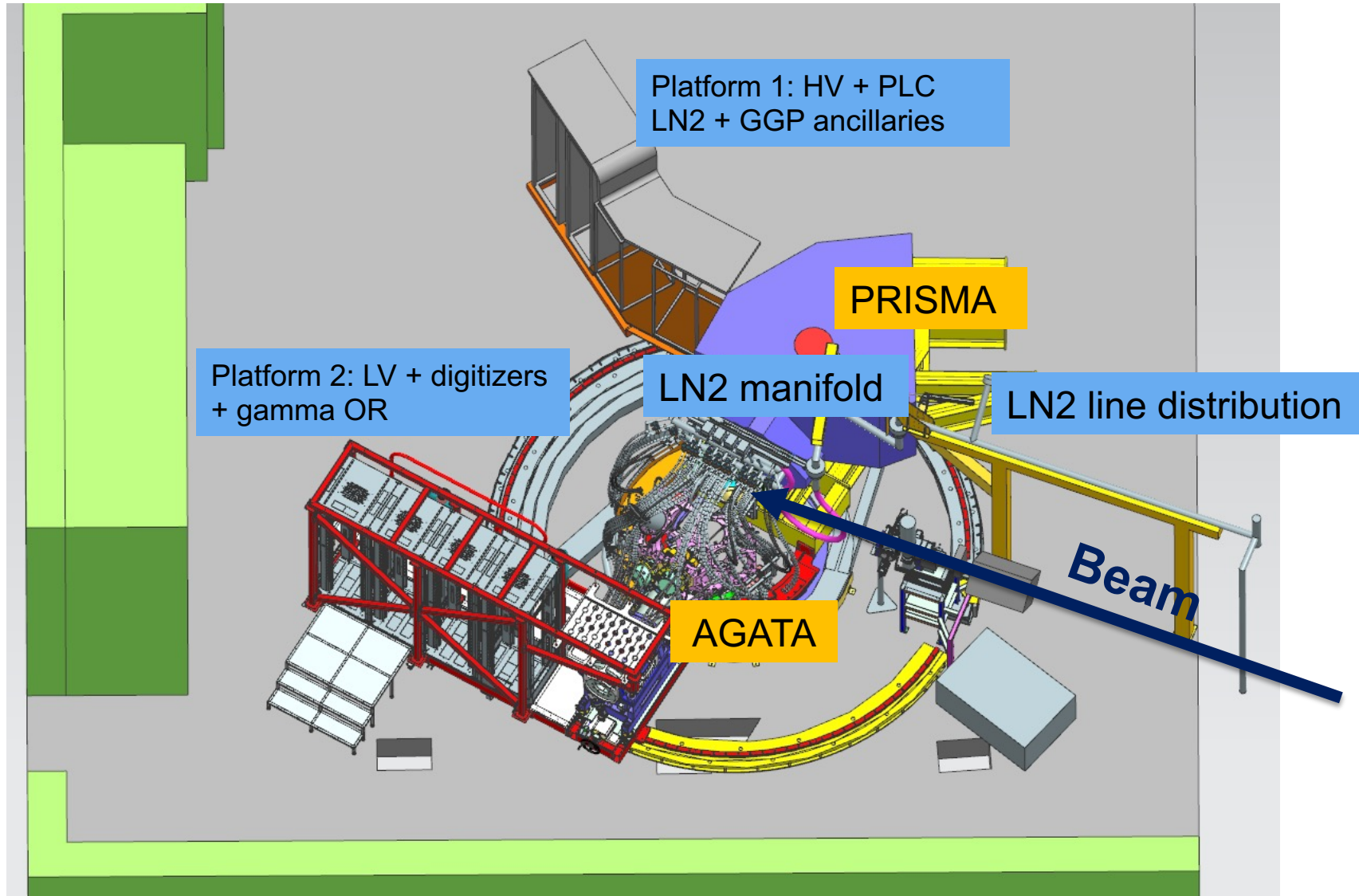
Beam

AGATA

Infrastructures

Cabling managing (~ 2000 cables, MDR ~10m)
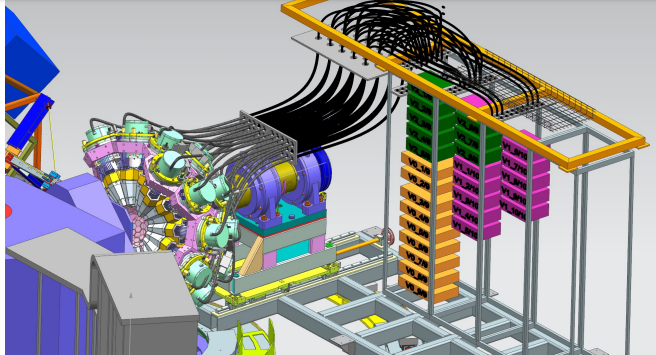
Floor reinforcement and rotating translating platform → ~ 5 Tones

Complex LN2 distribution line
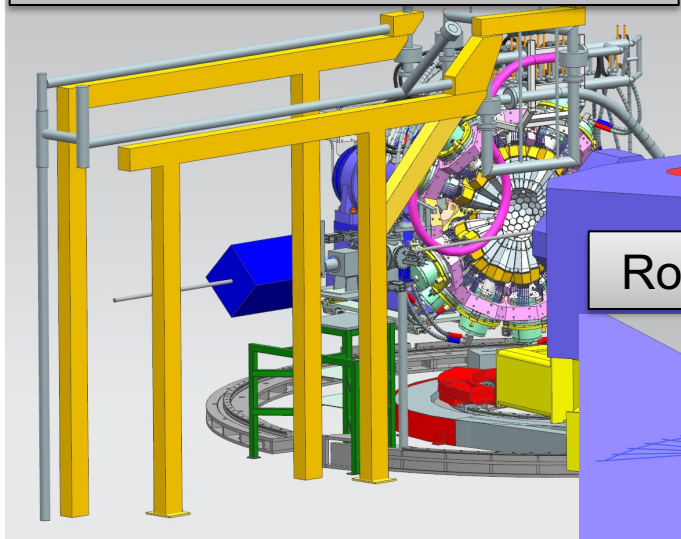
Roto-translation

Beam line

Telescopic tube
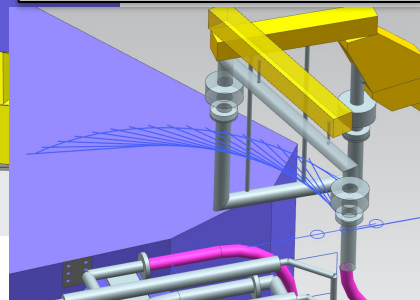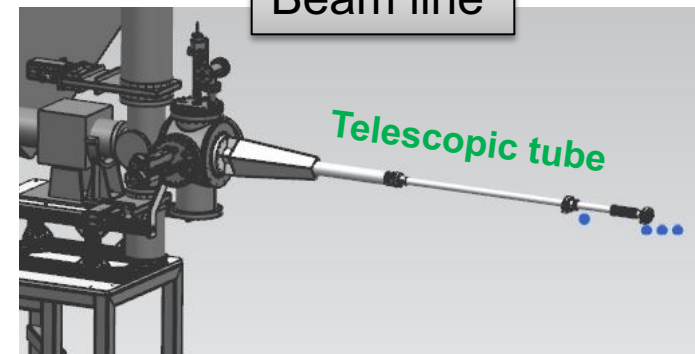
AGATA 2π flanges

Flanges realized within INFN
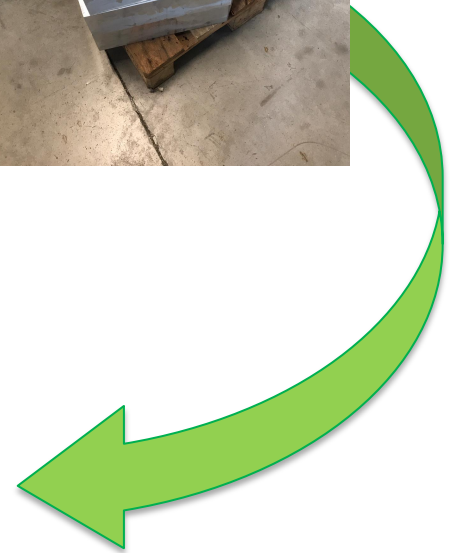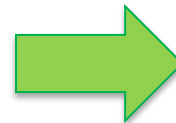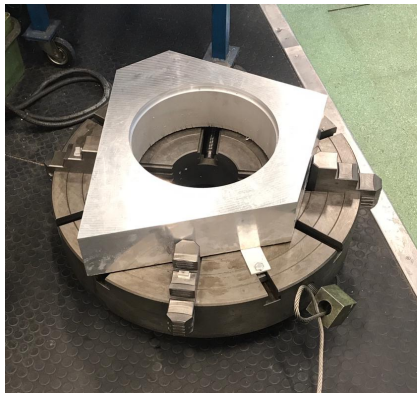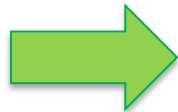
Some trucks arrived …

From France (GANIL)
September 8th 2021

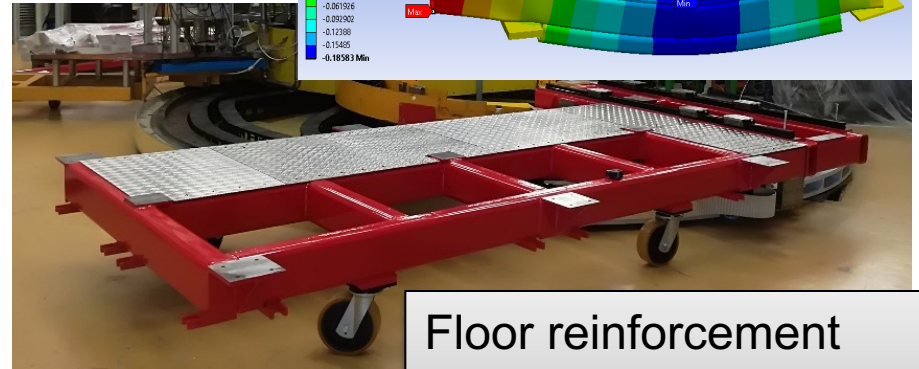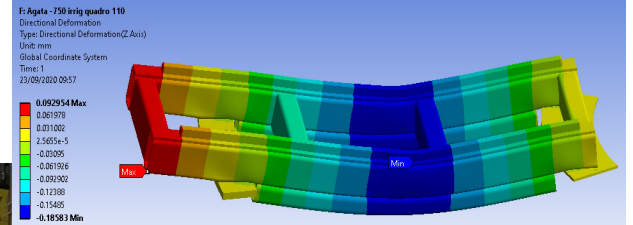From UK (Daresbury)
October 12th 2021

And here we are …

Reaction Chamber

Target

Beam dump

33.5

610
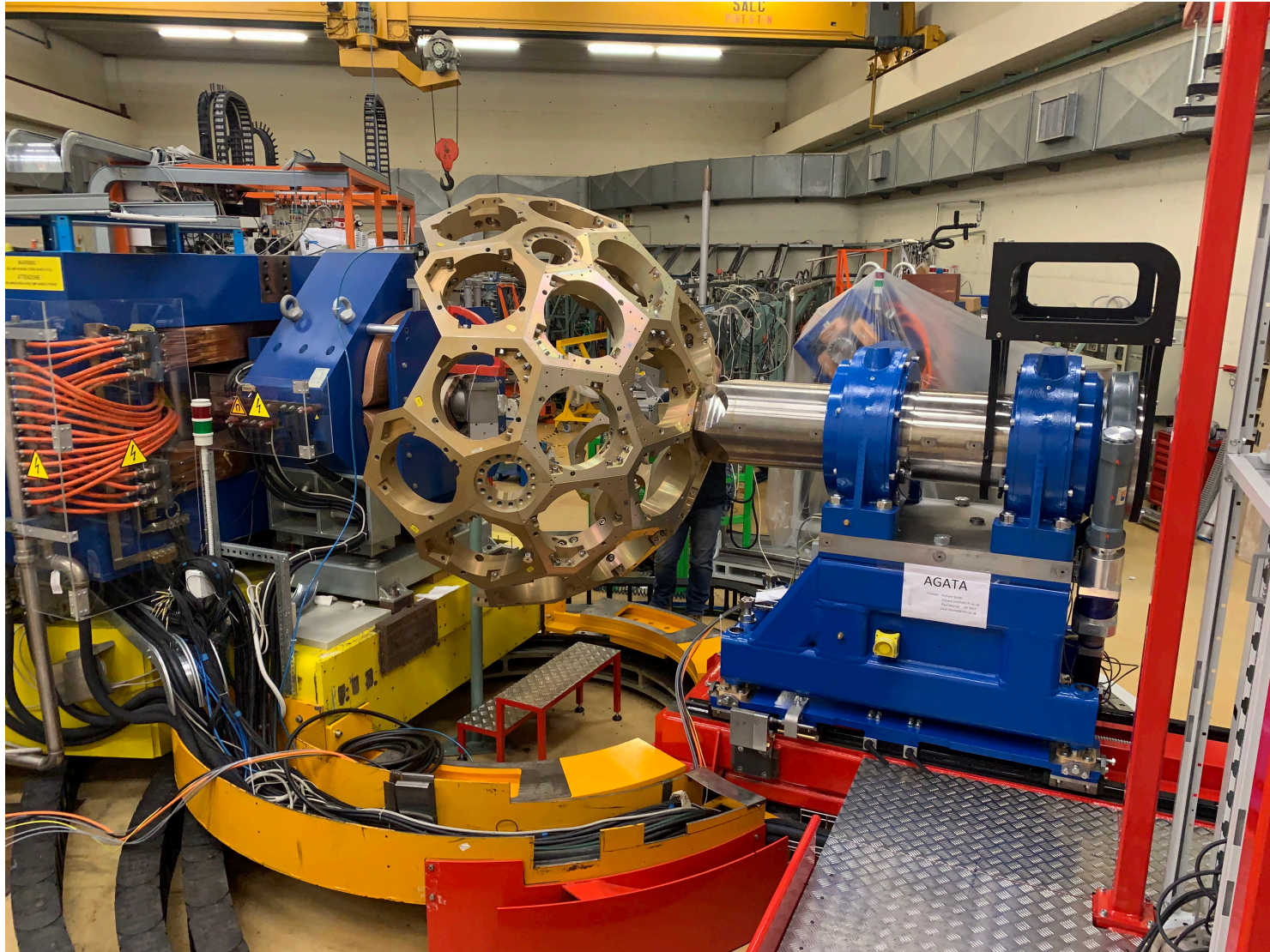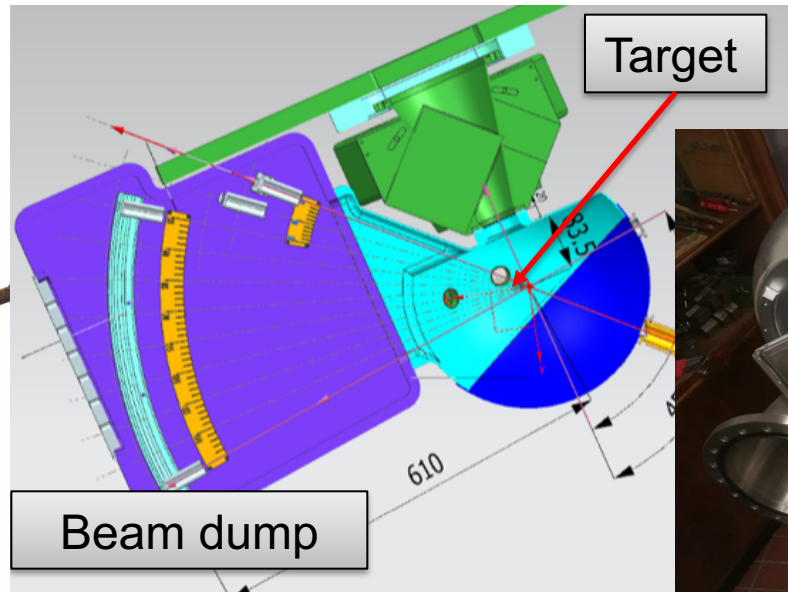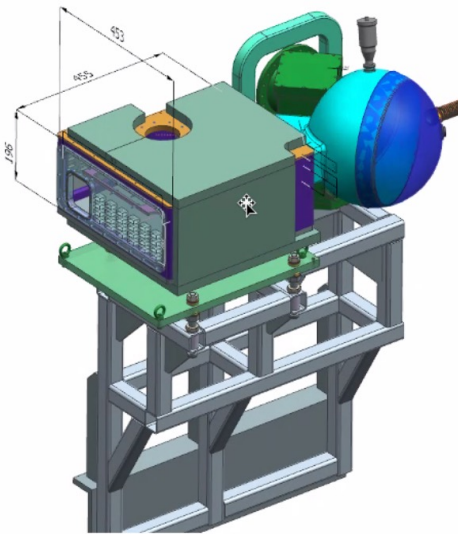
Simulations to define the shielding → to reduce the bkg

Scattering Chamber

Beam dump background shieldings

Alluminum

Vacuum Pump

Beam dump background shieldings

Alluminum

A

B

C

D
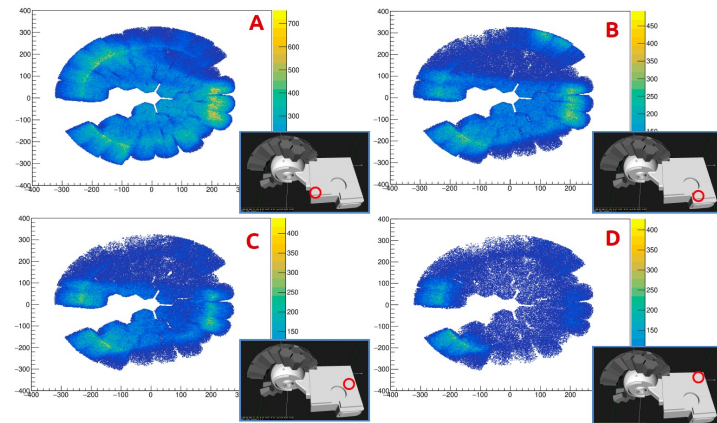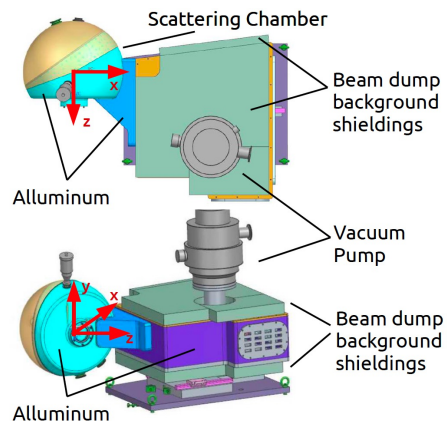
MILANO
17th-19th
January 2022

Registrations:
https://agenda.infn.it/event/28706/

Deadline: 8th of December

Ancillaries compatible with PRISMA

Silicon detectors:
- Coulex → SPIDER
- Transfer → GALTRACE (+SPIDER/CD)
- [Euclides]

Other...
- MCP → DANTE

- Plunger

FEE

Dets
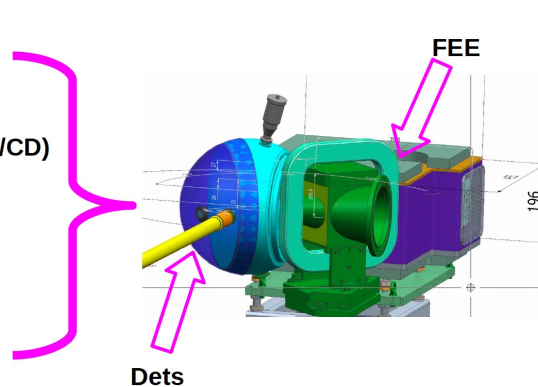
Integration challenge

16:30   **PRISMA** 10'
      Speaker: Franco Galtarossa

16:40   **GAL-TRACE** 10'
      Speaker: Stefano Capra

16:50   **EUCLIDES** 10'
      Speaker: Daniele Brugnara

17:00   **SPIDER** 10'
      Speaker: Marco Rocchini

17:10   **DANTE** 10'
      Speaker: Kseniia Rezynkina

17:20   **Gamma-ray scintillators** 10'
      Speaker: Sara Pigliapoco

17:30   **Plunger** 10'
      Speaker: Irene Zanon

Inside reaction chamber

Outside reaction chamber

Complementary

- EUCLIDES
- NEDA
- TRACE/GRIT/MUGAST
- plunger
- PARIS
- SPIDER
- RFD
- FATIMA
- SUGAR
- LaBR3:Ce
- LEPS
- Electtron conversion
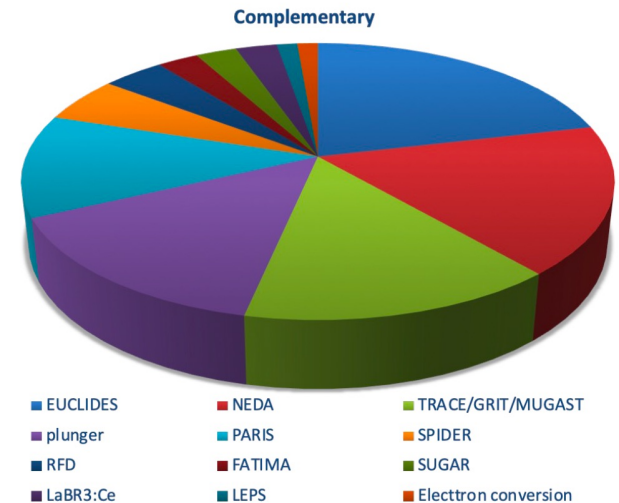
Electronics readout complementary

- "Traditional" VME (V785/V775) → PRISMA
  - Coupling to AGATA using the AGAVA
  - new VME bridge tested to reduce dead-time from 10% to 2% for 1KHz of PRISMA

- GGP readout → Si-array: EUCLIDES, SPIDER, TRACE, ...
  - Up to 12 systems available (Up to 434 channels depending on the FW)

- "Commercial" digitizers → PARIS, FATIMA, LaBr3 high efficiency
  - Coupling to AGATA using the AGAVA
  - Some digitizers available at LNL (16ch@500 and 64ch@250 MHz).
  - Solution adopted also for PARIS@EXOGAM collaboration
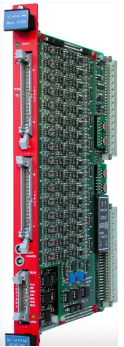
DAQ, network & near-online analysis

- Two distributed acquisition system (XDAQ – DCOD) - similar to GANIL situation. XDAQ → in AGATA format (ADF)
- New and centralized run control
- One single network: Inclusion of the ancillary detectors as Agata sub-network
- AGATA network isolated from the laboratory network
- VLAN access to lab resources (Printers, ...)
- Analysis programs are almost ready to perform near online analysis

Data flux and codes for on-line, near-line analysis

AGATA   VME PRISMA   GGP Galileo: TRACE, scintillators

                                    SPY PRISMA
                                    (Greware)
                Analysis PRISMA   readout
                                    Raw data on disk

AgaSpy

                ADF filter   Local filter

                                                                    Local spy

                    Event merger

Near-line analysis   • Every «external» ancillary must also
                                             provide its onwn analysis filters
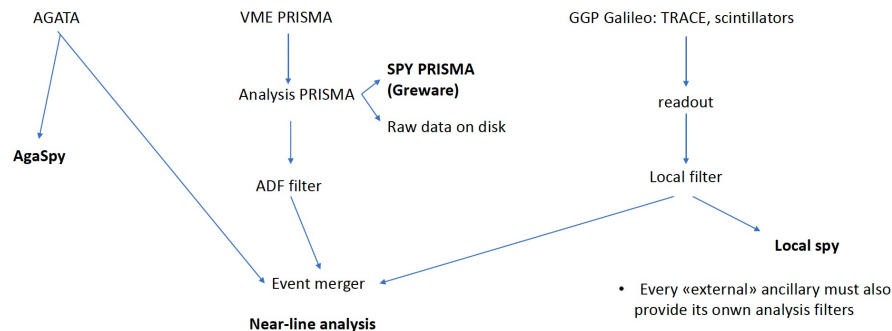
Monitoring and creation of metadata

Grafana

Hardware monitoring HW:
- HV HPGe and ancillaries
- LN2 germanium temp.
- GGP & digit. temperature
- GGP rates
- ...

Software monitoring:
- buffer rates
- data bandwidth
- disk space
- ...

Data Centre for AGATA

AGATA DAQ Servers
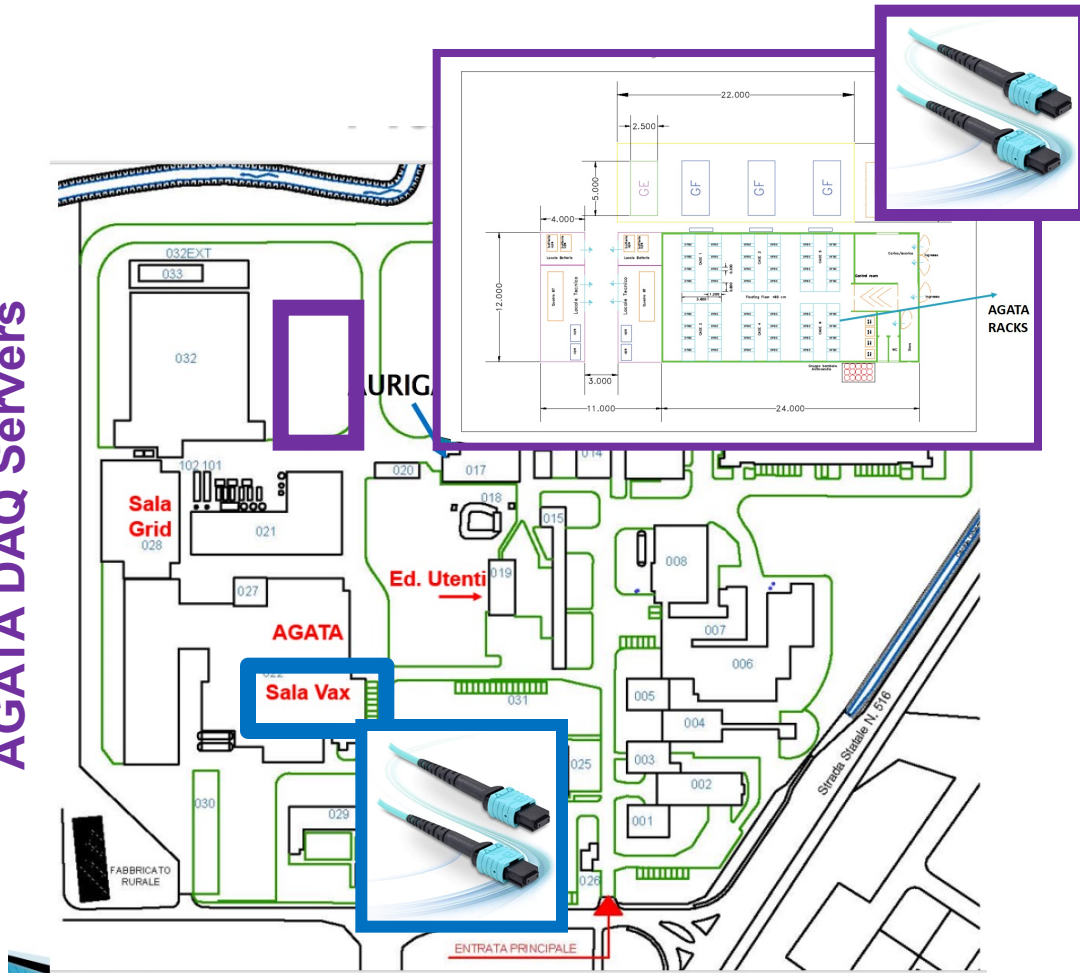
Sala VAX → V1 electronics
New data centre → V2 electronics

First detectors at LNL

Dedicated detector laboratory + new area in experimental hall 2 (mount and test)

- Four Agata detectors arrived at LNL-INFN at 19/10/2021.

  - Two of these (ATC18 and ATC17) arrived completely mounted with capsules. These ATCs were pumped and cooled down.

  - Other two ATCs were delivered ATC1 and ATC7. These two ATC were completed mounted at LNL-INFN

- From 15/11/2021, another 2 ATCs will be delivered by the IPHC Strasburg to LNL-INFN (assembled and tested). From the first of December other 1 or 2 ATCs will be delivered from IKP Cologne to LNL-INFN (assembled and tested).

EMC tests

Grounding of AGATA: to guarantee the signal integrity of the preamplifier which goes out from the Ge diode through the cold part FET transistor, to the warm part preamplifier and out to the Digitisers racks

Metallic cloth

POWER SUPPLY

Multi Meter
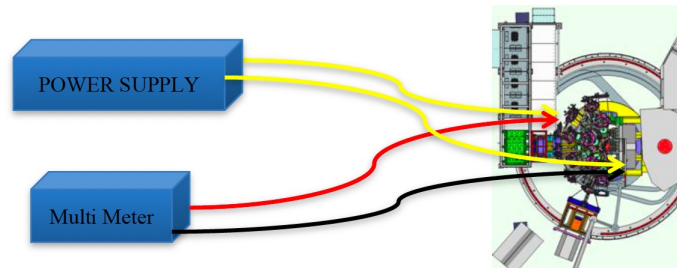
Figure 2   4 wire resistance measurement

Measure | P1:ampl(C1) | P2:freq(C1) | P3:pkpk(C1) | P4 | P5 | P6 | P7 | P8

Measure	P1:ampl(C1)	P2:freq(C1)
value	259 mV	
mean	260.362 mV	
min	250 mV	
max	267 mV	
sdev	1.910 mV	
num	668	

CSNSM

AGATA PROJECT

EMC Report @ LEGNARO July 2021

By: N. KARKOUR

EMC-Report-@LegnaroJuly2021.docx REV A
Created by karkour

Centre de Spectrométrie Nucléaire et de Spectrométrie de Masse (C.S.N.S.M.)
Bâtiments 104 et 108 91405 ORSAY CAMPUS (FRANCE)
+33 1 69 15 52 13   +33 1 69 15 50 08

Figure 83 Direct injection inside the electronic bay floor SNR (dB):-84

In beam commissioning

- Submission of an official proposal to the next LNL PAC
- Request ~4-5 days of beam time + 2 days source measurement
- Possible reaction **^{58}Ni @ 270MeV on ^{124}Sn** target or maybe comparison with other **previously done reactions** in the AGATA/CLARA campaign.

Important to be checked:

- Background from beam dump
- Count rate limits
- Correlations
- DAQ stability
- ...

AGATA target request

New targets ^{3}H, ^{9,10}Be, ^{232}Th, ^{238}U
New beams ^{14}C, ^{238}U ^{204}Hg
Coordination with **LNL USERS**
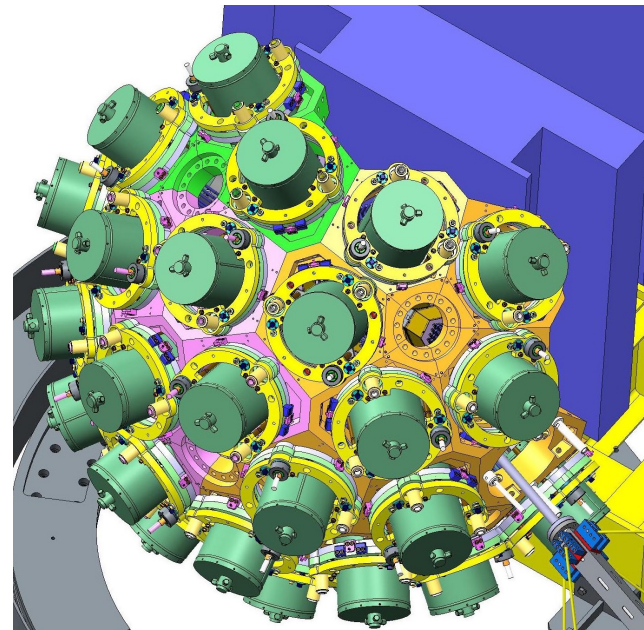
Universität zu Köln

Prof. Dr. Diego Bettoni
INFN-LNL viale dell'Università 2
52020 Legnaro (Padova)
Italy

Mathematisch-
Naturwissenschaftliche
Fakultät

Institut für Kernphysik

Cologne 15.7.2019

Prof. Dr. Peter Reiter

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Germany

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Telefax +49 221 470-5151

Developments of new beams and for usage of targets currently unavailable at LNL

Dear Professor Diego Bettoni,

with this letter I like to draw your attention to some specific requests, discussed at the AGATA workshop recently held at LNL on March 25th and 26th, related to the physics program to be carry out using stable beams. Indeed some very interesting and highly competitive physics cases there presented turned out to require beams and targets currently not available at LNL. **In particular, the community is very interested in the use of ^{14}C, ^{238}U, ^{204}Hg ion beams and the new targets ^{3}H, ^{9,10}Be, ^{232}Th, ^{238}U for experiments with the AGATA array.**

We like to stress that the availability of those beams and targets will significantly extend the scientific potential of the experimental program at LNL with heavy ions in the areas of nuclear structure and dynamics, representing the main mission of the laboratory. The proposed developments will surely make LNL more competitive worldwide with other laboratories, such as GANIL (France), IPN-Orsay (France), GSI (Germany), ISOLDE (CERN), Argonne (USA), where such beams and targets are already in use. In addition, these developments will be beneficial also to the physics program using other instrumentation, in particular the magnetic spectrometers (PRISMA) and the charged-particle hodoscope GARFIELD.

For these reasons it would be very important that you could consider the development and/or permission requests to the authorities for the previously listed beams and targets species as an important part of the short term planning.

In order to better organize the physics campaign in 2022, after the installation of AGATA in the second half of 2021 it is an essential issue for us to be informed, possibly within the end of this year 2019, on the feasibility of each requested new beam and target together with a tentative timeline for each development.

We are looking forward to hearing from you.

Sincerely yours

Prof. Peter Reiter
Chair of the AGATA Steering Committee

Prof. Wolfram Korten
Chair of the AGATA Collaboration Council

Targets: ^{9}Be (approved). ^{232}Th, ^{238}U first interaction with ISIN. Currently preparing the final report.
Beams: ^{238}U test with Tl in progress ~ 2023

Time line installation

Transport of AGATA from GANIL ~ 1/9/2021

GANIL France

Physics campaign after 04/2022

Last exp. LNL→March 2021

Commissioning 04/2022

		Task Name
		AGATA LNL Installation
		GANIL
		Experiments in GANIL
		Last experiment in GANIL
		AGATA packed up and shipped to LNL
		AGATA Shipped to LNL
8		**LNL**
9		Groundworks for services
10		Last experiment in LNL
11		Move water and power
12		Install rotating platform
13		Install AGATA platform on rails
14		Install racks on platform
15		Ready for support
16		Install support on rails
17		Commission control system
18		Install honeycomb
19		Install first detector
20		Ready for commissioning
21		**Design LN2+DSS**
22		DSS design
23		LN2 design
24		Second HV platform
25		Cooled racks
26		Beam line
27		**Refurbishing Sala I**
28		Floor hole
29		Water supply
30		Power lines
31		**Safety AGATA**
32		Oxygen detectors
33		Xylene detectors
34		**Reaction chamber**
35		Design reaction chamber and support
36		Realization reaction chamber and support
37		Installation reaction chamber and support
38		Design mech. for ancillaries in the chamber
39		Realization mech. for ancillaries in chamber
40		Installation mech. For ancillaries
41		**DAQ box**
46		Decide how to do the power supply dig. ancillari
47		PRISMA readout + IC. Readout usb

Time line installation

29			Water supply
30			Power lines

41			**DAQ box**
42			Design DAQ box
43			Realization of DAQ box
44			Procurement PCs DAQ box
45			**Electronics**
46			Decide how to do the power supply dig. ancillari
47			PRISMA readout + IC. Readout usb
48			AGATA network LNL
49			Design optical fibers DAQ-Sala and PT4
50			Installation optical fibers DAQ-Sala and PT4
51			Core card: test LVDiff Sig output GAMMAOR
52			Refurbish V0 thermal at GANIL
53			Refurbish fan in ATCA+Control all DC/DC (GGP)
54			Installation server in DAQ room
55			Test with a gamma source
56			Test Event Builder AGATA
57			Run Control and mointoring
58			
59			**DAQ ROOM**
60			Design project
61			Tender for the realization
62			Realization
63			
64			**STFC**
65			Support being manufactured
66			Support delivered at DL
67			Test and commissioning
68			Pack and ship to LNL
70			
71			**New targets and beams**
72			Richiesta U beams
73			U and Th targets
74			Be usage rules

First ATC in structure → January 2022

01/12

30/03

STFC UK

15/12

New targets and beams

Task	Milestone	Project Summary	Inactive Milestone	Manual Task	Manual Summary Rollup	Start-only	External Tasks
Split	Summary	Inactive Task	Inactive Summary	Duration-only	Manual Summary	Finish-only	External Milestone

Exotic beams

RIB	Intensity (pps)	E_{max} (MeV)
$^8Li^{3+}$	5×10^4	21.7
$^7Be^{4+}$	5×10^5	44.2
$^8B^{5+}$	4×10^2	45.5
$^{10}C^{6+}$	2×10^3	51.8
$^{11}C^{6+}$	10^5	54.2
$^{15}O^{8+}$	2×10^4	70.6
$^{17}F^{9+}$	4×10^4	79.6
$^{18}Ne^{10+}$	2×10^3	78.1

Possibility to connect the facility EXOTIC for the In-Flight production of light Radioactive Ion Beams to the gamma-ray Spectrometer AGATA

Beam

Exotic
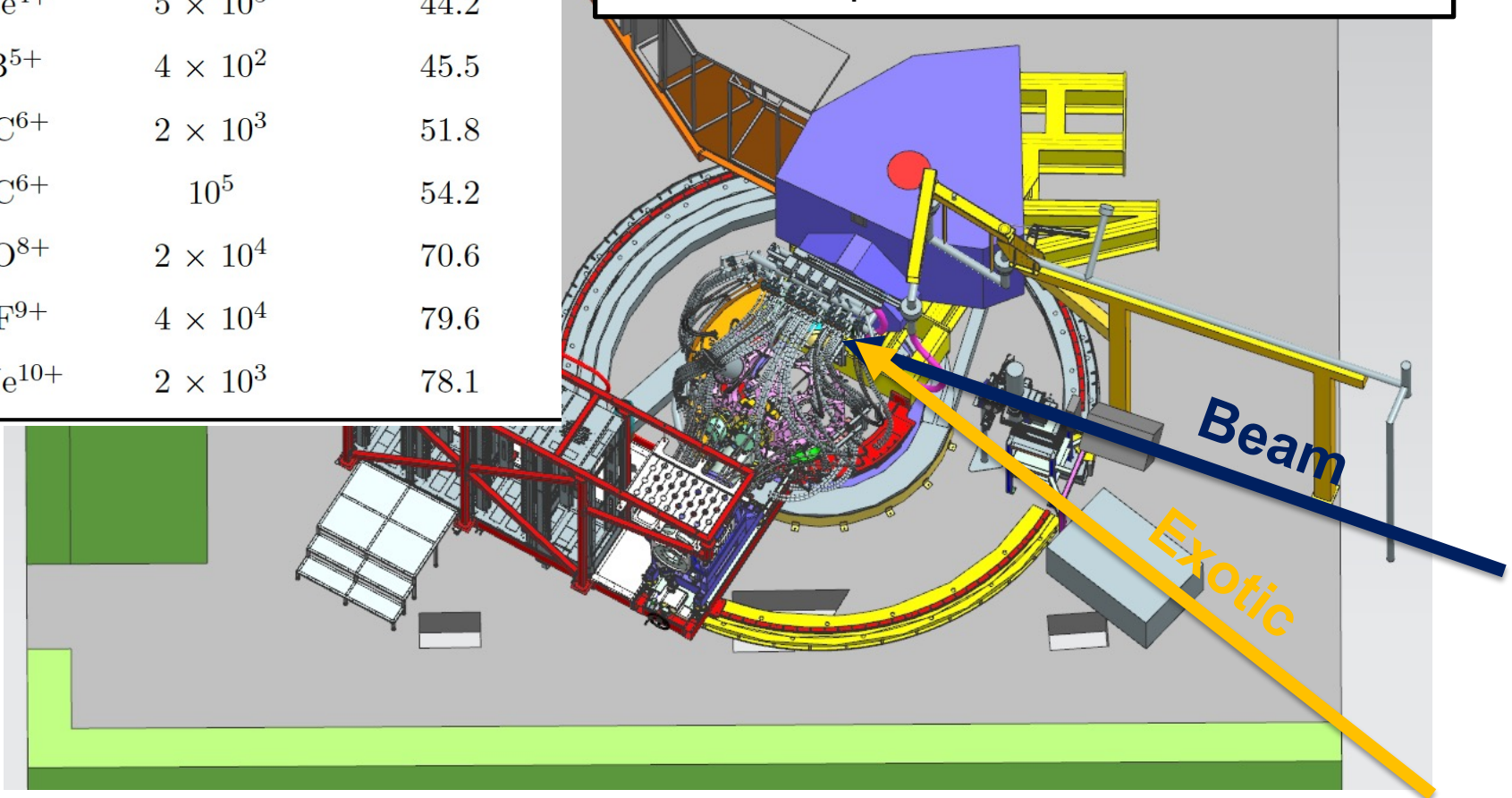
Summary

Installation of AGATA is at a very good point, thanks to LNL/PD/MI/FI services and physicists and the AGATA collaboration.

Great coherence in the collaboration between all the local groups and the AGATA collaboration.
THANKS TO ALL OF YOU!

Amazing reaction from the community, 34 LoIs!!!
→ See talk M. Zielinska

END

Data base

An Oracle Database, hosted at the Computer Center of IN2P3 and a Graphical User Interface in Java to track the construction and configuration of AGATA.

Objects are identified by barcodes and structured by [ObjectName/type/version] and a barcode reader must be used to scan barcodes stuck on them


Also each transfer is identified by a barcode (stuck on the transfer box) in which are explained: objects to move, two actions (sending and reception) and the persons involved. Then, the location of objects are automatically update in the DB.

This tool, it has been proven by the past, is important for the move of AGATA facilitating the inventory of transferred objects.

You can search within objects and the result is shown in a rich tree structured by object/type/version and the list of corresponding barcodes.
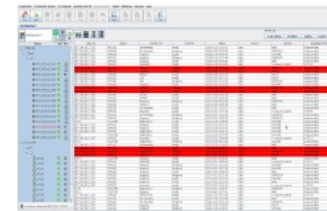
An object browser panel displays various information on objects, the object history panel gives details on actions done in time on these and the object move panel manage the transfers of different objects between centers.
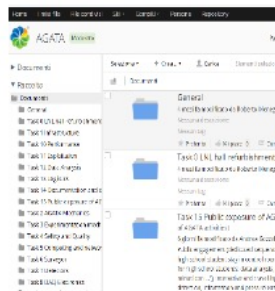
ument management software

each task.

—for file libraries, folders and nd delete documents

ll-back functionality, simplifies tegrity

Public exposure of AGATA activities

Collaboration with Alessia Lorenzi, student of New Art Technologies at Accademia delle Belle Arti in Venice, under the Lorenzo Pranovi's supervision (internal tutor)
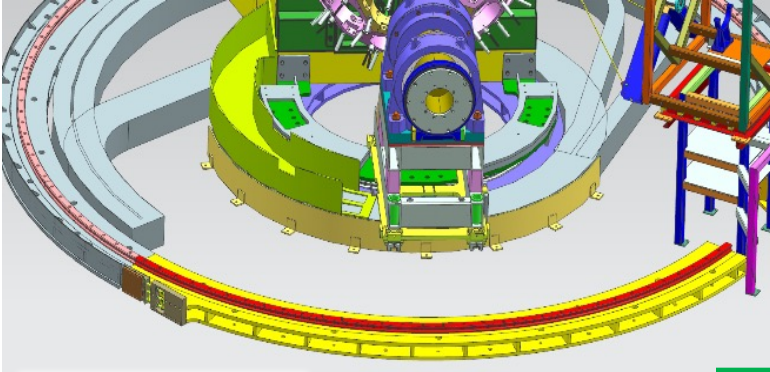
AGATA is in the mainframe of the LNL virtual tour

AGATA is part of Alessia Lorenzi's thesis the thesis/project is an interactive experience in virtual reality

Facebook
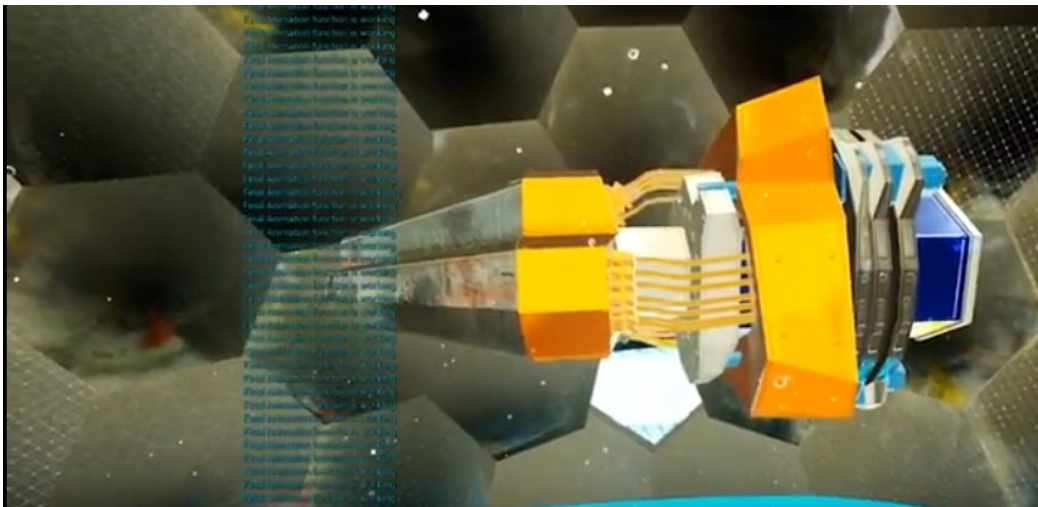
AGATA rotating tracks

Design of the missing piece of rail.

February 2021

March 2021

New hole in the floor for the services