

AGATA Simulation Code Status

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Generalities and recent developments

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On behalf of the simulation WG.

26th AGATA week, 9th–11th Sept 2025
Warsaw - HIL



Science & Technology Facilities Council

Nuclear Physics Group

Generalities

Latest version of the distributed AC is on gitlab:

- <https://gitlab.com/malabi-agata/agata>
 - 3 branches:
 - main → Geant4 10.07 and prior
 - mainG410 → Geant4 10.05 and prior
 - G4v1104verifiedJL → Geant4 11.0.4
 - Work is on-going also with Geant4 11.1.2 but not yet available on gitlab:

Some issues encountered when running with ancillaries.

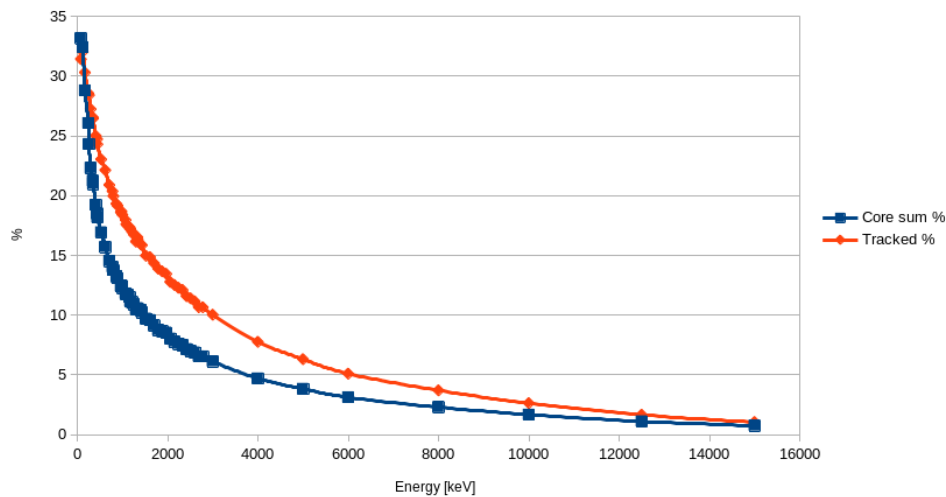
Generalities

Since last year report:

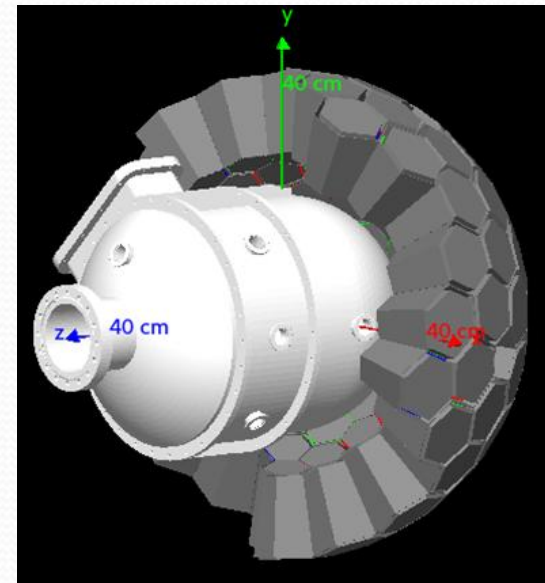
- Merge request from D. Brugnara has been completed with no major conflicts:
 - Ancillary detectors: OSCAR, GALTRACE, MUGAST, S1, large LaBr crystals and the CTADIR cryogenic target
 - Event generators with the possibility to have different angular distributions for different excited states
- LNL new chamber for the zero campaign has been added as ancillary
- AGATA-LISA package developed by Wiktor Poglepa (GSI)
 - Not yet widely distributed – Merging on gitlab may be tricky.

Efficiency curve for 2-pi AGATA (nominal)

2Pi-AGATA photopeak efficiency



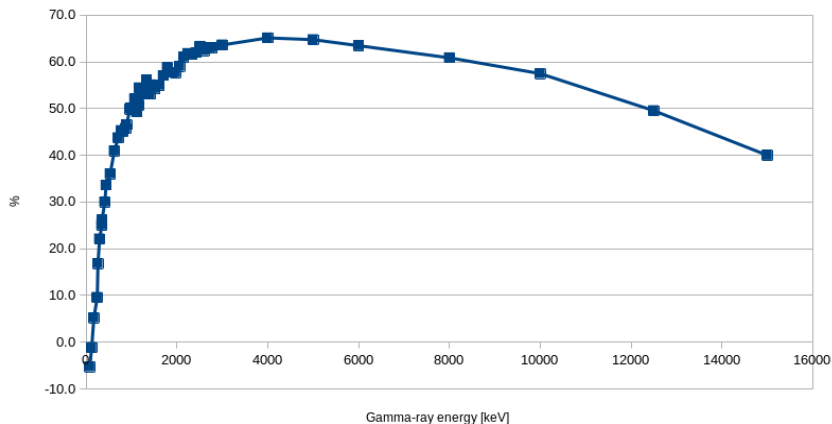
Extended to high energies as requested by PARIS collaborators



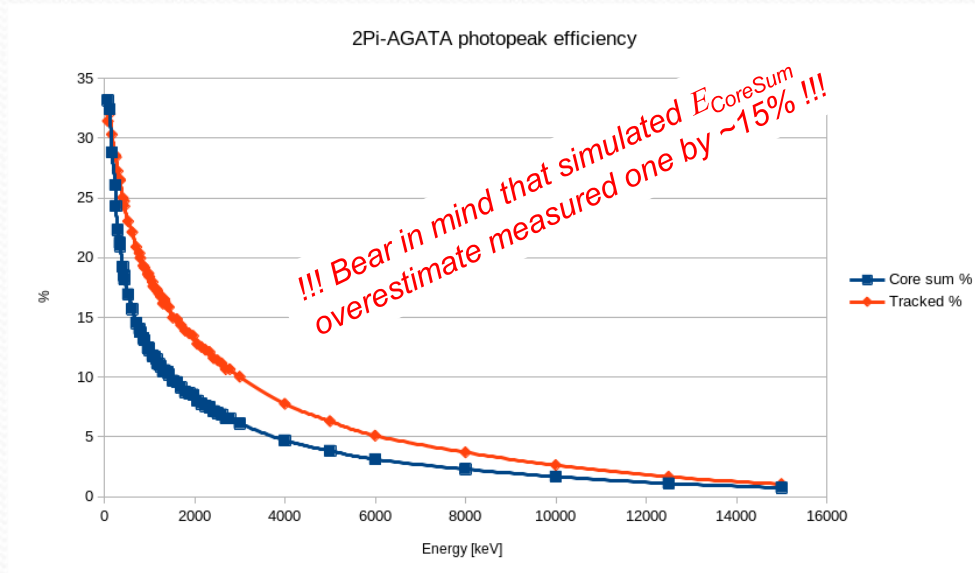
gdml files available here:

<https://github.com/malabi/gdml-files>

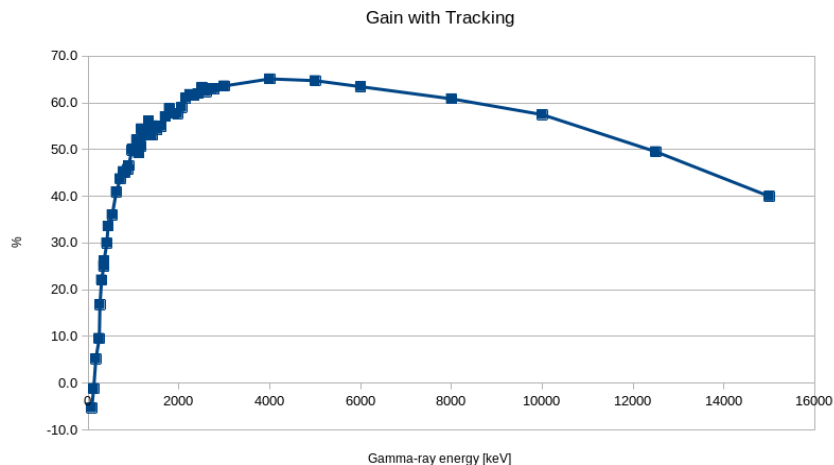
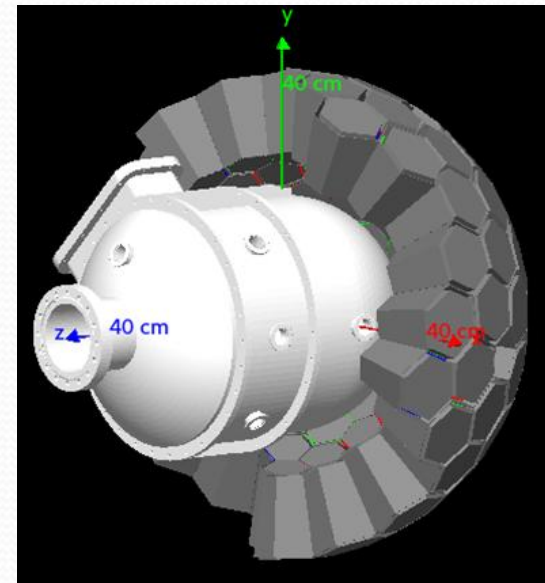
Gain with Tracking



Efficiency curve for 2-pi AGATA (nominal)



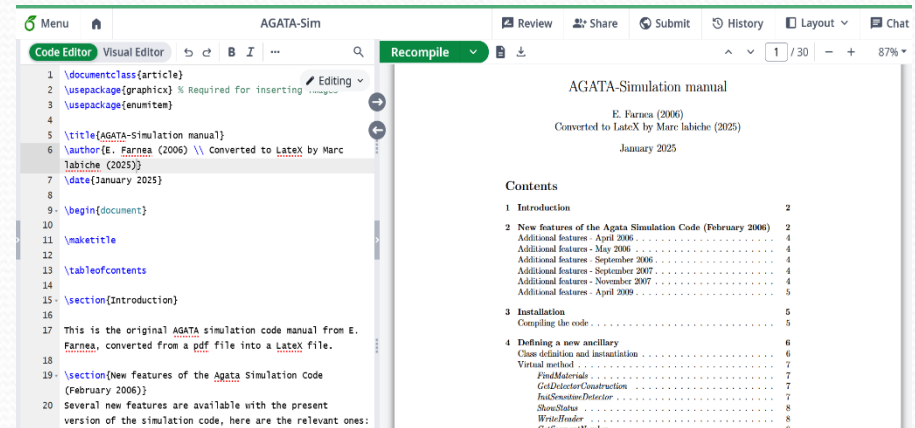
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Generalities

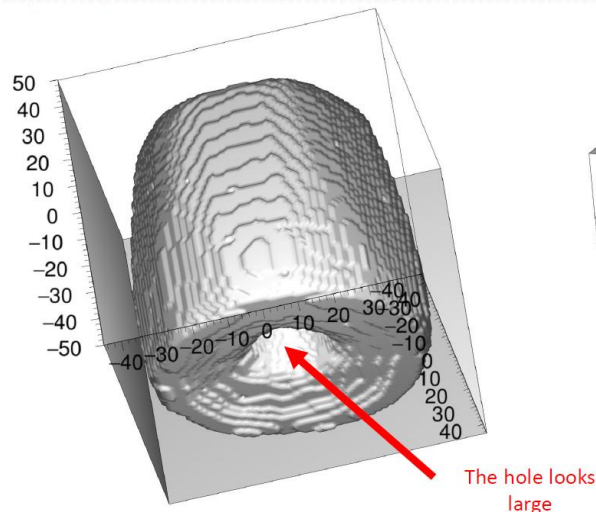
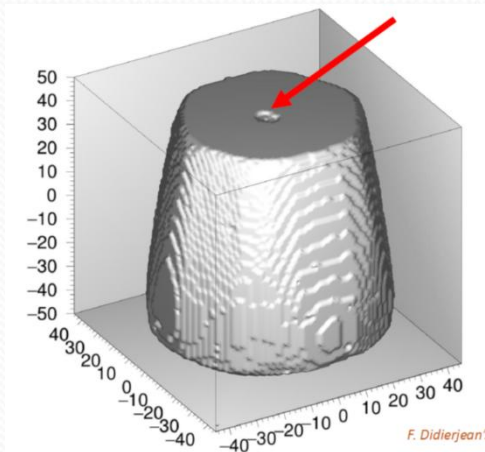
Documentation:



- The original user manual is available in overleaf for downloading and editing
- It still needs updating but still valid for beginners
- Anyone willing to contribute is welcome - please simply request editor rights to me or send your input to me.

Simulation using geometry from tomography

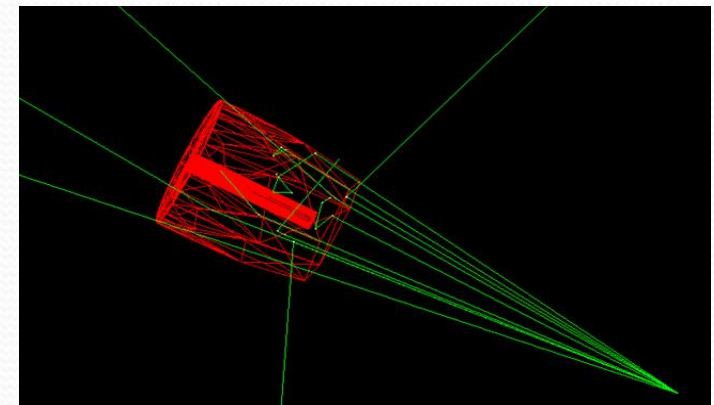
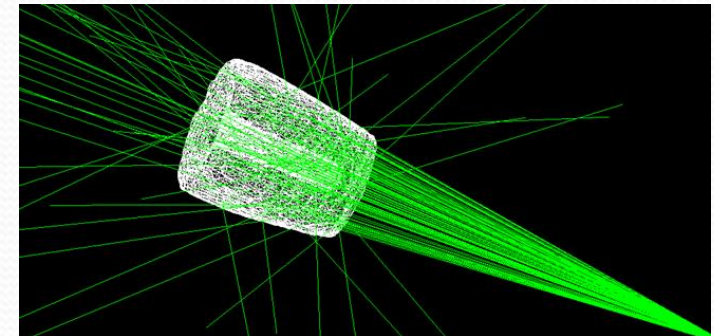
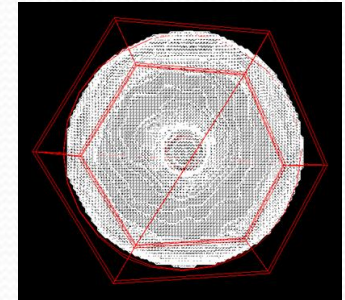
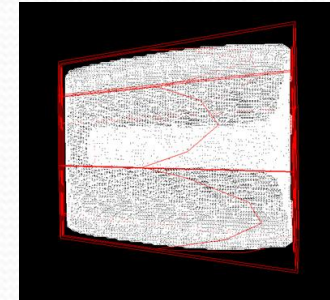
A005 tomography at IPHC Strasbourg



*Converted
into
GDML format*



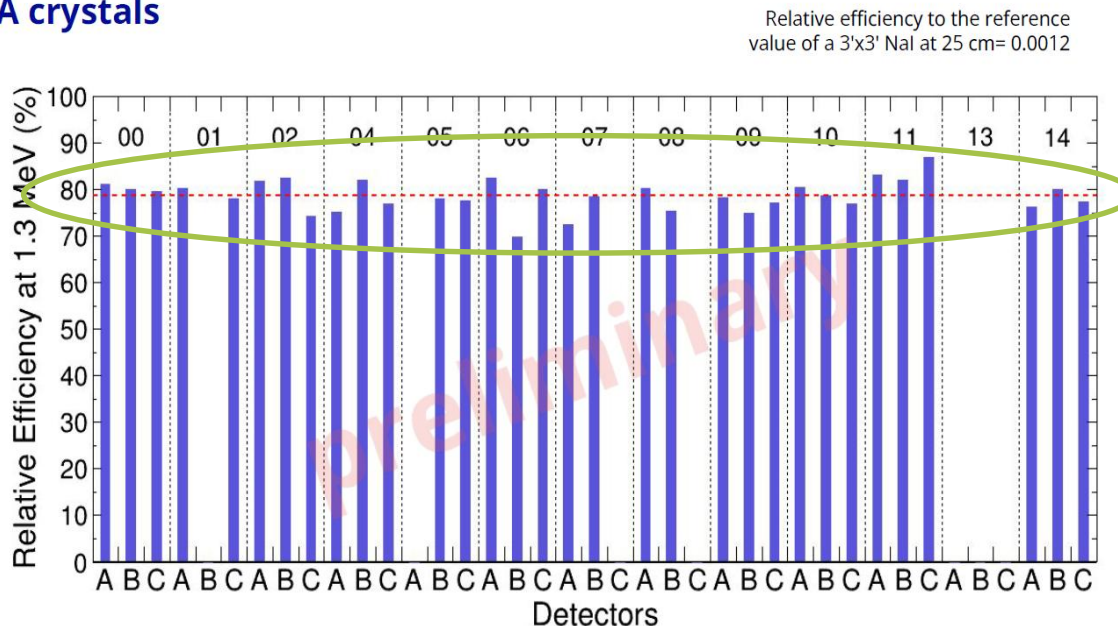
*Courtesy of F.
Holloway*



Simulation of A005 efficiency at 1332keV

<u>Simulated</u> <u>CoreEff@1332keV</u>	A005- tomo (%)	Simulated A- Type (%)	Simulated A- type with large Pass. Area (%)
Rel. to 'NaI 3"x3" crystal	89.9	96.9	88.7

AGATA crystals



Conclusion:

By implementing the tomography file we may have a more accurate picture of the passive area

BUT: Validation problem not solved !

Simulation using geometry from tomography

Tomography scan at IPHC Strasbourg of B003 completed

Tomography scan of C016 expected in ~2 months time

►► looking forward to receiving these files and converting them into gdmf for:

- The implement these in the GEANT geometry for all crystals
- The implement these into the other frameworks:

AGATAROOT (FAIRROOT) – See last year's presentation

NPTOOL for simulation with GRIT.

No Summary just a message

Please remember to send merge requests on the gitlab repository if you develop the code.

The sooner the better to avoid large amount of conflicts.

If unsure, please contact me. (marc.Labiche@stfc.ac.uk)

Please also add some documentations to the overleaf document.



C'est fini !

Merci

Simulations, Performance & Commissioning Session

- **Self-calibration and in-beam measurement**

Chen Sidong (University of York) Remote

- **AGATA performance at high energy**

Matus Balogh (IoP SAS)

- **AGATA high multiplicity performance**

Conor Sullivan (University of Liverpool) Remote

- **Detector performance status**

Marc Labiche (STFC - Daresbury Laboratory)

- **Commissioning for the 0-degree campaign setups**

Fabio Crespi (INFN Milan) Remote

- **Recent development of AGATA Simulation code**

Marc Labiche (STFC – Daresbury Laboratory)