MUGAST@LISE

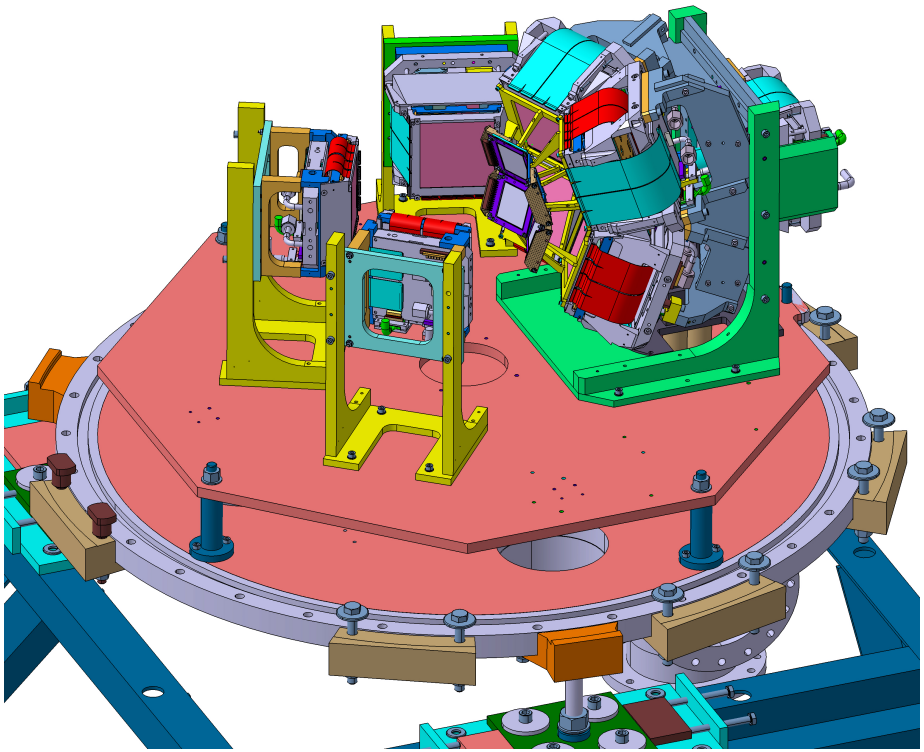
GHT 2017

Adrien MATTA

IPNOrsay, 23-24th January 2017

What type of setup?

MUST2@LISE: 2017-2018

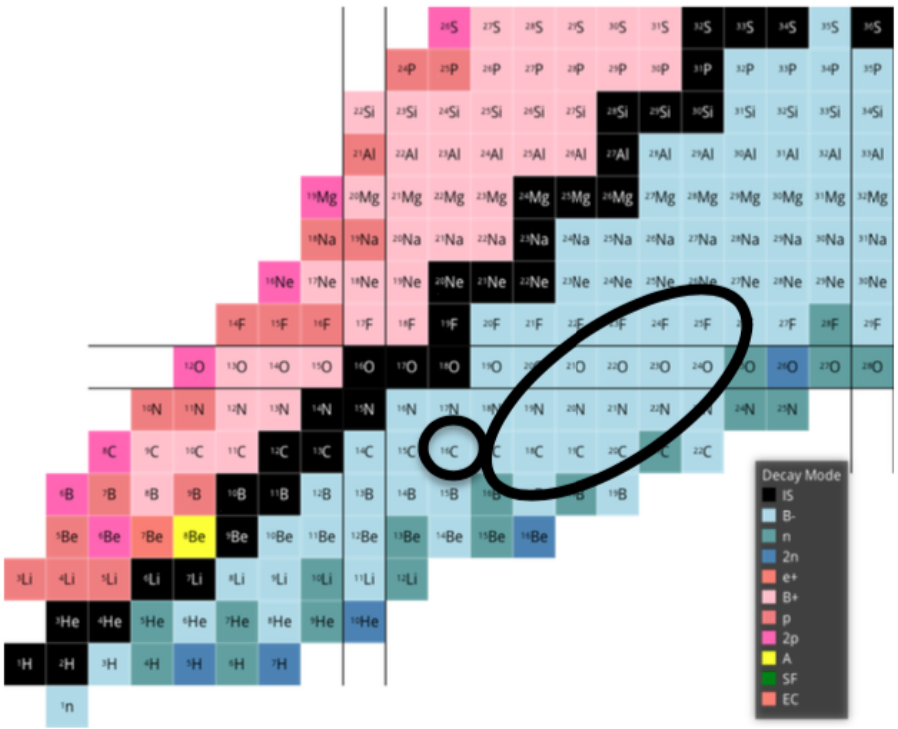


- Forward angle setup
  $\rightarrow$(d,t)/(p,t)/(d,^{3}He)
- No HPGe

Key point for a new setup

- New Slowdown Beam
  $\rightarrow$ talk by O. Kamalou
- γ-compatible:
  $\rightarrow$ EXOGAM/MINIBALL/PARIS
  $\rightarrow$ Super Compacte (R<11-13 cm)
- Optimise for (d,p) and (t,p)
  $\rightarrow$backwards angle

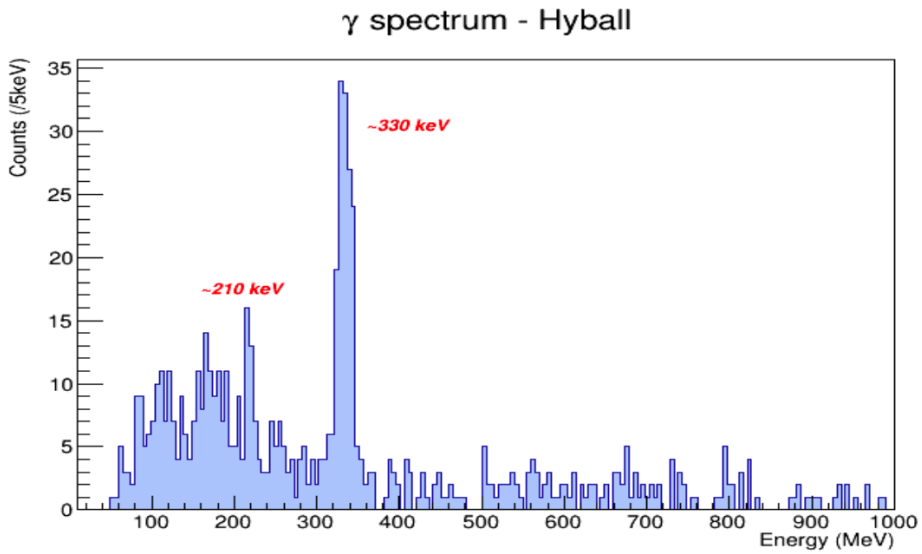
Carbon Isotopes



- Magic Numbers N=14,16
- High A/Q

  → Borromean / Exotic decay

^{16}C(d,p)

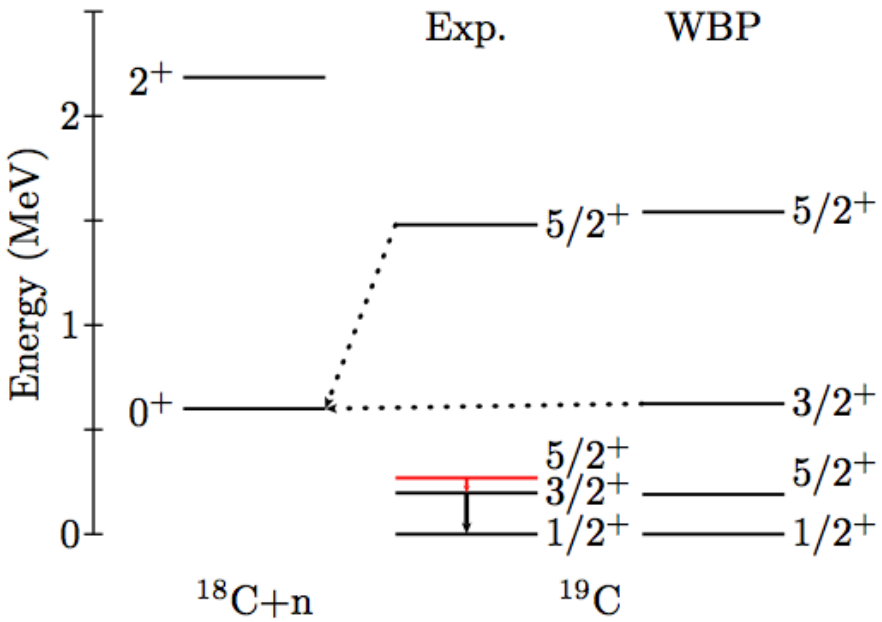


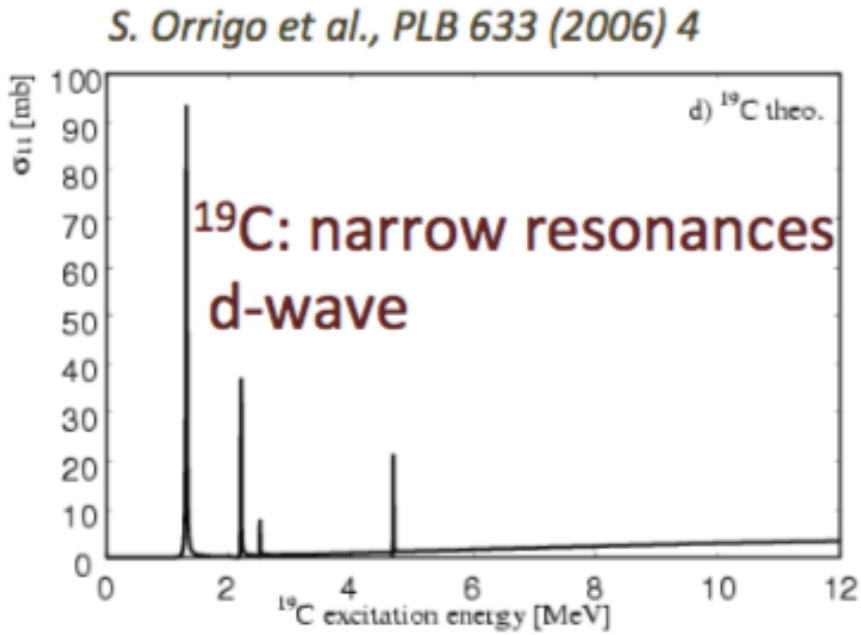
X. Pereira-López Ph.D.(2016)

- MUST2/TIARA/EXOGAM
- One week beam time
- ^{16}C@17 AMeV

→ 1.10^4 pps

^{18}C(d,p)



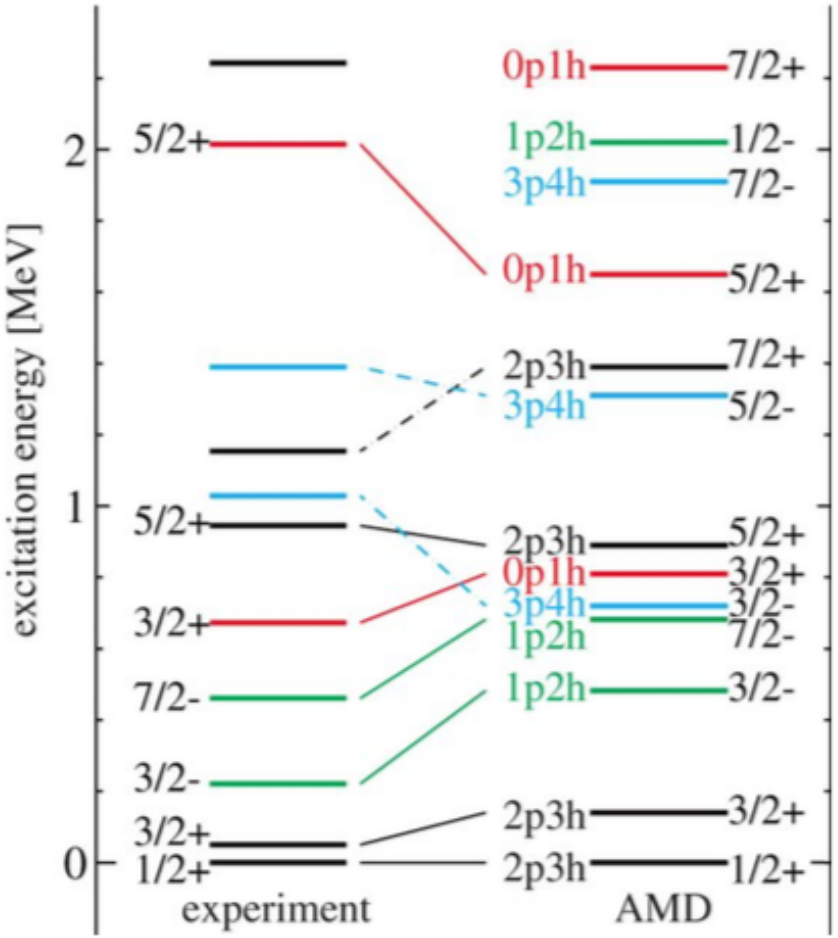


- Magic Numbers N=14,16
- Neutron Halo
- Core excitation $^{18}C^{*}$

  $\rightarrow$ Fano resonances

- Bound states: Ex, SF
- Unbound states: Ex, Γ, BR
- 5. 10^3 pps

^{31}Mg (B. Dominguez-Fernandez)



E. Becheva et al. PRL 96, 012501 (2006)

Key Points:

- Neg. Parity: 2p3/2 and 1f5/2
- Coexistence of Many-p Many-h states
- Inelastic specro. of ^{30}Mg
  $\rightarrow$ access defor. length
  $\rightarrow$ 2^+_2 based on 0^+_2 and 0^+_3
- High level density:
  $\rightarrow$ need for particle-γ
  $\rightarrow$ need for elastic scattering

Physics case conclusions

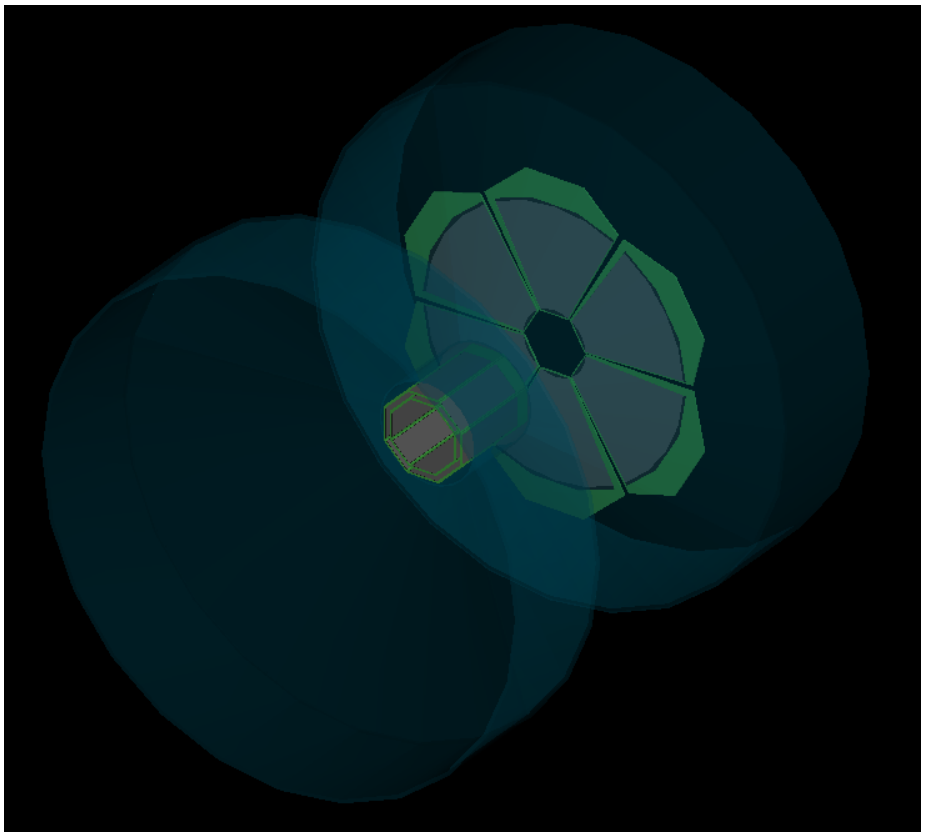
Key Point

- ^{18}C beam at 1.10^3 pps
- ^{30}Mg beam at $1.10^4 - 5$ pps
- 15 AMeV or less achiveable
- Need for particle-γ
- Need for 100-170 coverage (d,p)
- Need for 90-70 coverage (p,p) and (d,d)

Suggestion for tritium target
$\rightarrow$ problem with target size?

Forward angle setup
$\rightarrow$ Is it needed?

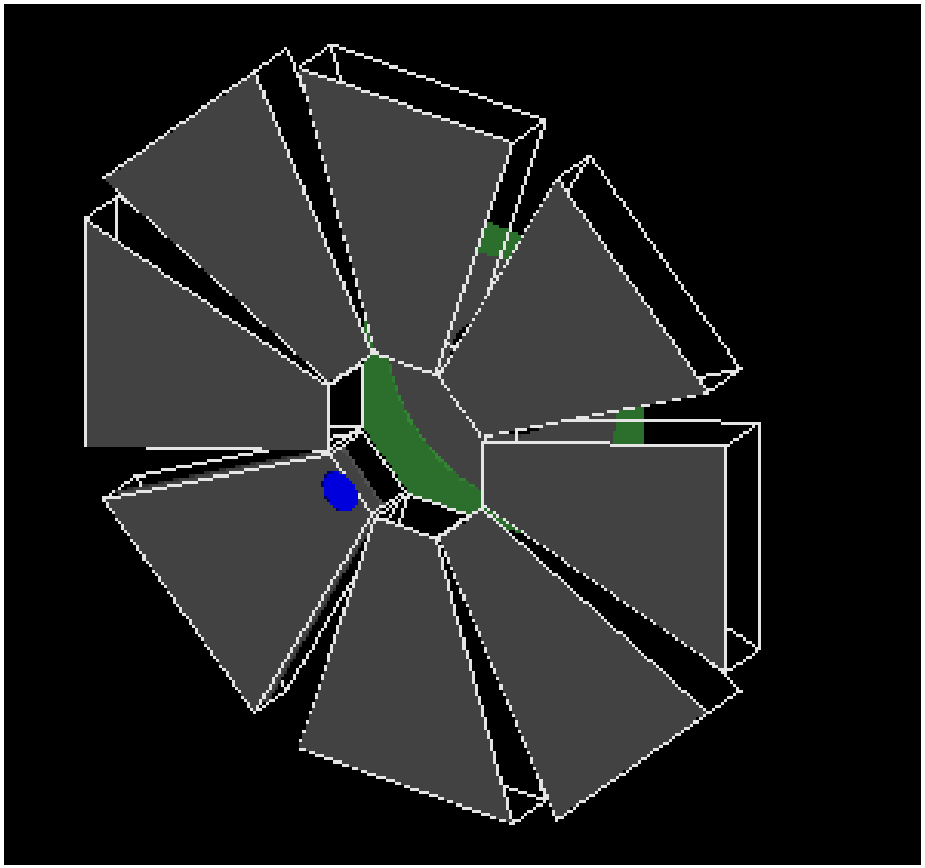
Setup



Starting point

- Replace Hyball with Trapezoid
- Use Existing Chamber
- 4 Exogam clover
- Compatible MUST2 forward

Setup



Key point

Pro:

- 6 Trapeze

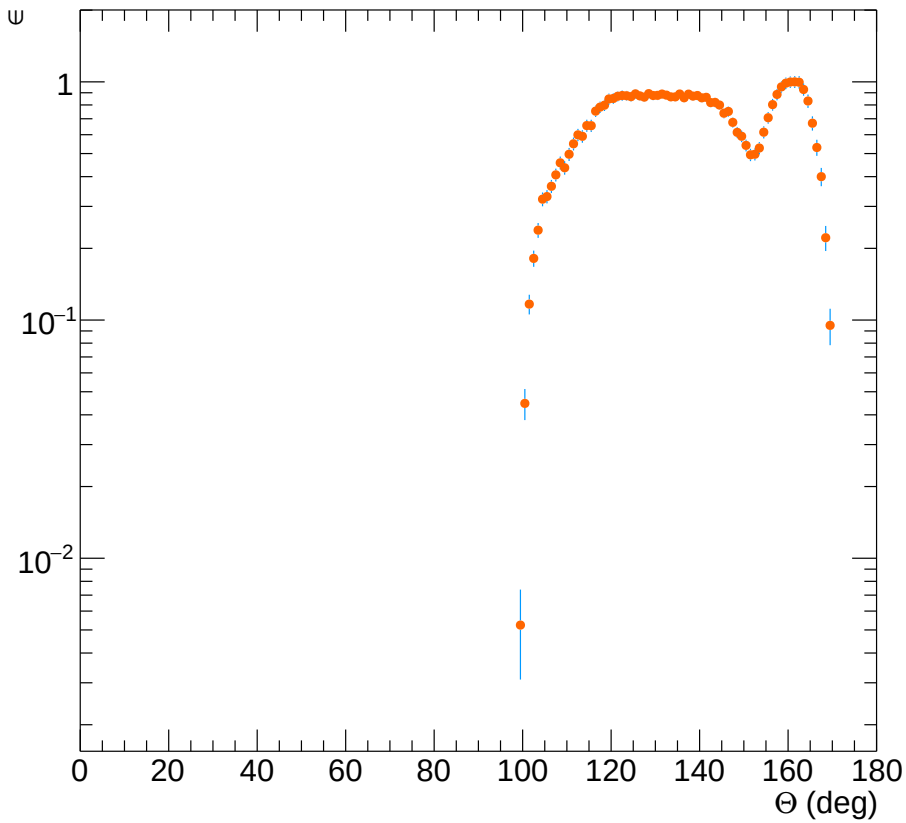
  $\rightarrow$ Tiara Like at 90 mm
- 1 Annular S1

  $\rightarrow$ 100 mm from target

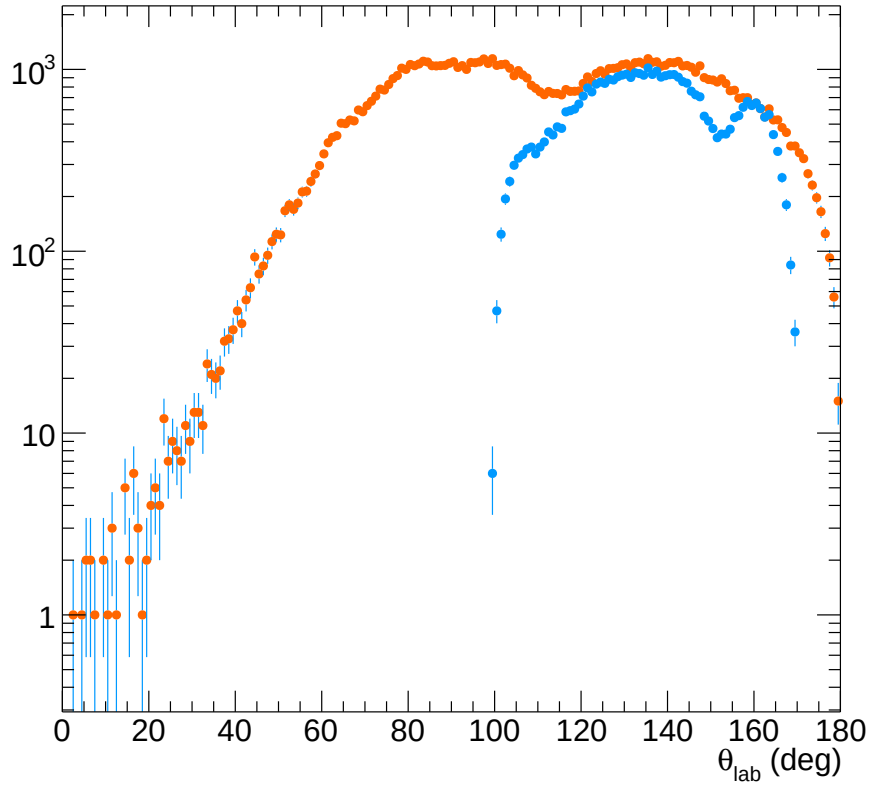
Con:

- Not compatible with Tiara Chamber
- Forward angle / Elastic ?

Efficiency

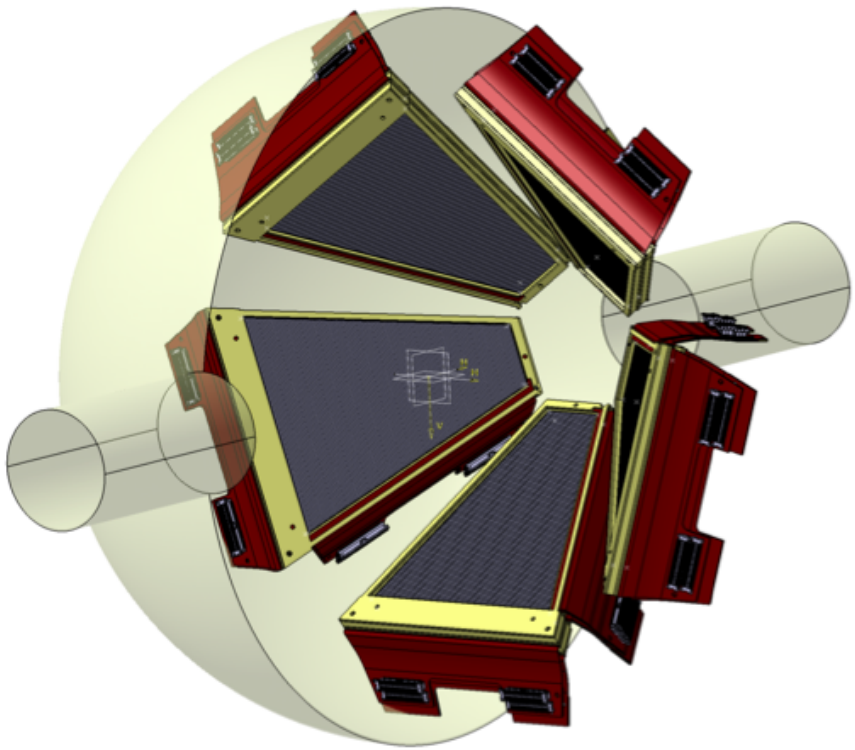


Shape



70% efficiency across the board, smooth angular resolution

Setup



Key point

Pro:

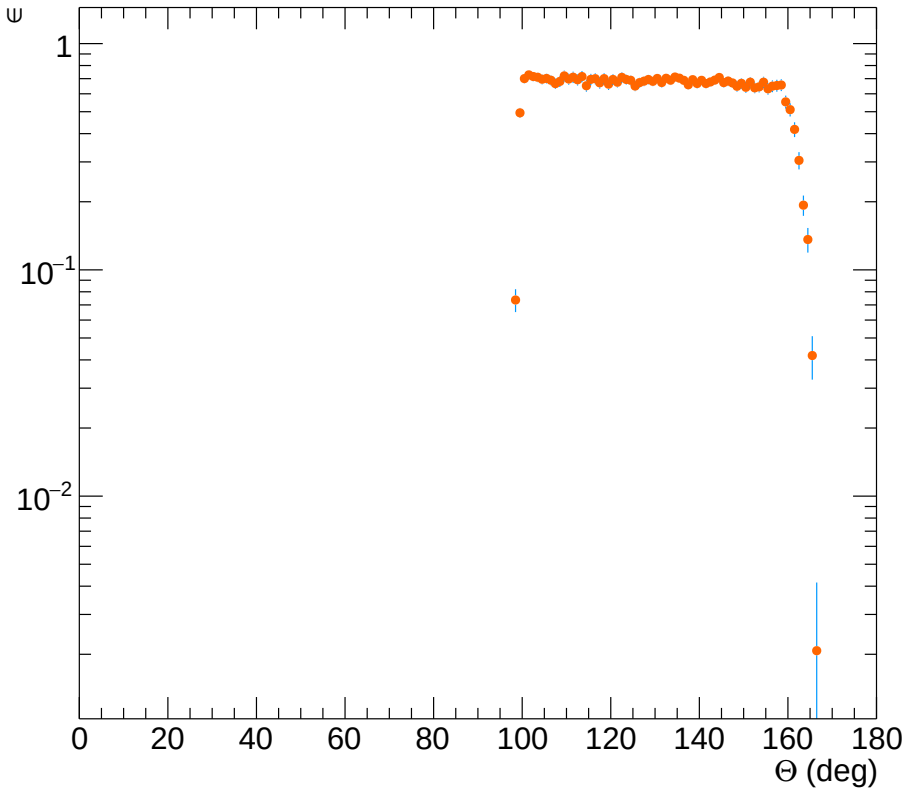
- 5 Trapezoid
- Fit within Exogam
  - → Chamber R=110 mm
  - → Detector 85mm from target

Con:

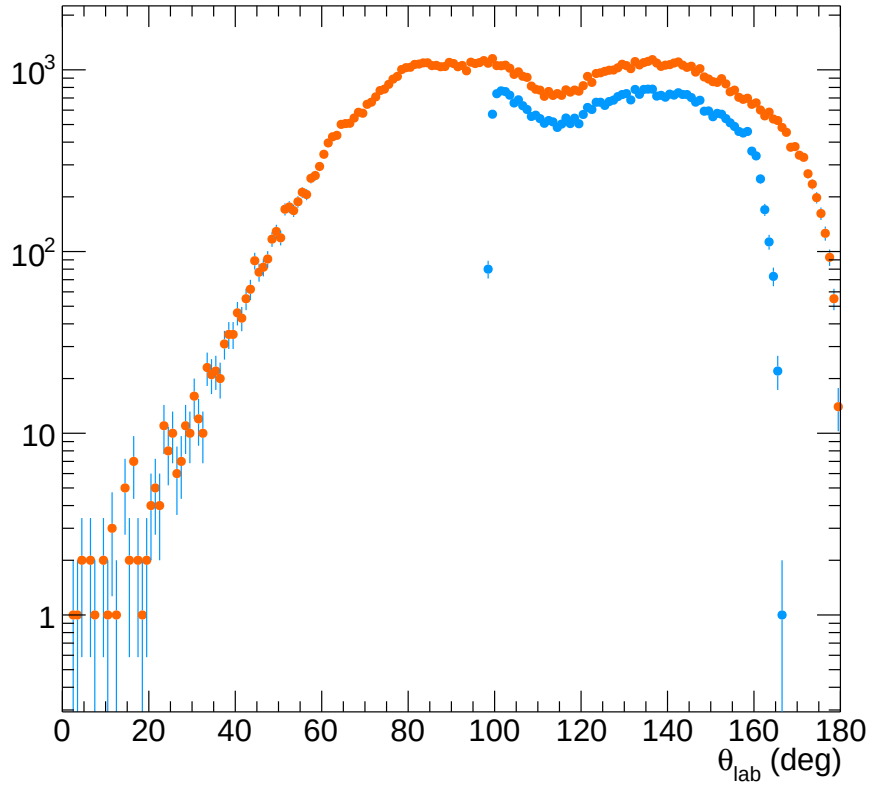
- Where the hell put the Elec.?
- Forward angle / Elastic ?

IPNOrsay pre-study (Rindel)

Efficiency

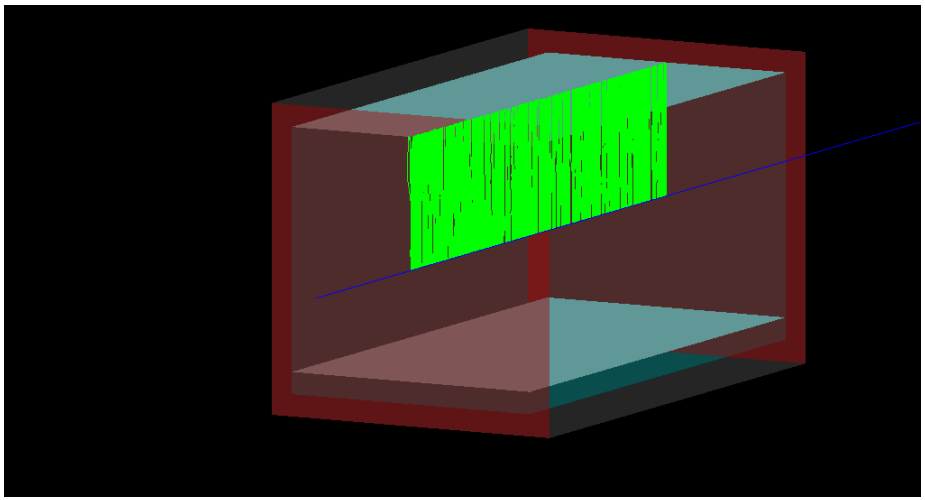


Shape



70% efficiency across the board, smooth angular resolution

Drift Electron Physics

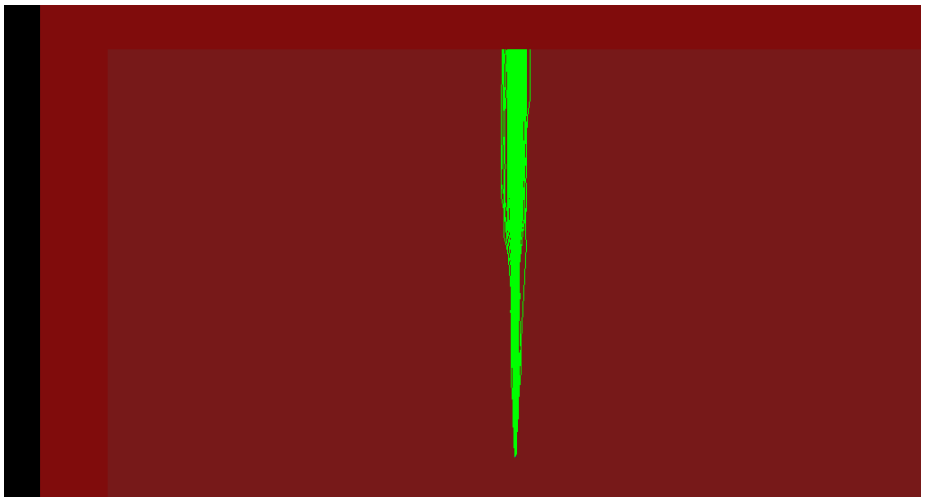


Follow Optical Physics way

- New charge particle: drift electron
- Ionisation with DE emission
- DE absorption
- DE amplification
- DE transport

  $\rightarrow$ Drift Speed, Spread

Drift Electron Physics

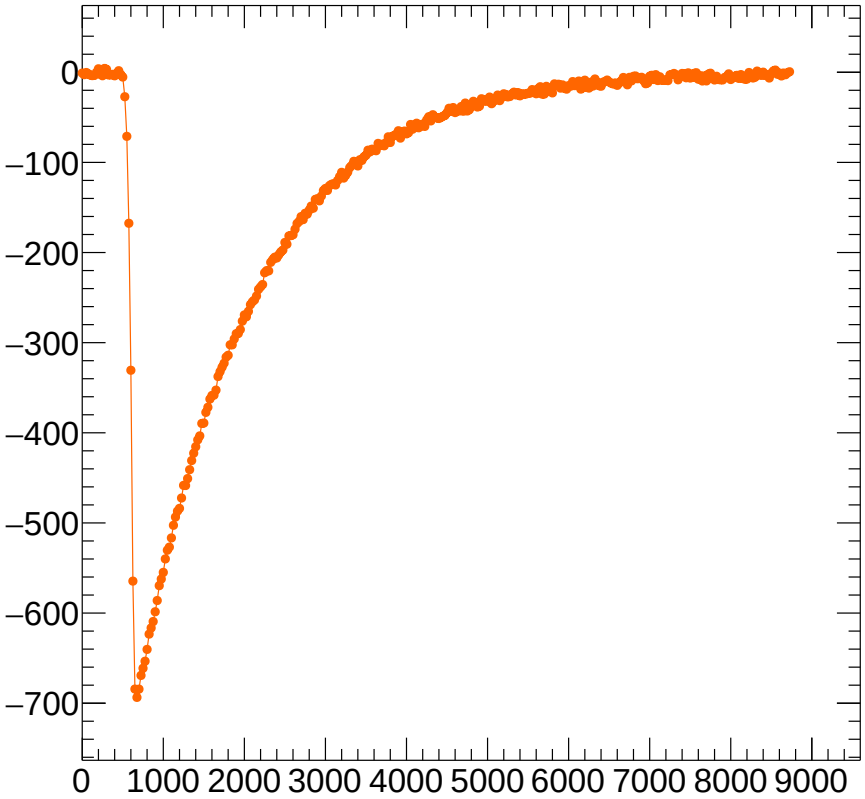


Follow Optical Physics way

- New charge particle: drift electron
- Ionisation with DE emission
- DE absorption
- DE amplification
- DE transport

  $\rightarrow$ Drift Speed, Spread

Drift Electron Physics



Possibilities

- Simulate Electron in Silicium

  → PSA, Electronic response

Conclusion

- A setup for MUGAST @ LISE is being studied
- Constraints fixed by the user

  $\rightarrow$ Come with physics cases
- Setup compatible with Spherical EXOGAM and MINIBALL