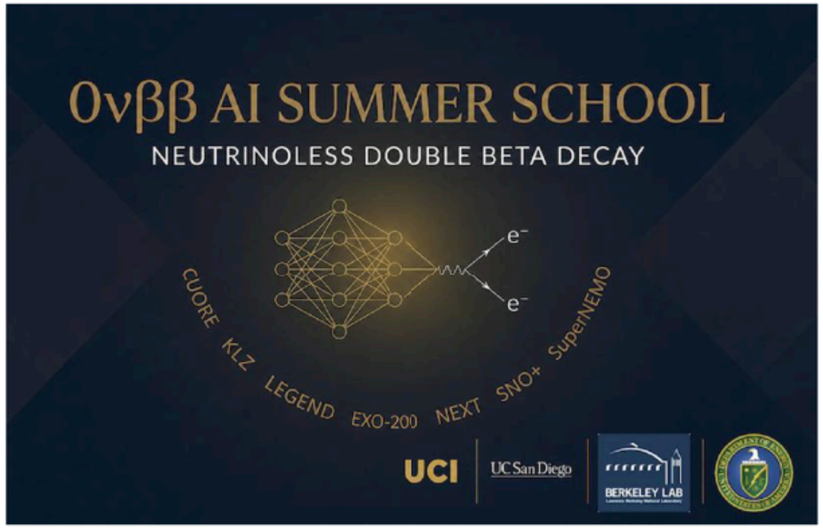
Bratislava collaboration meeting

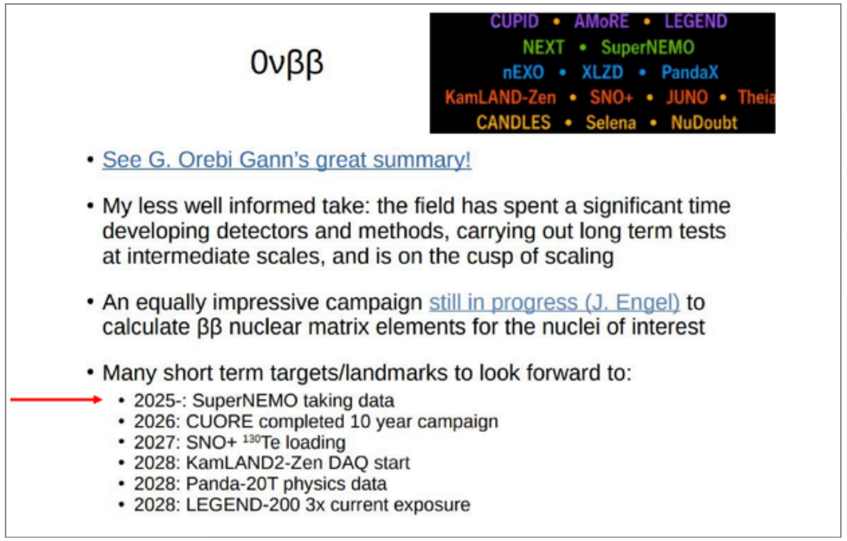
30th June to 3rd July, 2026

Cheryl Patrick & Christine Marquet

Lots to be proud of!

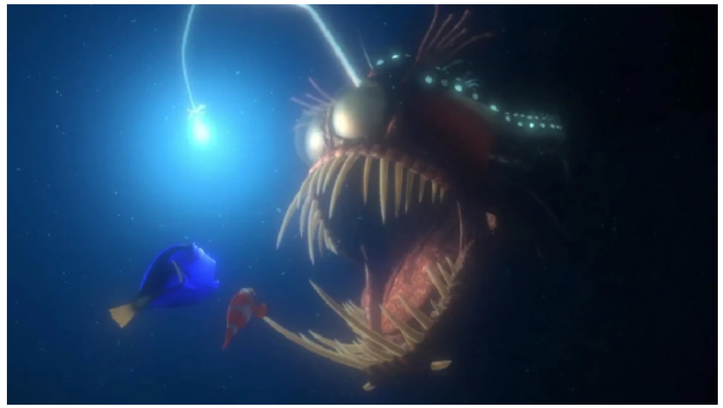
- Detector running very smoothly - *Thank you shifters!*
- Helium recycling working well - *Thank you Hichem and Elvis!*
- Demonstrated radon level 10 times lower than NEMO-3
- Small recent issues not our fault, and we recovered swiftly





Neutrino 2026 highlights of the year, C Wilkinson

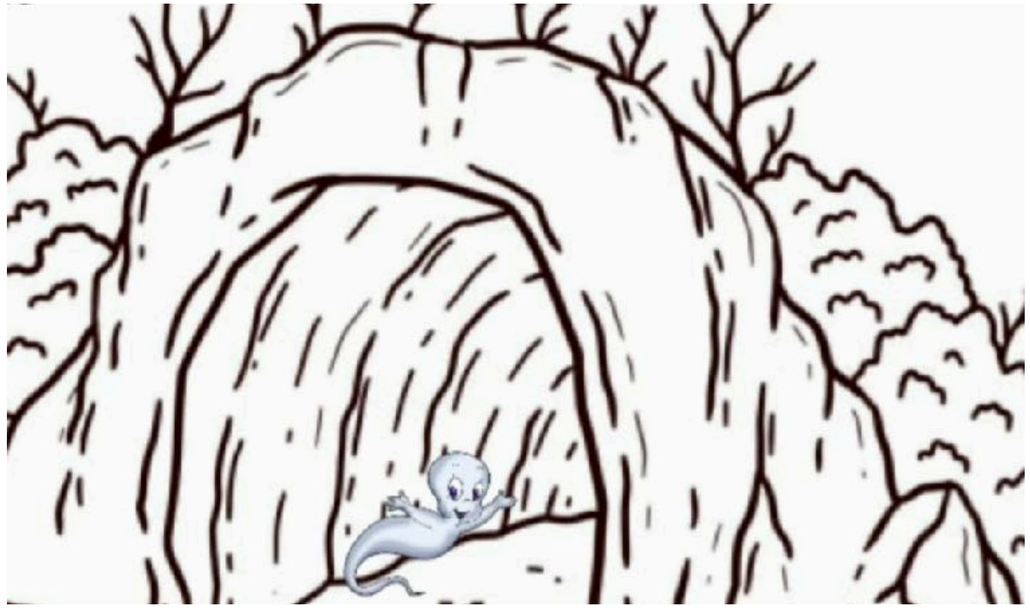
SuperNEMO is in the spotlight!



(uh, maybe not like that)

Two big issues

- Anti-radon factory still not working well
- Running scheduled to end this December



Our friendly ghost is not being so friendly

Progress on big meeting goals
- How to make the best of our remaining run time
- Will a short running extension help us?
- How to improve the radon situation

Important work to do - but big payoffs possible

Proposal - SuperNEMO meets IN2P3 in October

Should we request more runtime?

What would we gain from the extra time:

- **Physics** (world's best measurements / limits / discoveries)
- **Technology demonstrations** e.g. radiopurity, energy resolution…

How can we prove we are **already doing good physics?**

Work needed from everyone before October to prove to ourselves - and the world - what SuperNEMO is capable of

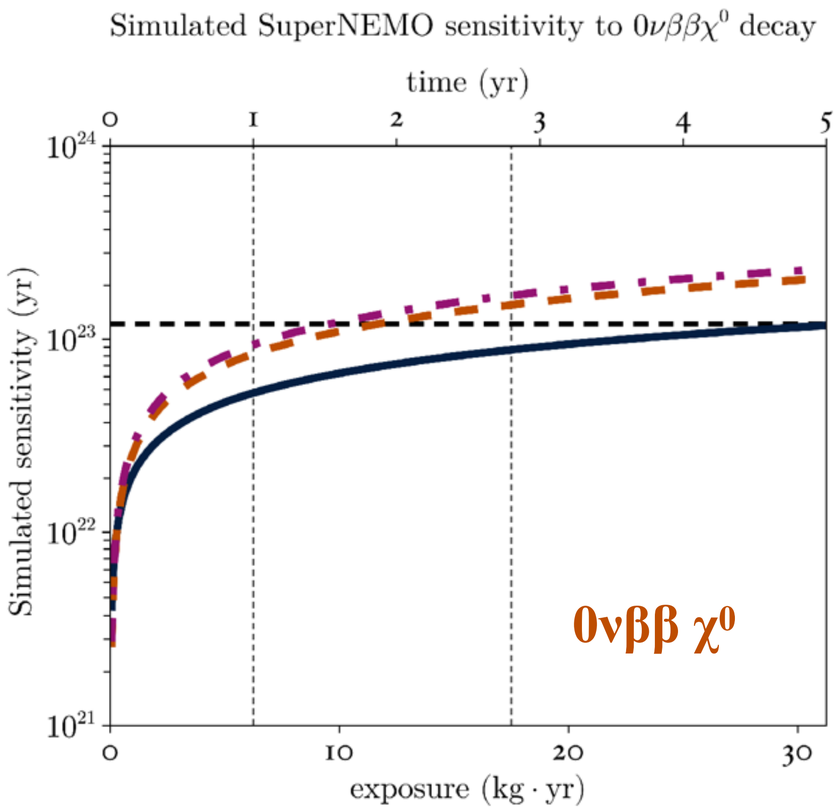
Intense work period in September - expect 2 analysis meetings per week!

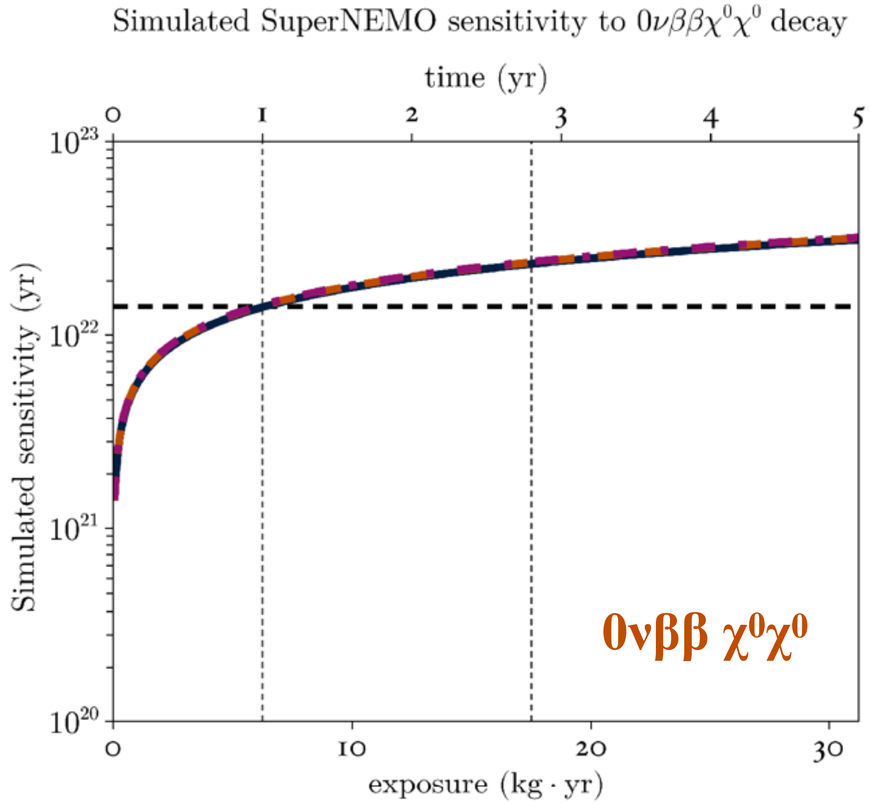
Technology demonstration

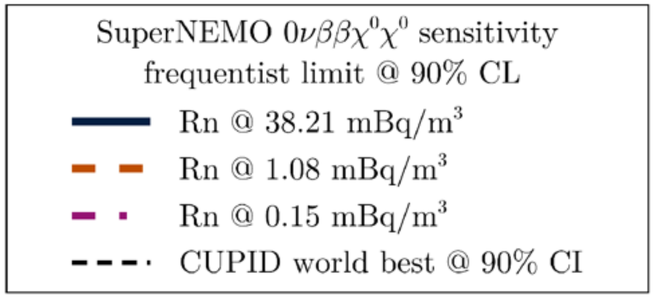
- **^{214}Bi and ^{208}Tl source foil contamination**
  - Results this summer from Antoine
  - **How much data do we need to characterise the individual source foils?**
- **Radon -** How close can we get to our target of 0.15 mBq / m^3?
  - **Needs consistent low radon** from ARF (for how long?)
  - Test with maximum flow rate 17lpm (pure helium)
  - No extra runtime needed (if ARF works)
- **Energy & time resolution**
  - Enough data already, lots of work done!
- **Magnetic coil**
  - Won't improve our physics sensitivity
  - Currently no helical track reconstruction
  - Suggestion: **turn on for short period with ^{207}Bi sources** at end of run; see if it affects energy resolution

Physics potential: 0νββ exotic modes

Thank you Maroš







World's best at > 2 yrs running (radon-dependent)

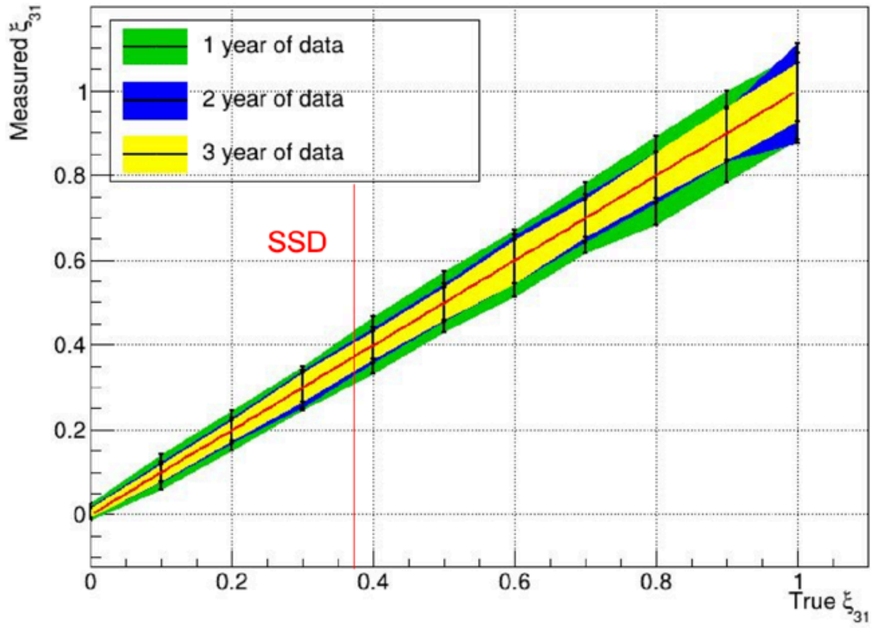
World's best at > 1 yr running (not radon-dependent)

0νββ (V+A) - Can we be competitive?

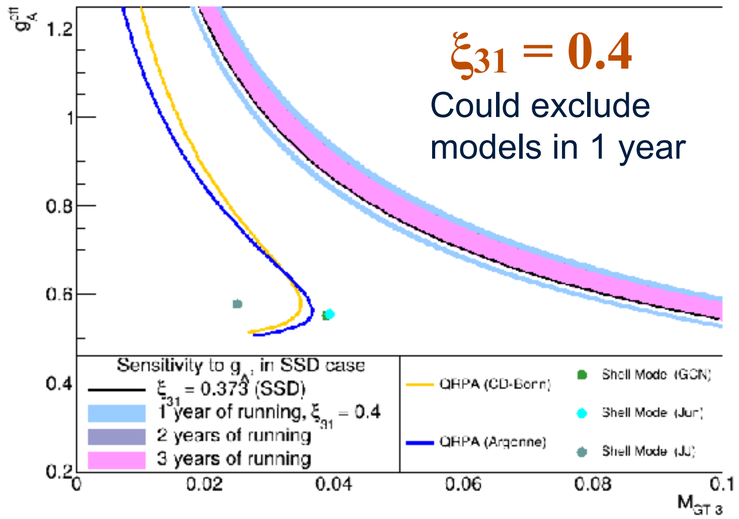
And what about rare ^{207}Bi decays…?

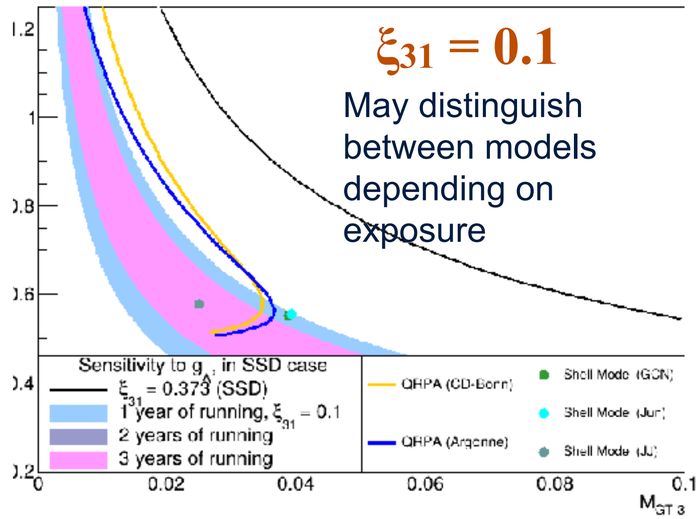
Other physics potential: g_A

Good sensitivity maybe possible 1 year of data!



Whether we need more runtime depends on ξ_{31} value measured





Targets for October:

- Implement backgrounds in sensitivity fit (including radon)
- Make preliminary data fit
- Consider simultaneous fit (both electrons, lower-energy, higher-energy)

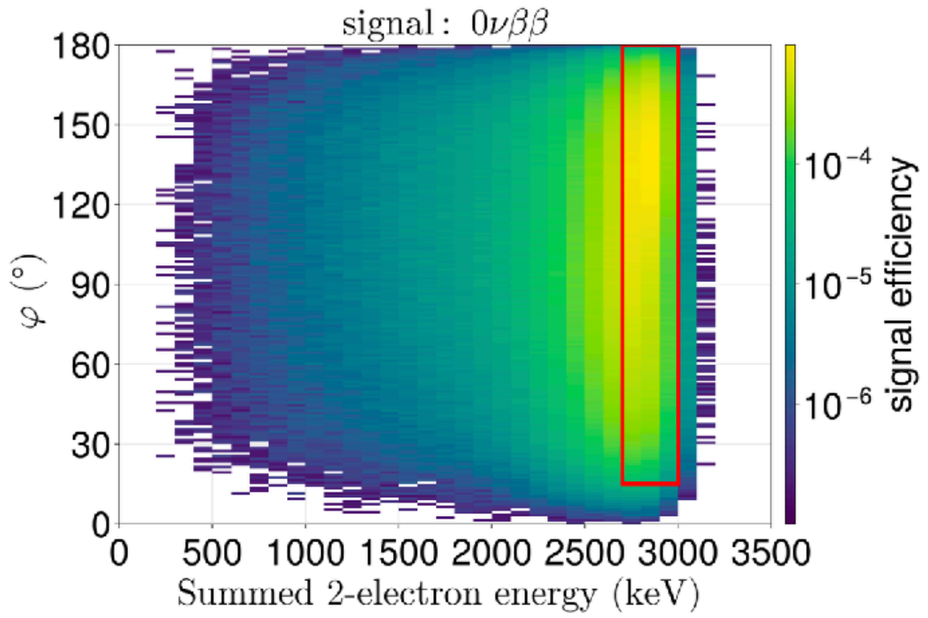
Goals for presenting in October

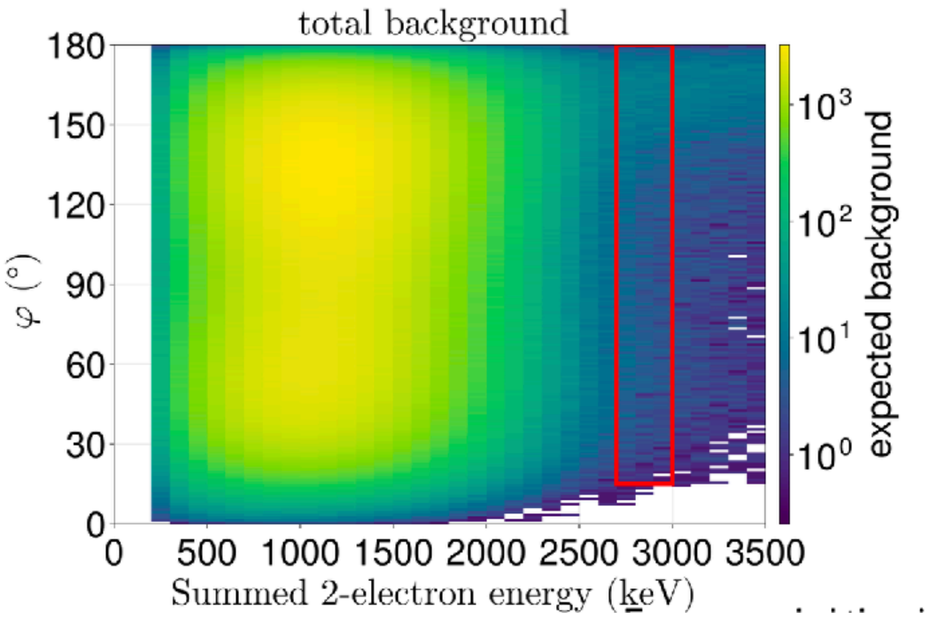
- $2\nu\beta\beta$ preliminary measurement
- Neutron background (and muon?)
- g_A first measurement and sensitivity
- Radon level
- Source foil ^{214}Bi and ^{208}Tl contamination
- $0\nu\beta\beta\chi^0\chi^0$ preliminary search?
- Sensitivities for all exotic processes (V+A?)

What else can we do?

Workshop - measurements, sensitivities and limits

For a collection of variables find the best *ROI* which maximizes $T^{1/2}$.





Thank you very much Maroš for a very useful training!

Publication opportunities for this year!

- Cimrman (Tomáš, Miro)
- Cosmogenics (Laurent)
- ^{207}Bi activities (Miro)
- Source foils (Andrea, Christine)
- External gammas (Xalbat)
- LSM neutron flux (Sam, Cheryl)
- Muon studies (Cheryl, Sam, Katherine)
- Tracker (Anastasia, UK team)

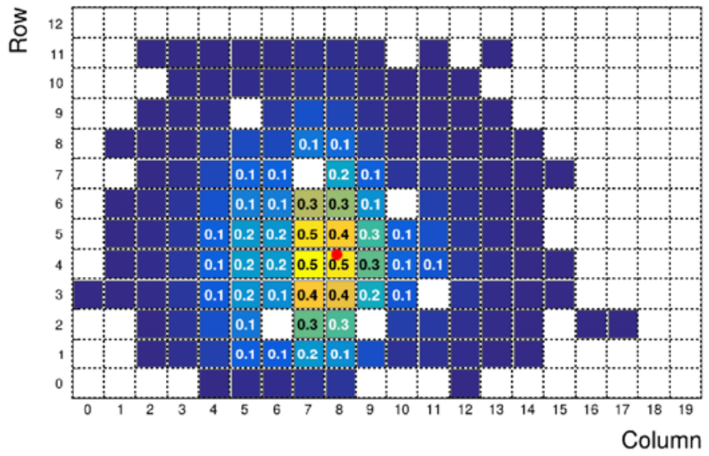
Publishing papers is a huge benefit for all of us!

Conference opportunities

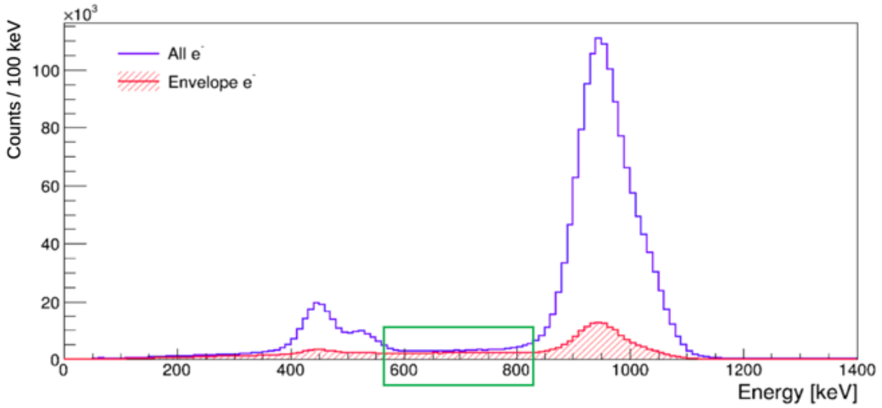
Conference	Dates	Location	Submission deadline
ICHEP 2026 Speaker needed! https://ichep2026.org/	30th July – 5th August 2026	Natal, Brazil	23rd July 2026 (registration)
APS Division of Nuclear Physics (**DNP**) 2026 https://www.aps.org/events/2026/dnp-2026	11th – 14th October 2026	Philadelphia Marriott, Philadelphia, USA	31st July 2026
2026 International Workshop on Baryon and Lepton Number Violation (**BLV2026**) https://indico.wlab.yale.edu/event/906/overview	22nd – 24th October 2026	Yale, New Haven, USA	No deadline
25th International Workshop on Next Generation Nucleon Decay & Neutrino Detectors (**NNN26**) https://indico.neutrino.or.kr/event/514/page/20-overview	26th – 30th October 2026	Chung-Ang University, Seoul, Republic of Korea	Not yet known
4th International Conference on Neutrinos and Dark Matter (**NuDM 2026**) https://indico.cern.ch/event/1609263/overview	14th – 17th December 2026	Aswan, Egypt	1st August 2026

Great work on calibrating and understanding our detector!

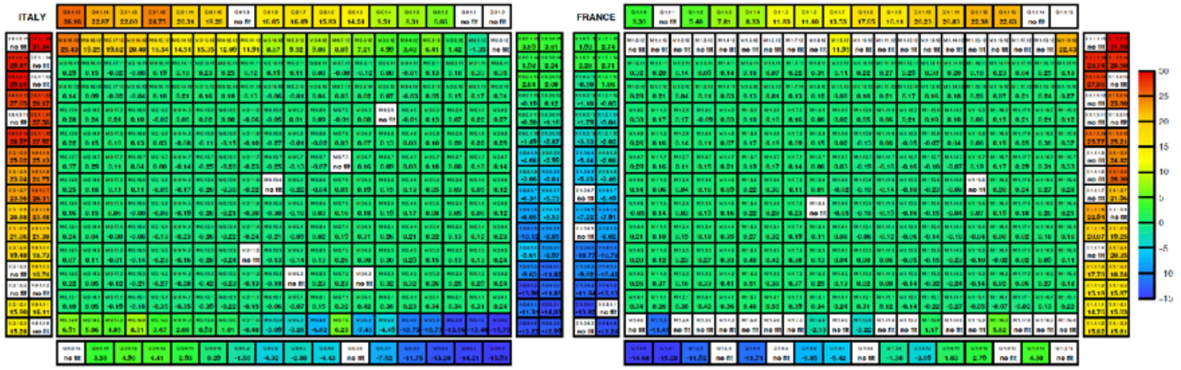
Kyrylo - detector efficiency



Yaroslava - explaining ^{207}Bi plateau



Elvis - timing calibration with gammas



Summer plans:
Andrew - further studies on ^{207}Bi plateau
Aryak - Radon measurements with e-γ events
Katherine - sensitivity to muons
Oleksandra - Cimrman optimisation

Our brave heros, Mathis and Antoine

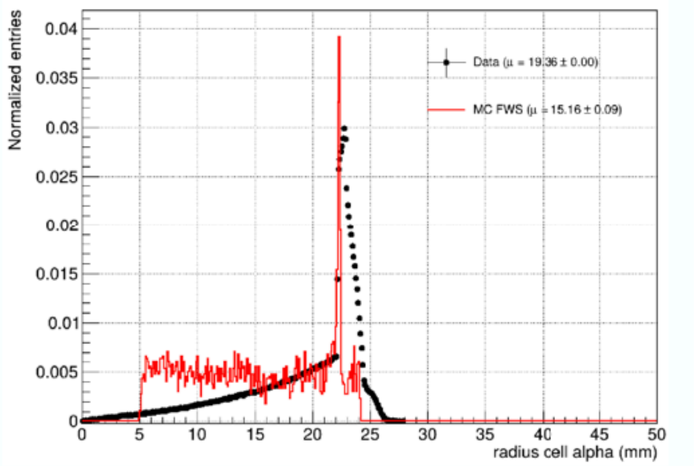
- Radon measurements
- ^{214}Bi measurements
- Tracker gas composition
- Source foil geometry
- New source-foil-bulk generator

- Calibration
- Thresholds (with Raphaël)
- Geometrical corrections (with Raphaël)
- ββ measurement
- Crossing-electron backgrounds

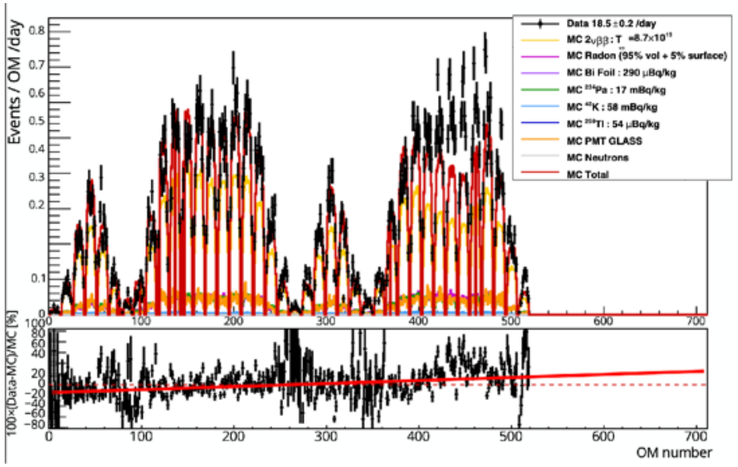
Most talks in a SuperNEMO meeting

Mysteries to solve

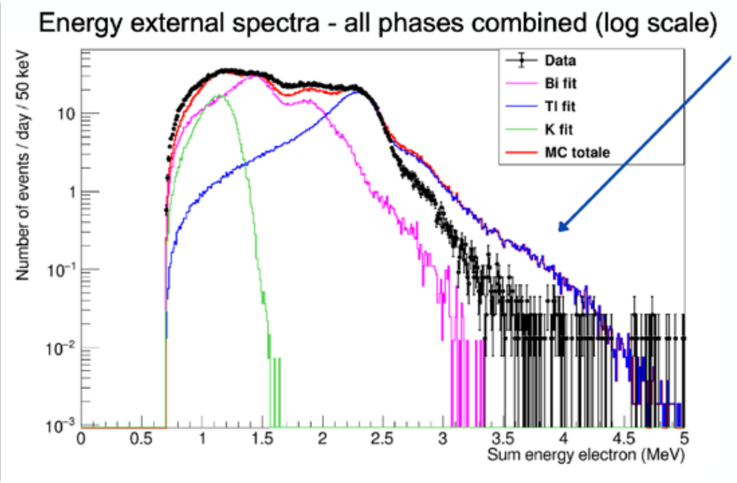
Why is the alpha cell radius distribution in MC so different from data? (Antoine radon talk)



What's the data/MC discrepancy for some OMs? (Mathis ββ talk)



What's the high-energy data/MC discrepancy? (Mathis crossing-electron talk)



Software progress - and still more to come!

Unified reconstruction pipeline coming next week, thanks to Xalbat & Mathis (Yves to help with disk space optimisation)

Huge step forward in making it easier for analysers to work with our data!

Included in this release:

- Bulk source foil generator

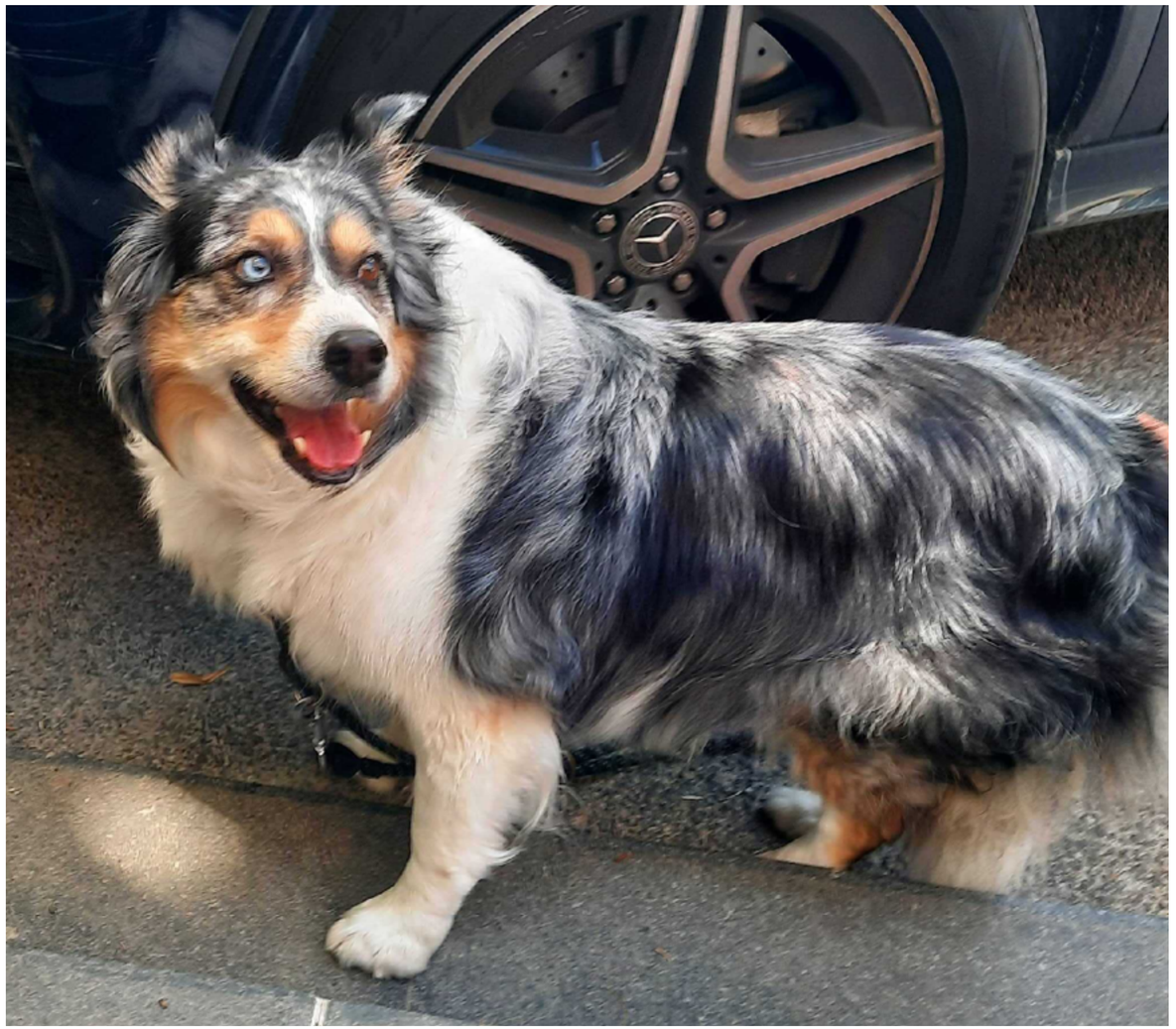
For the next release:

- z reconstruction
- Realistic bent source foils
- Dynamic thresholds
- Optical correction algorithm (γ)
- γ timing corrections

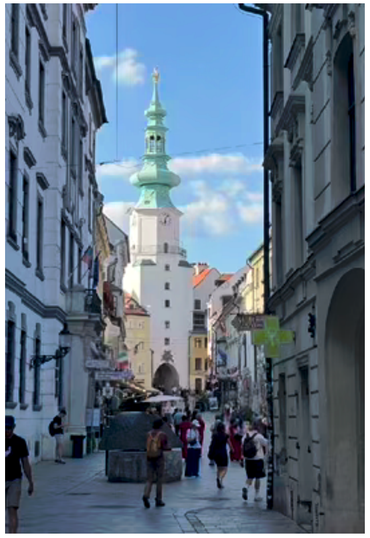
Thank you François & Robert!

Thank you Tomas for fantastic Cimrman reconstruction

Maggie is standing in for Lascar!



Thank you to Pavel, Robert, Jakub and their team!



What a lovely meeting!
What a beautiful city!
What amazing hosts!
And great food, too :)

Upload your photos:

https://msprvkff.smugmug.com/upload/cDGbCs/2026Bratislava

See you again soon!

Next meeting plan:

AUSSOIS

Winter 2026/7

Get ready to PARTY and celebrate SuperNEMO!

Title