Demonstrator: study of the external calibration with ^{241}Am

BULLKID-DM digest, 12/11/2025

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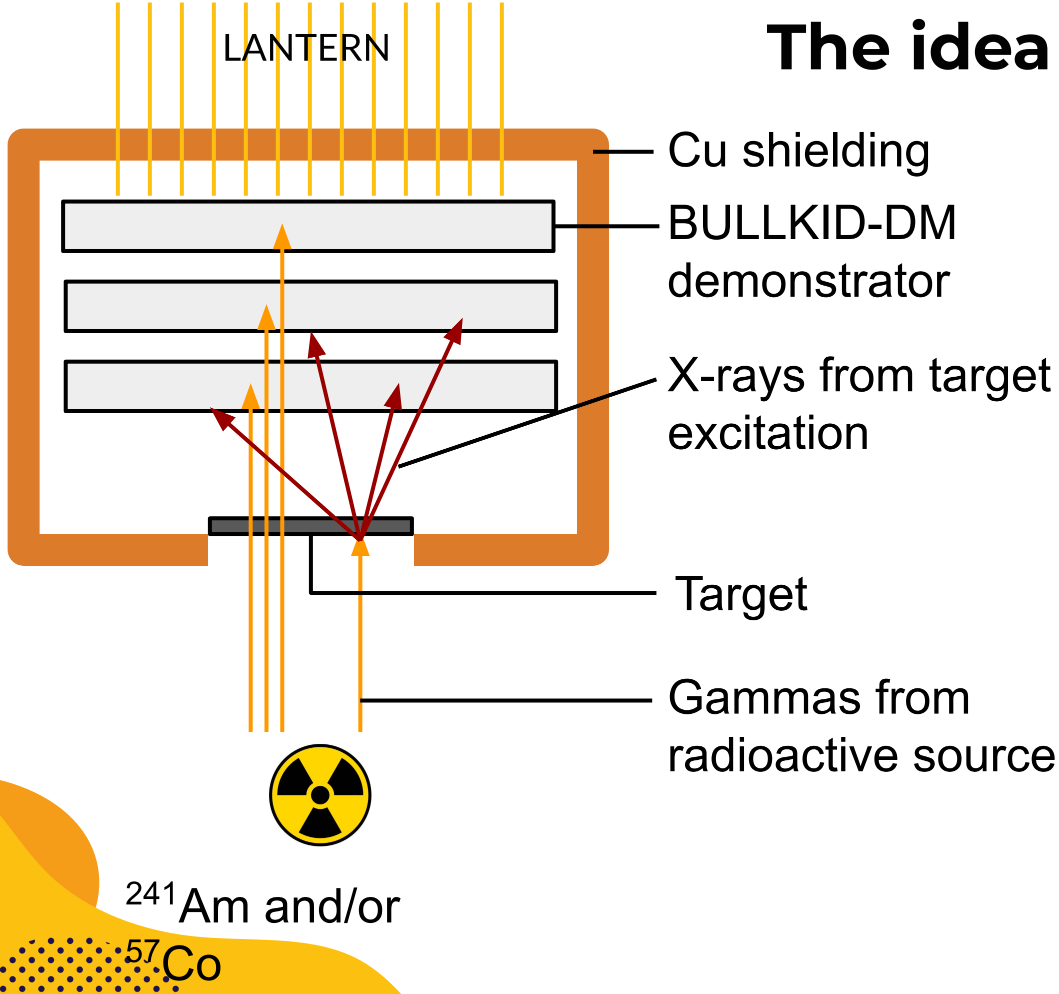
The idea



Induce **fluorescence emission** of target materials through ^{241}Am and/or ^{57}Co **radioactive sources external to the cryostat**

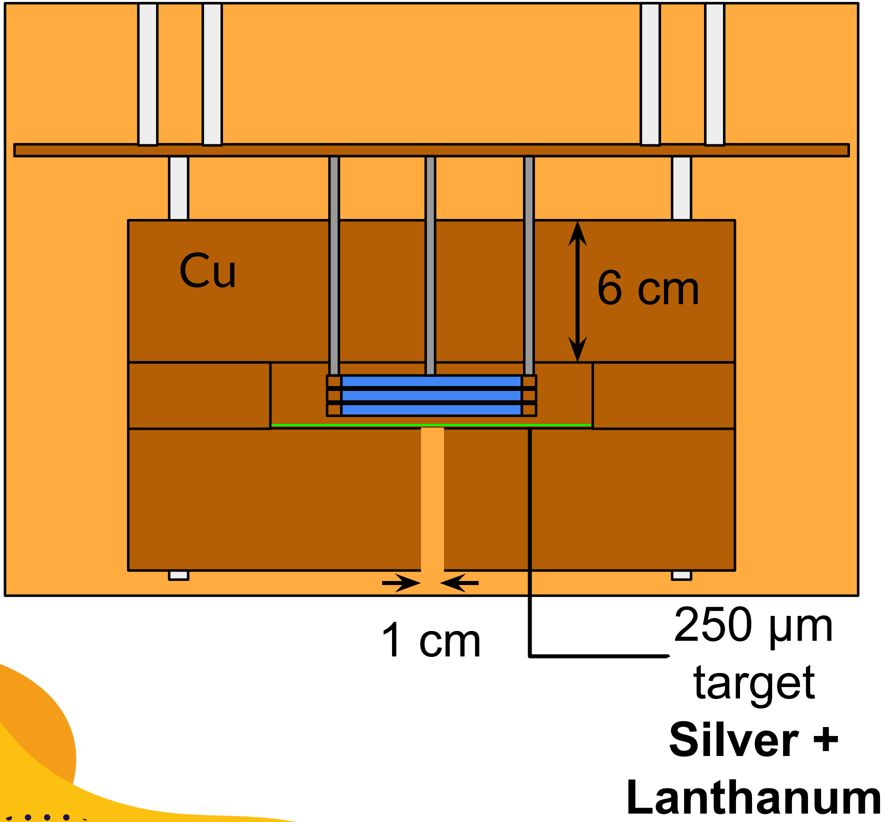
PROS:

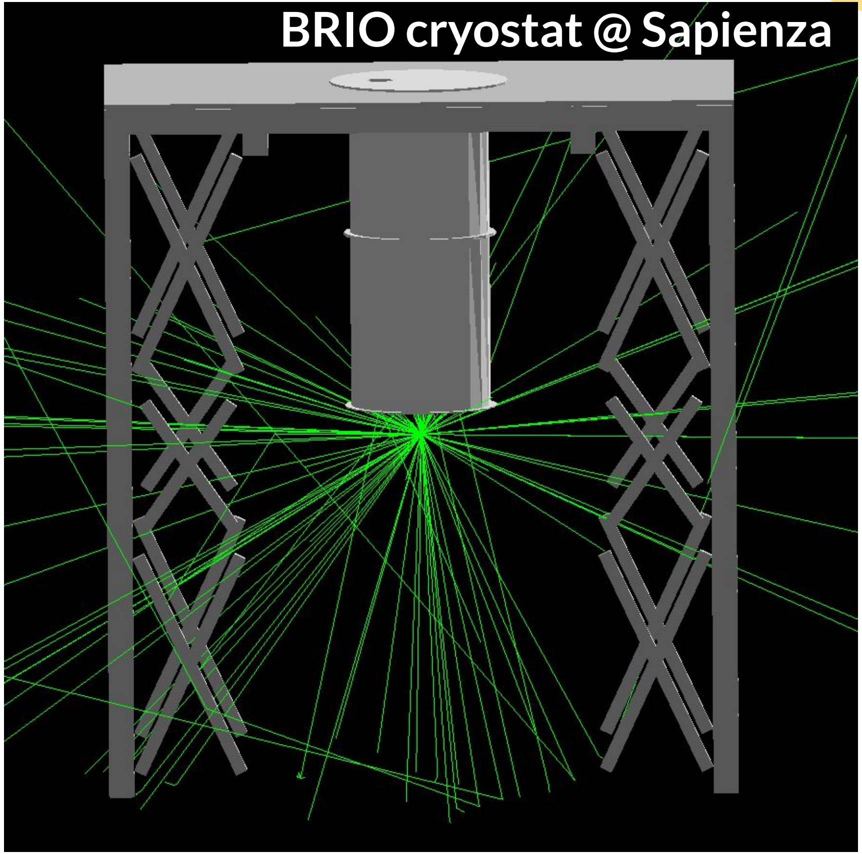
- No permanent contamination of the background
- Multi-peak calibration
- Multi KIDs calibration

CONS:

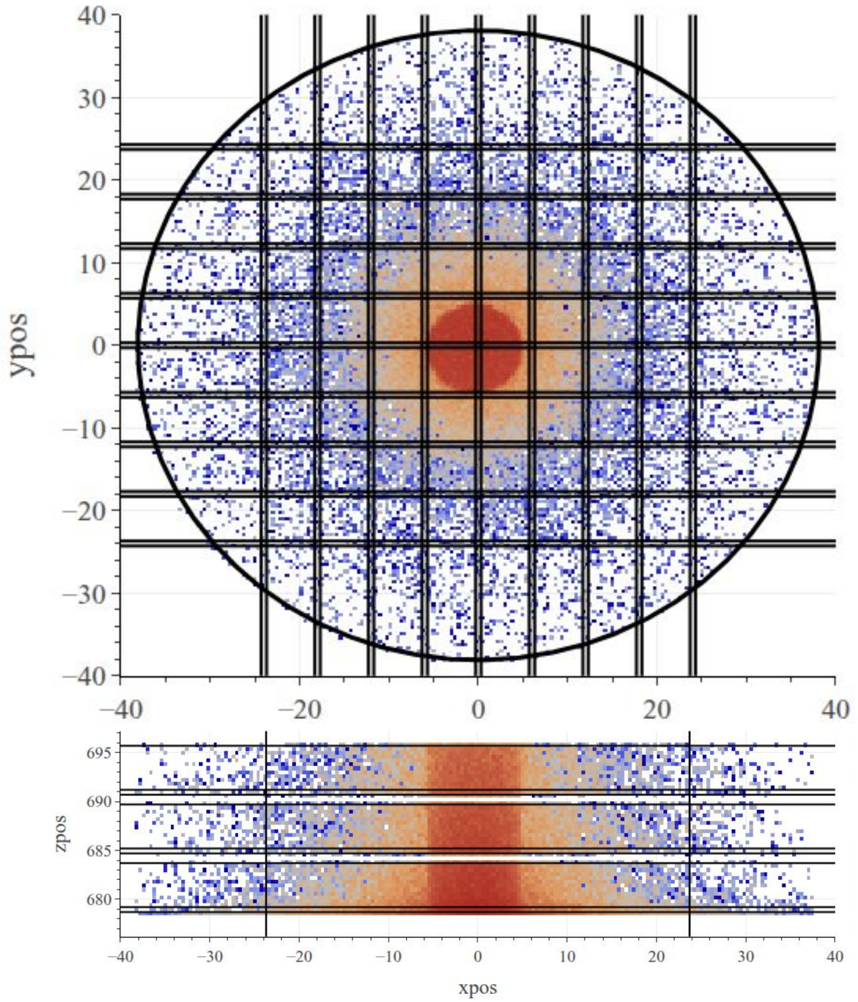
- Modification of the internal shielding
- Slow (some hours)

The prototype simulated

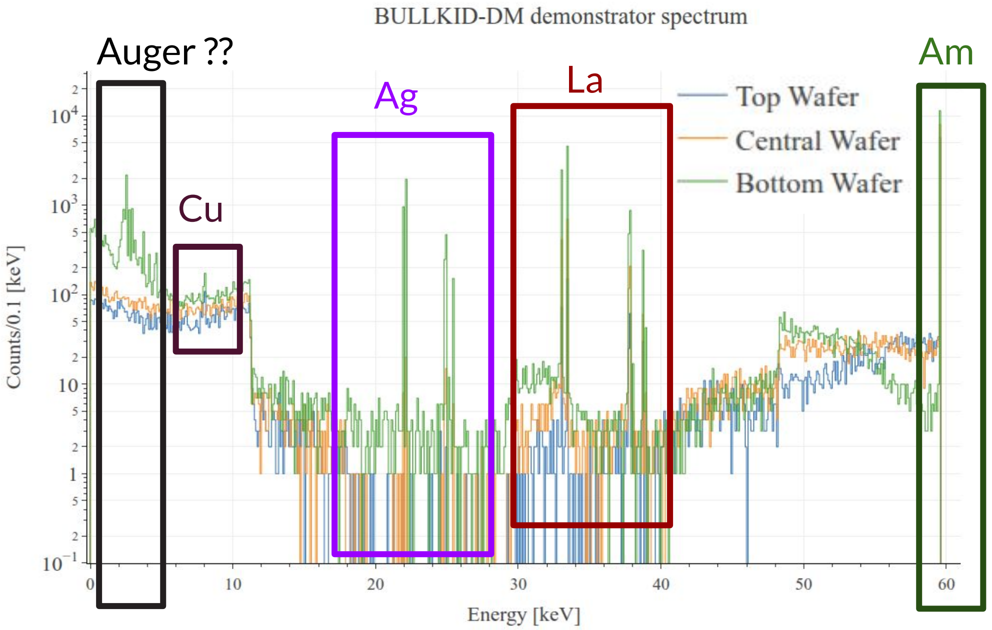




Preliminary results

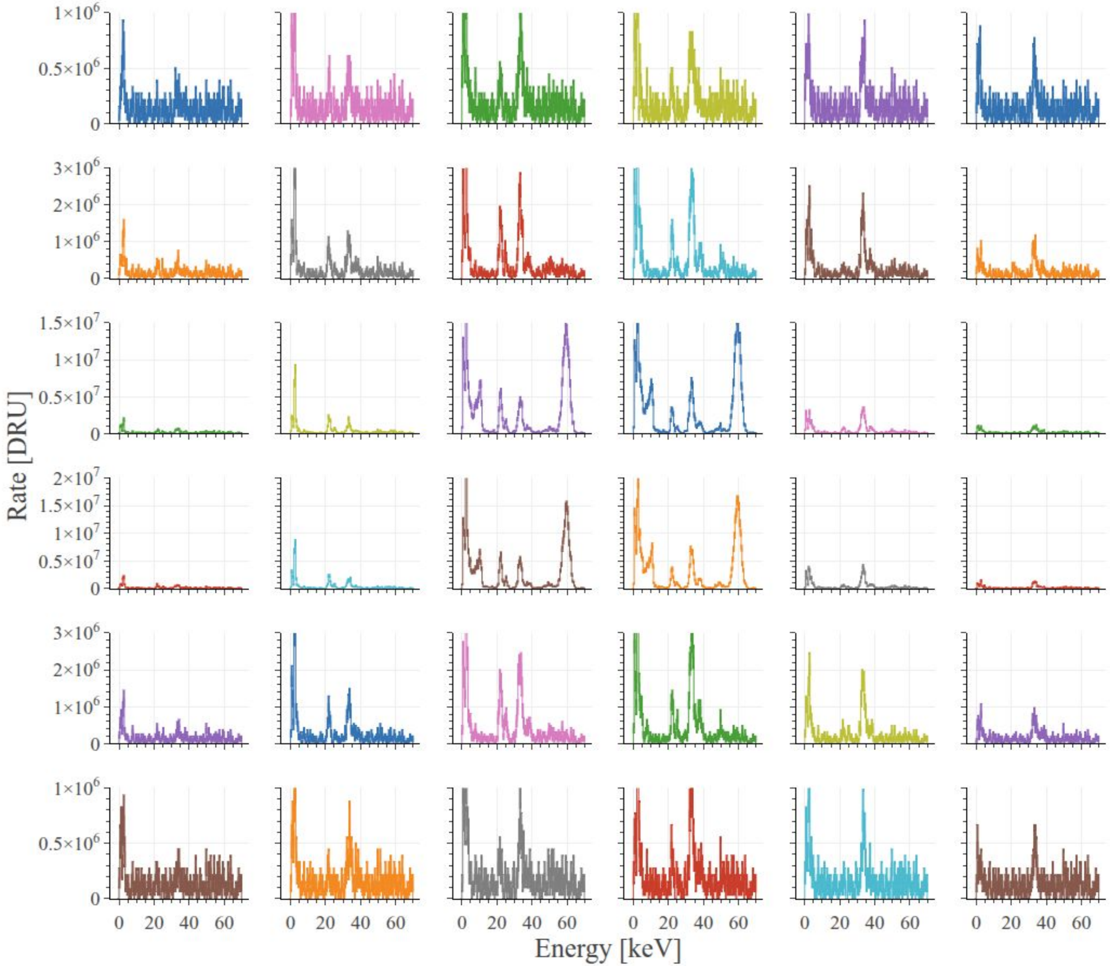


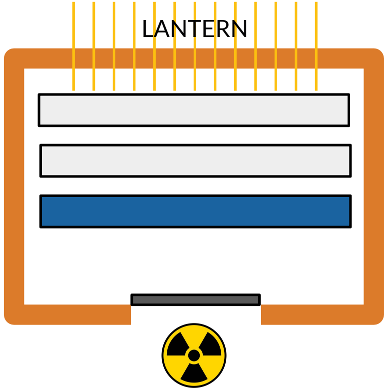
- ^{241}Am source of 370 kBq
- Simulated 3 h of calibration
- Added a flat background of 10^5 DRU



Preliminary results - Bottom wafer

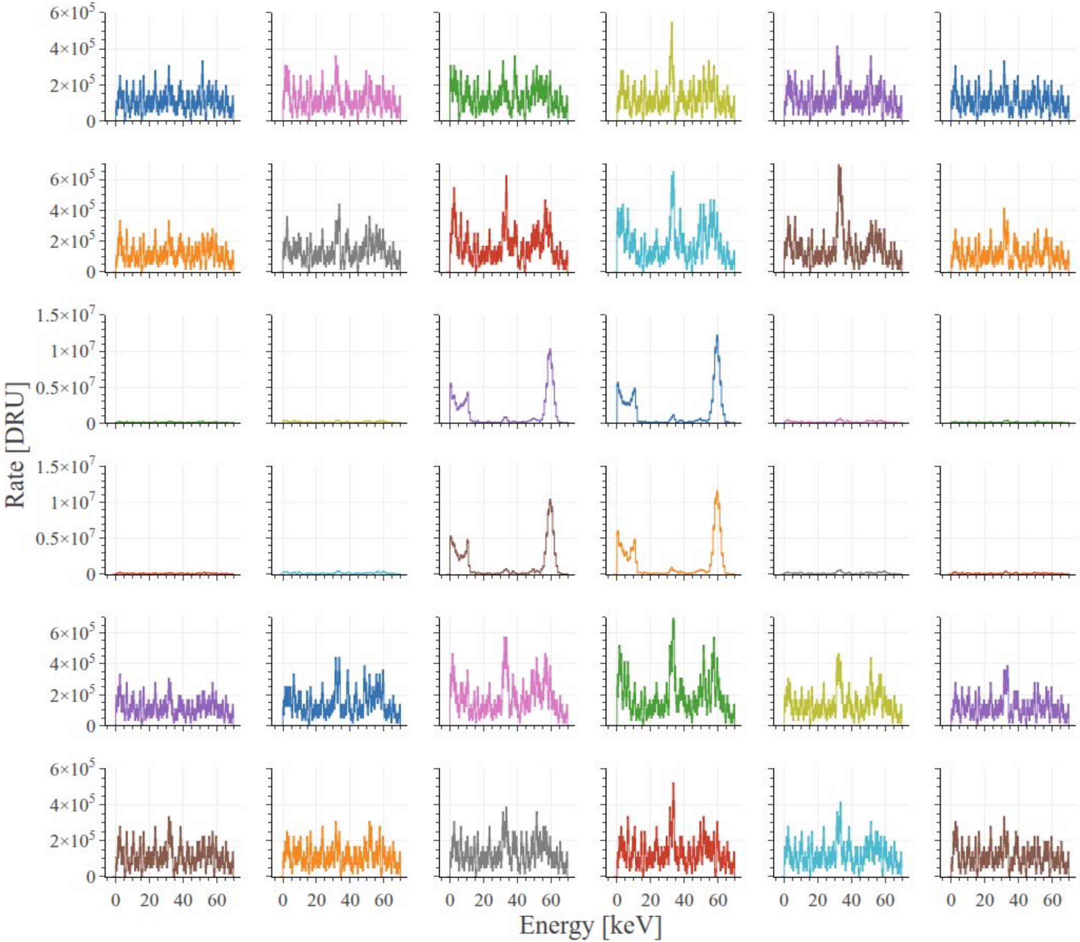
Applied a resolution of 3%

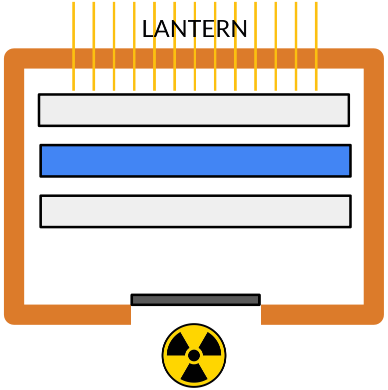




Preliminary results - Middle wafer

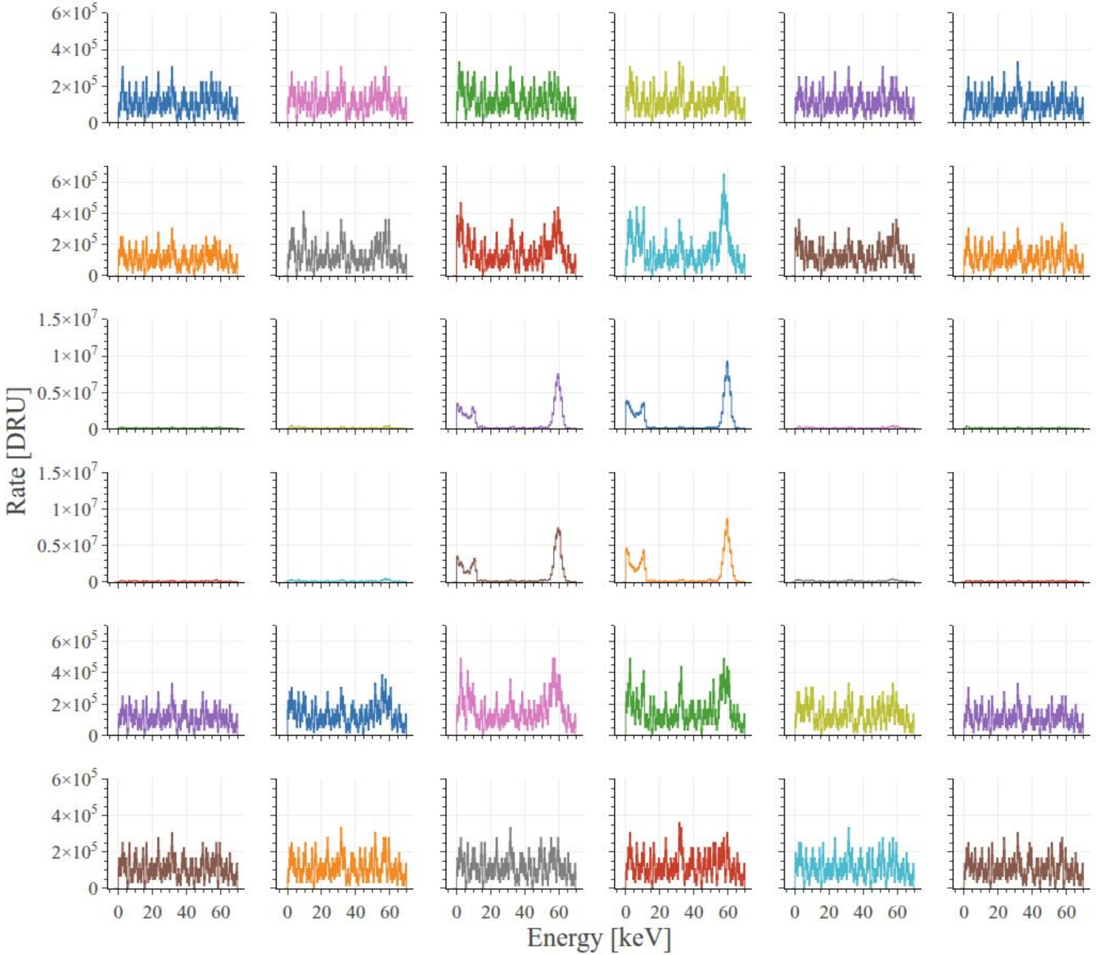
Applied a resolution of 3%

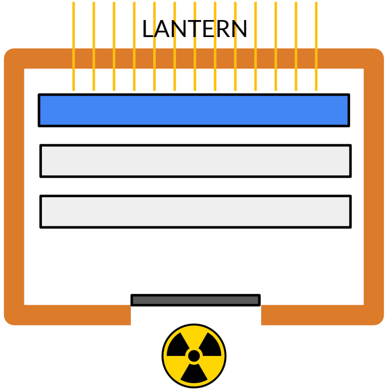




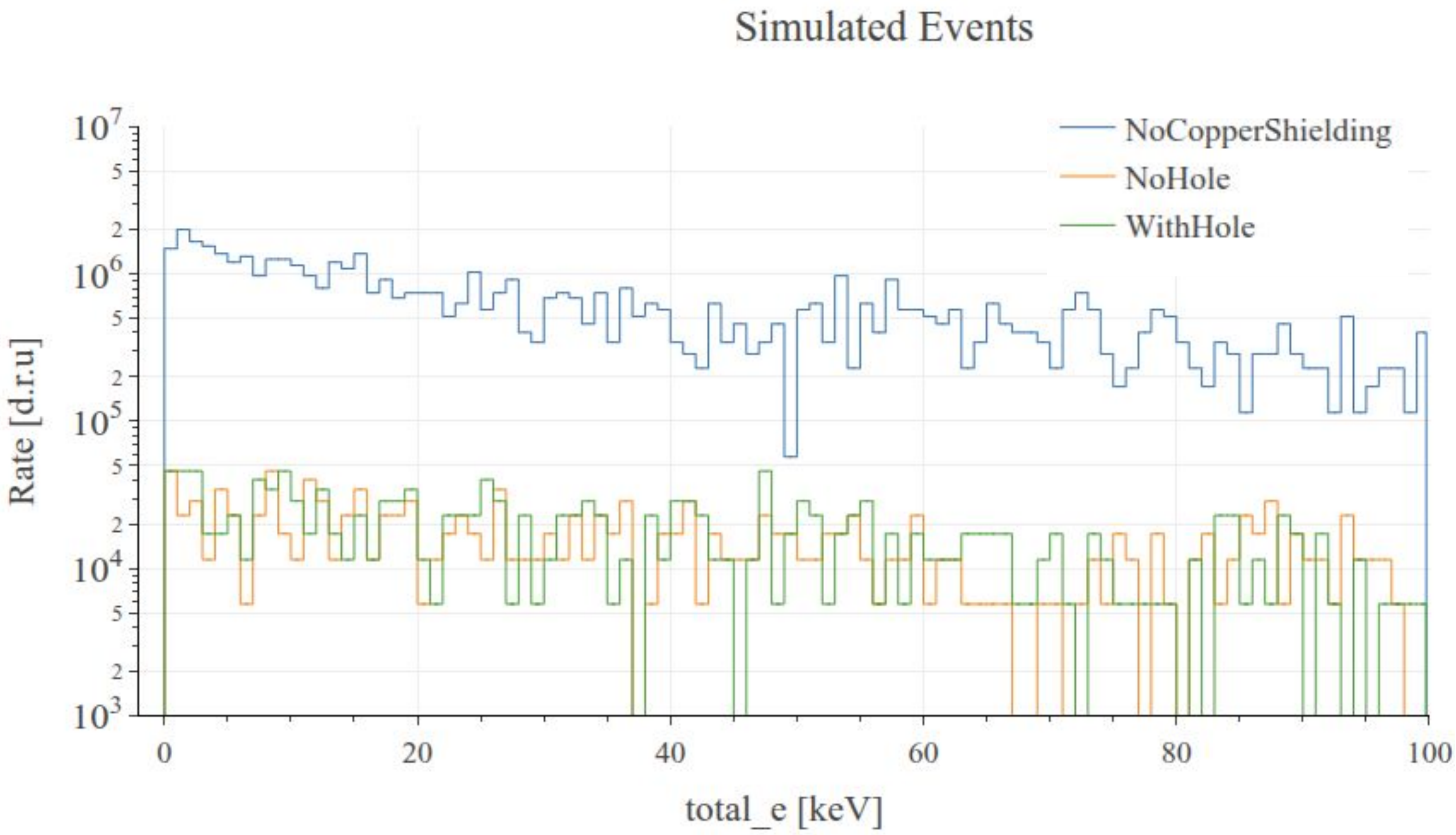
Preliminary results - Top wafer

Applied a resolution of 3%





Preliminary results - Impact of the hole



Conclusions

Simulation side:
- Improvement of the geometry
- Impact of the Hole at LNGS

Acquisition side:
- Proof of concept with brass and silver target **ongoing**
- Calibration of the demonstrator at Sapienza