

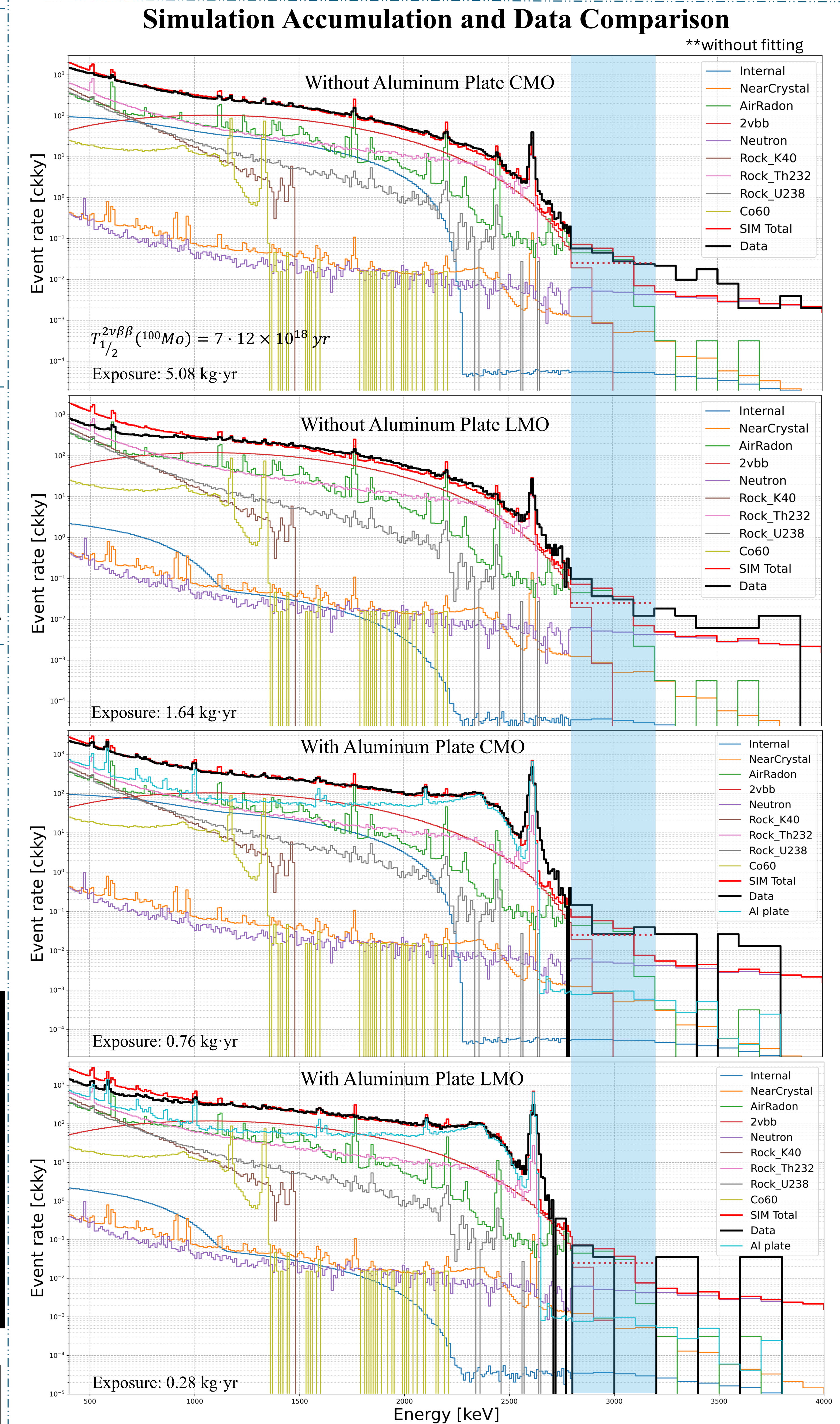
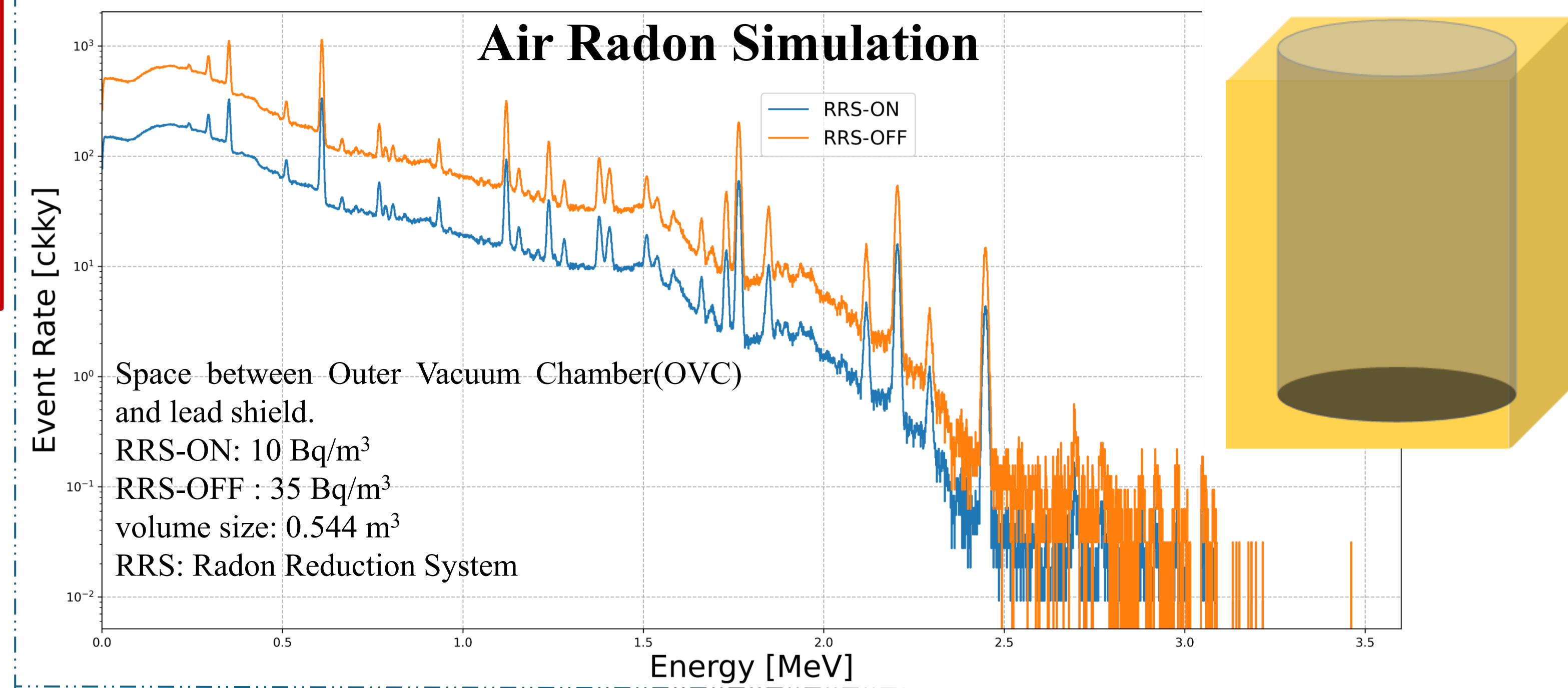
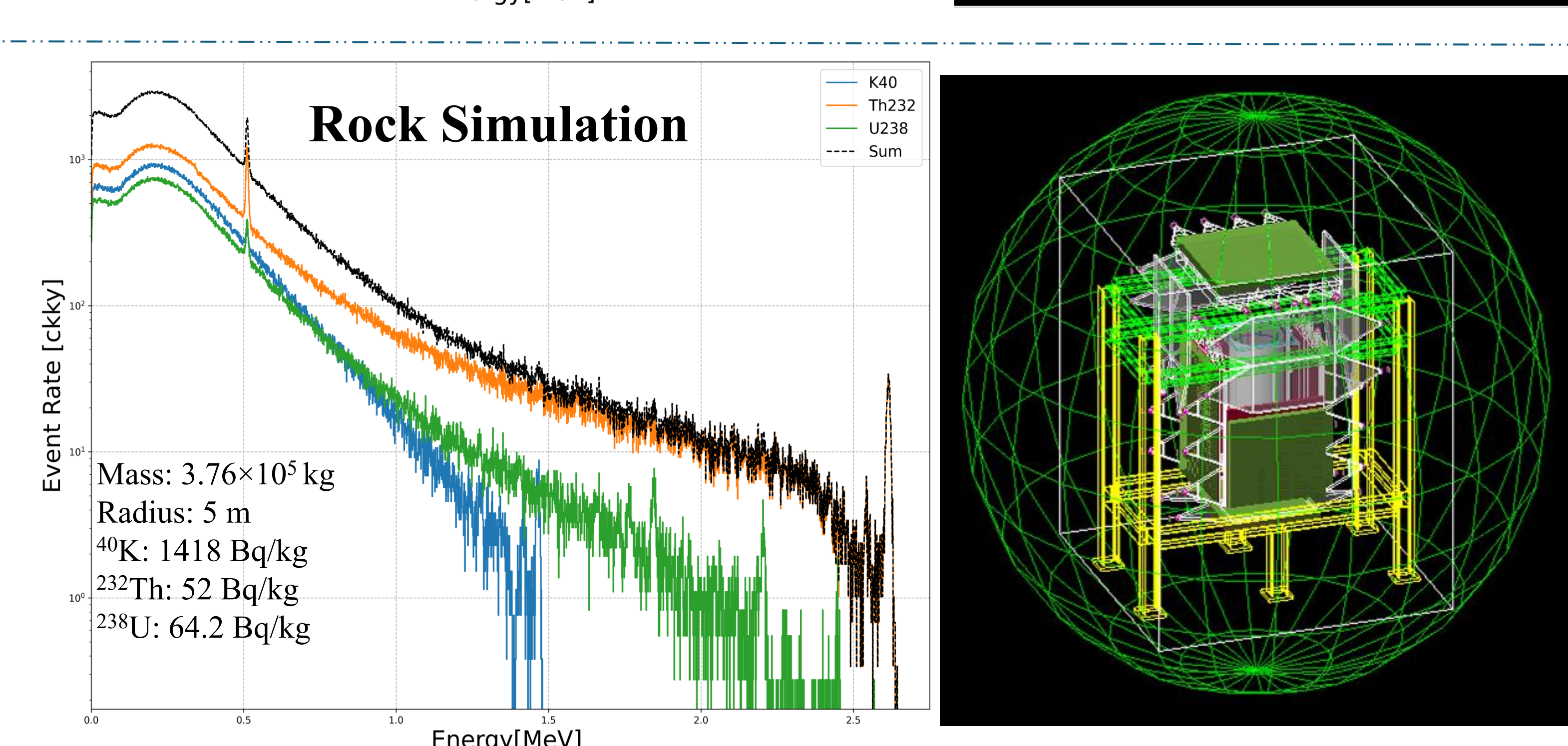
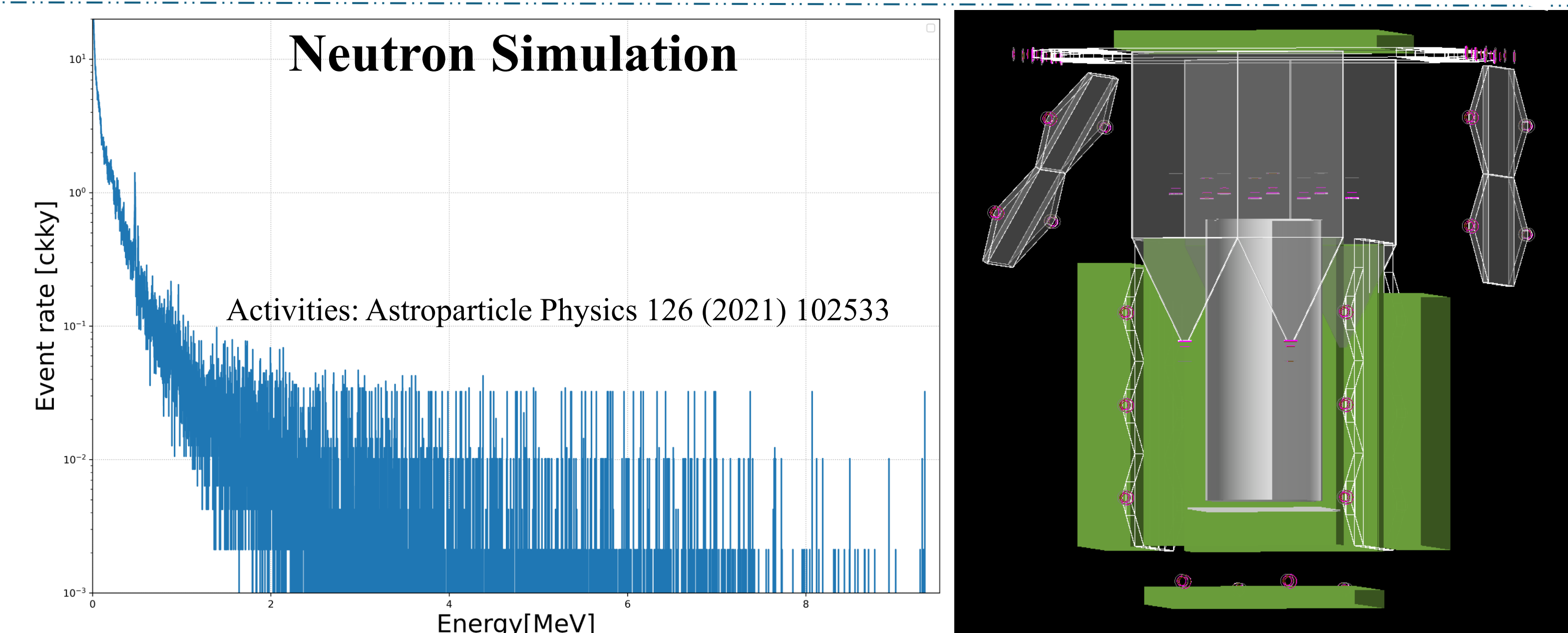
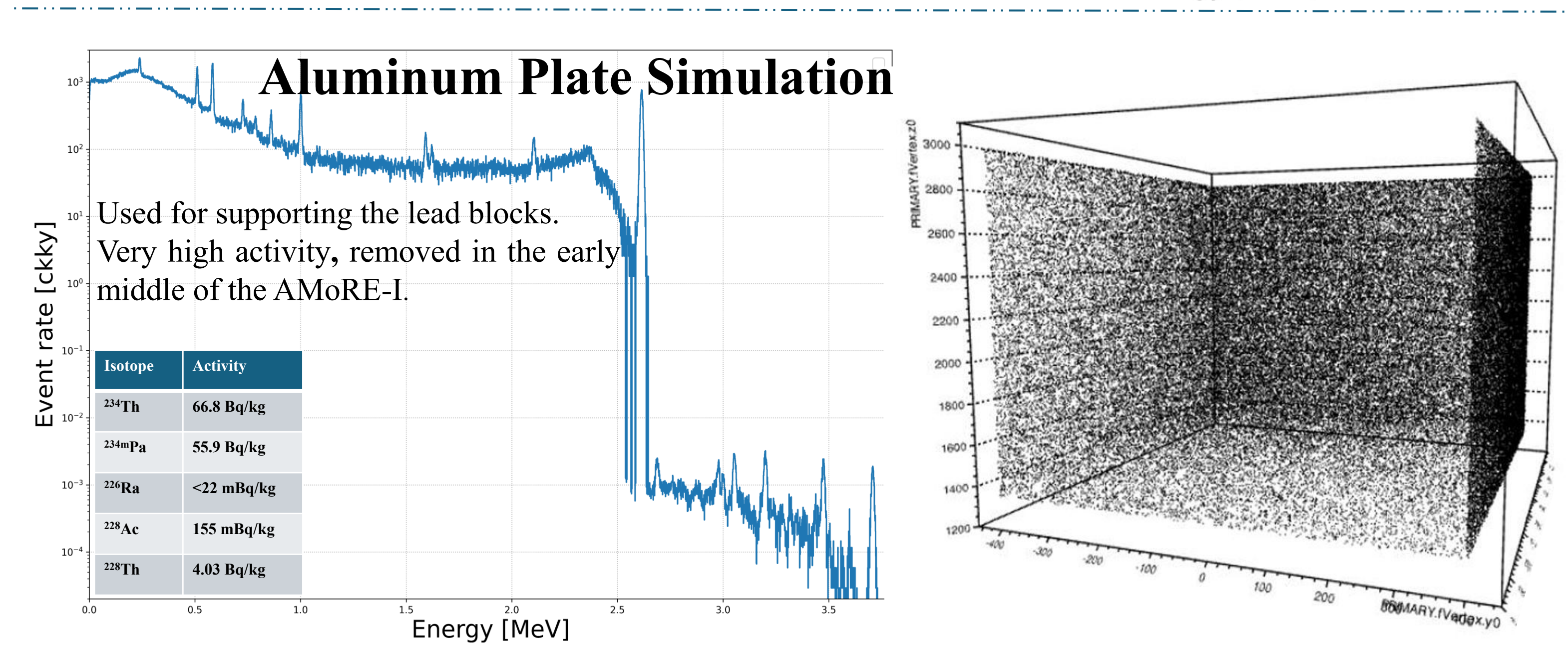
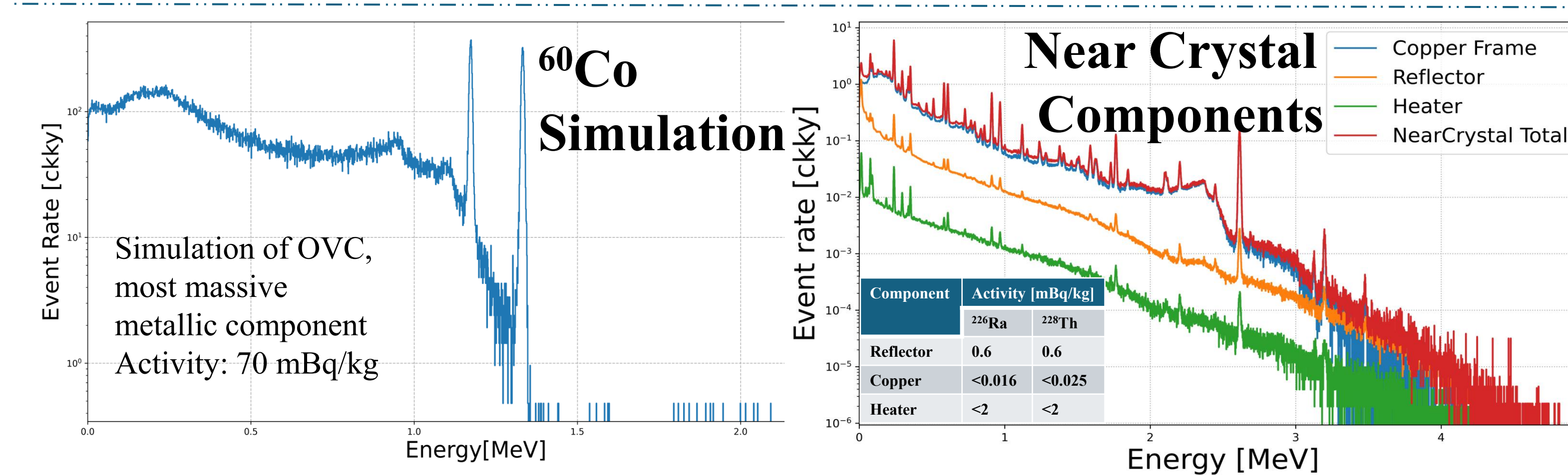
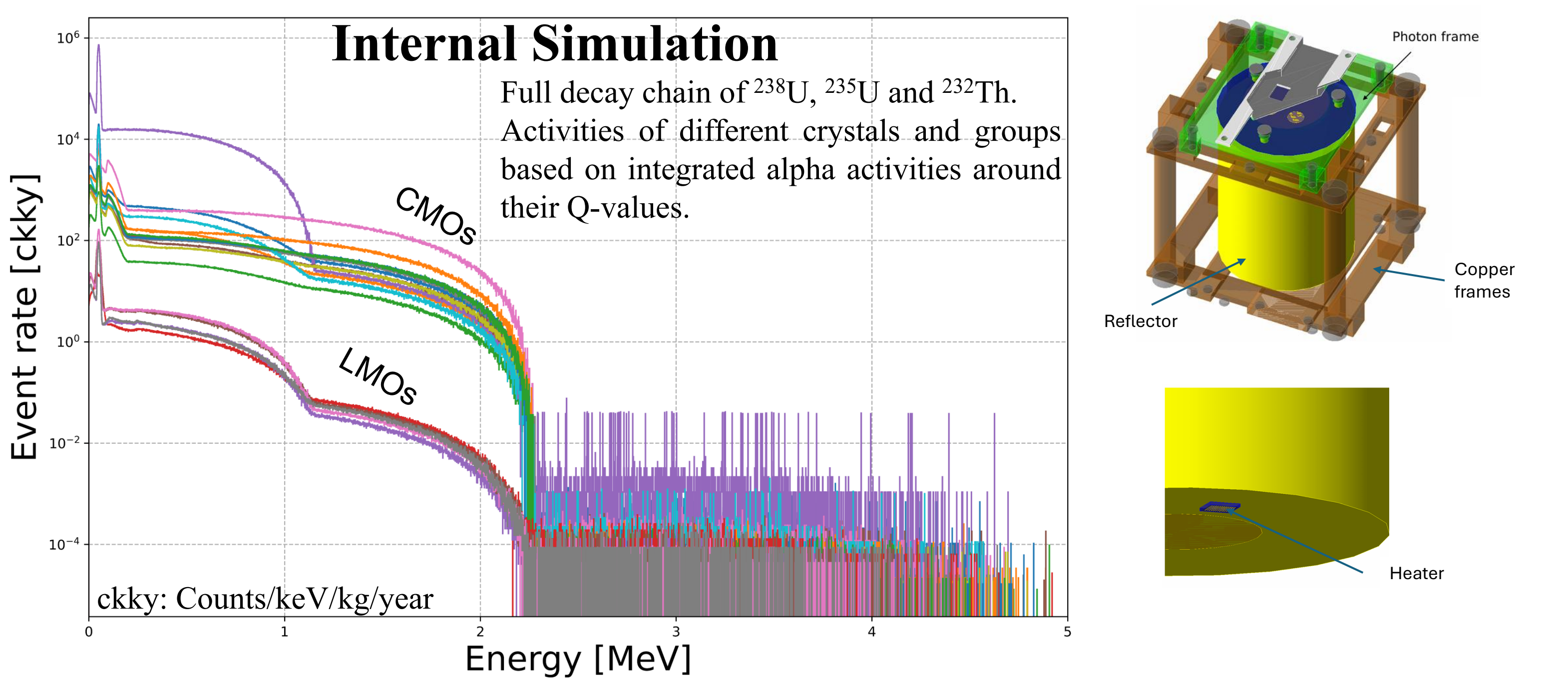
Background Modeling of AMoRE-I

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To aid the search for neutrinoless double-beta decay of ^{100}Mo ($Q = 3.034 \text{ MeV}$) in AMoRE, a background simulation of AMoRE-I is performed using Geant4. It aims to estimate contributions from major background sources and to reproduce the observed experimental spectrum for background modeling.

- 18 crystals with a total mass of 6.194 kg: 13 Calcium Molybdate (CMO) and 5 Lithium Molybdate (LMO).
- Single hit events: Events depositing energy in single crystal.
- Smearing was applied using detector resolution of AMoRE-I data.
- Events within 30 minutes of ^{212}Bi alpha decay ($6207 \pm 50 \text{ keV}$) can be classified as alpha-tagged and rejected with 98% efficiency.



Background Source	Event rate [ckky]	Background Source	Event rate [ckky]
Internal CMO	0.537×10^{-4}	Air Radon (RRSON)	9.42×10^{-3}
Internal LMO	0.336×10^{-4}	Air Radon (RRSOFF)	32.01×10^{-3}
Near Crystal components	7.86×10^{-4}	Aluminum plate	0.80×10^{-3}
Neutron	5.124×10^{-3}	2vbb	4.983×10^{-3}

Events on Extended ROI [2.8-3.2 MeV].

- Simulation matches data overall, with several discrepancies under study.
- Surface, Alpha backgrounds, and Multiple-hit studies are ongoing.
- Radon dominates near ROI; Data-MC modeling is in Progress.