BULLKID
Simulation meeting

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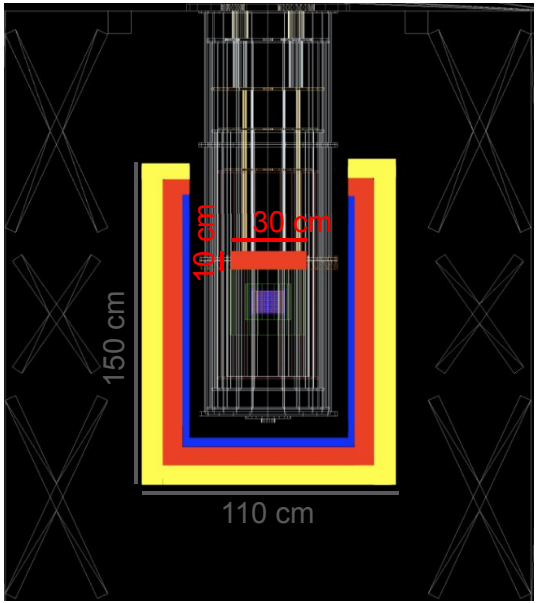
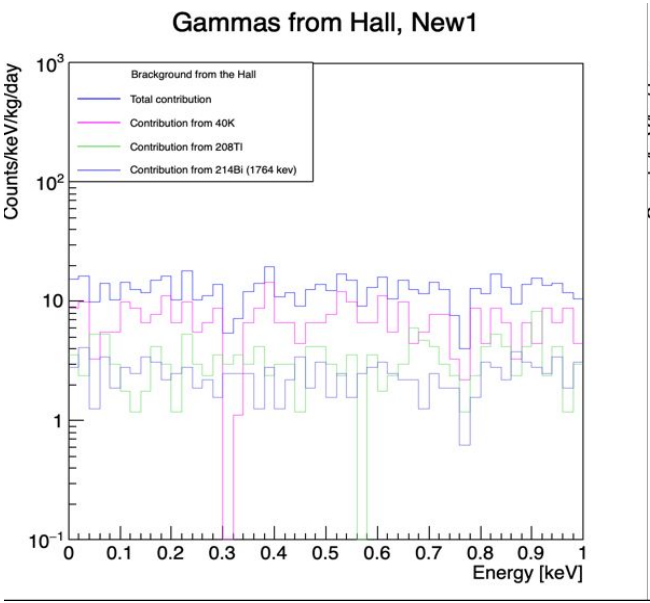
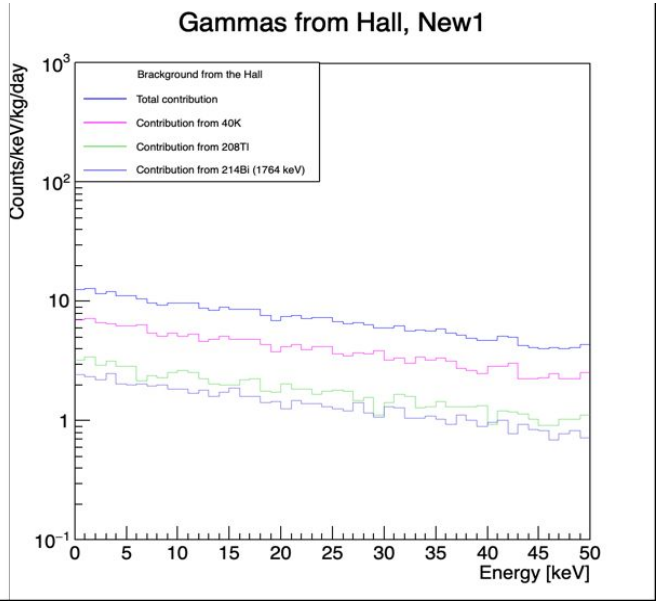
Internal shielding for BULLKID-DM

- It has been shown that NEW1 for the internal shielding it won't reach the 10^{-2} dru
  - considering only the top Cooper block with a radius of 15 cm
  - the radius for the Copper block was reduced 3 cm
  - the position over Z axis of the Copper block was lowered 13.45 cm

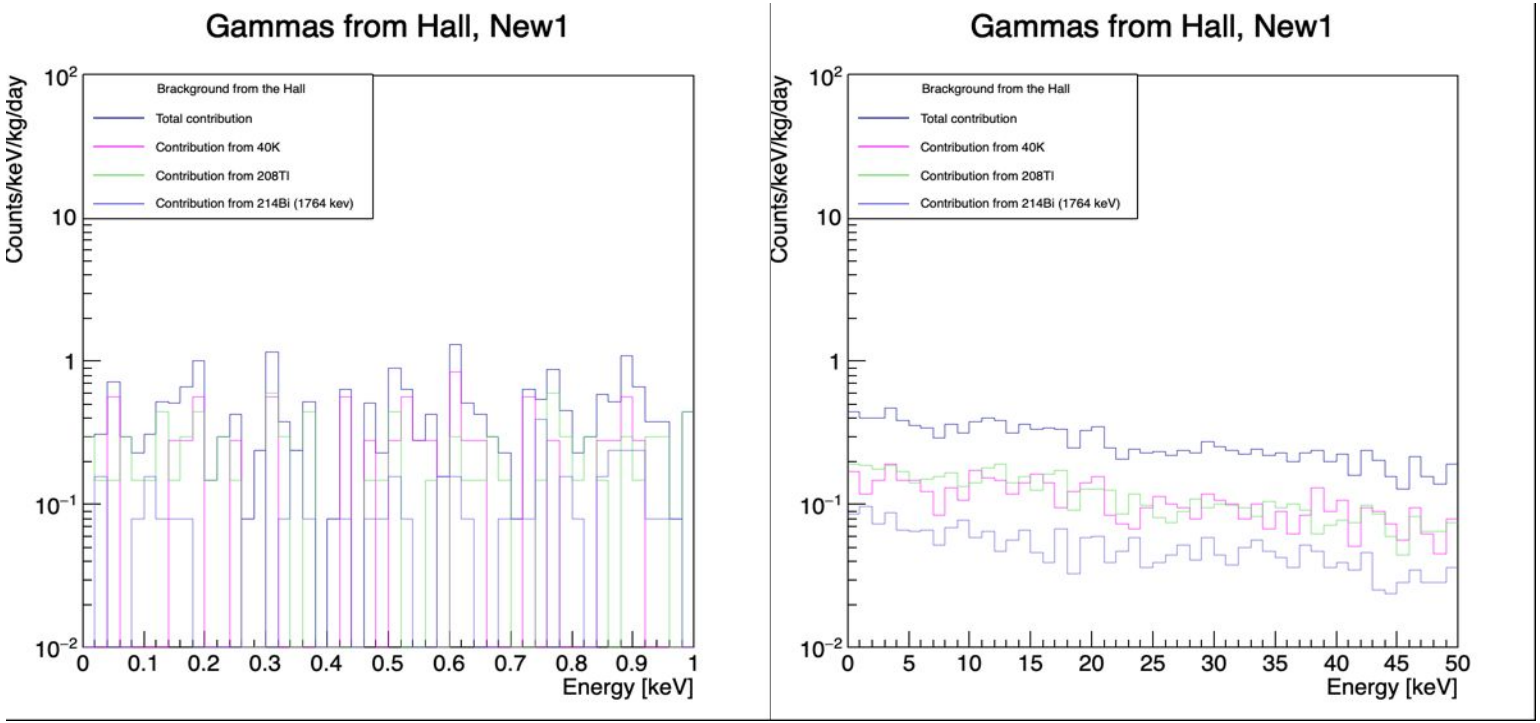






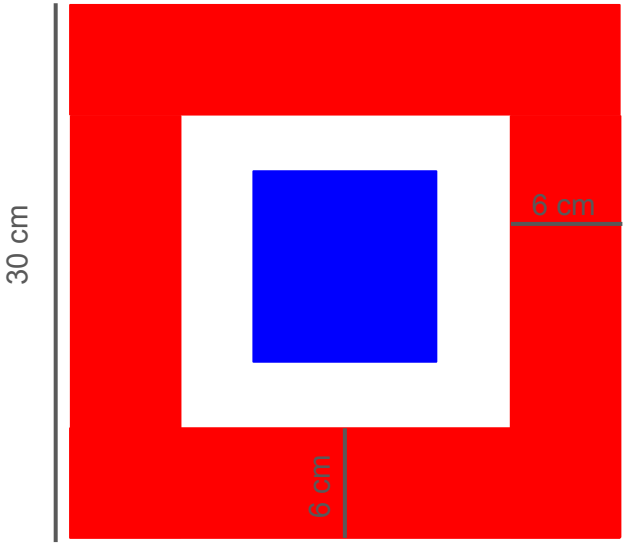
Internal shielding for BULLKID-DM

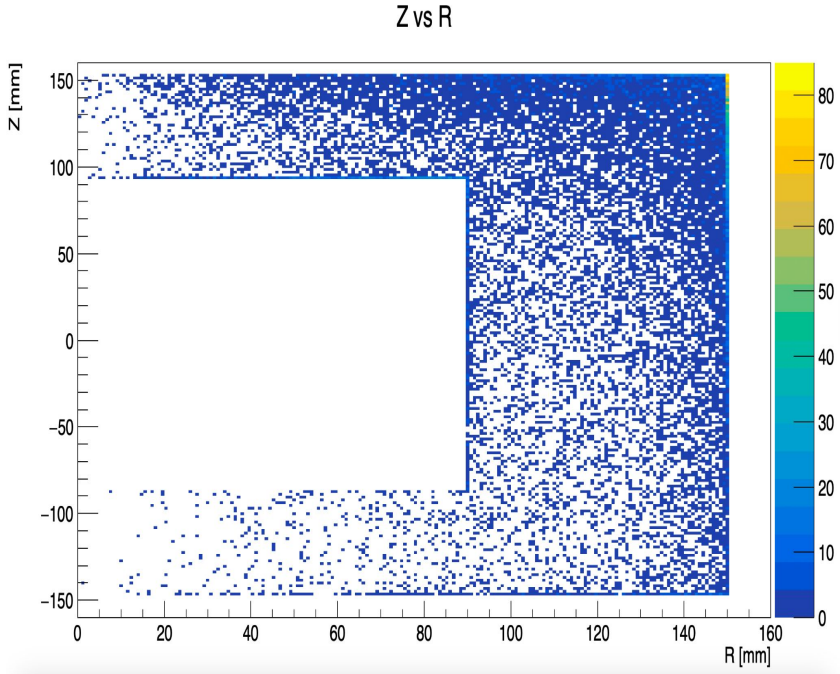
- Considering all the internal shielding in the configuration NEW1



Internal shielding for BULLKID-DM

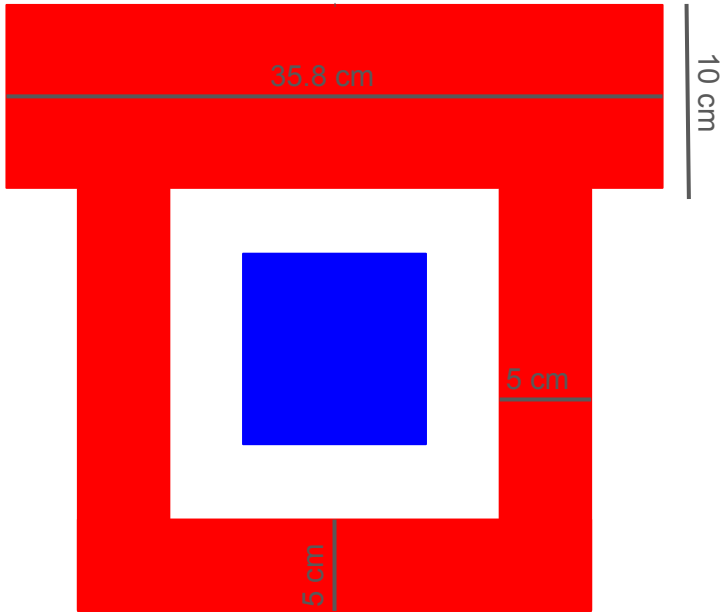
- Distribution of the interaction of particles in the internal shielding for the first time
  - first interaction in the red region
  - background contribution of the gamma from ^{40}K (main contribution)

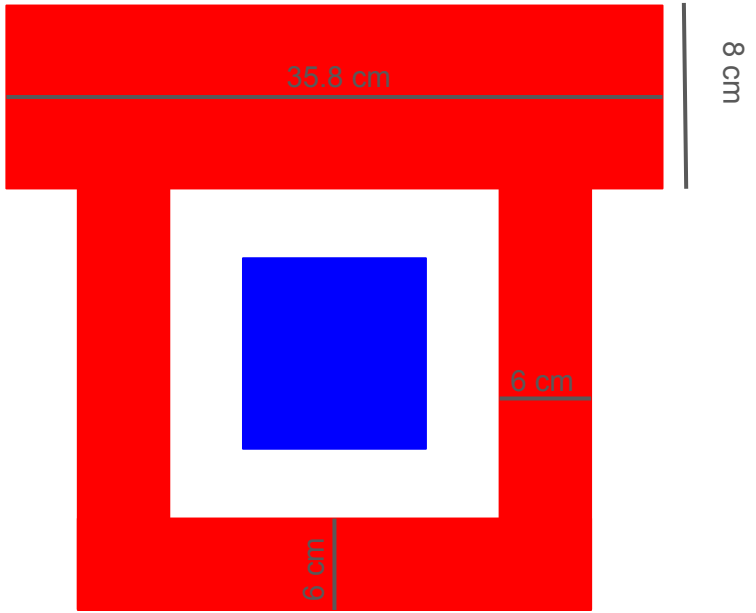




Internal shielding for BULLKID-DM

- We can consider a bigger radius for the top shield, r = 17.9 cm
- To keep the copper mass around the same value, two cases can be considered
  - height of 10 cm, limits the sides and bottom to 5 cm
  - height of 8 cm, limits sides and bottom to 6 cm

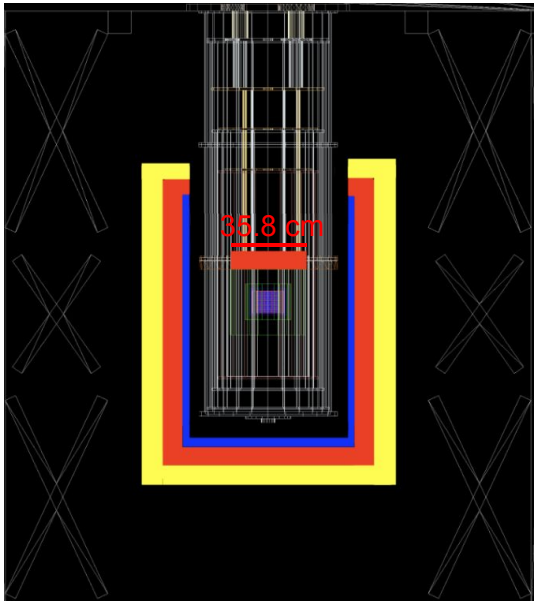




Internal shielding for BULLKID-DM

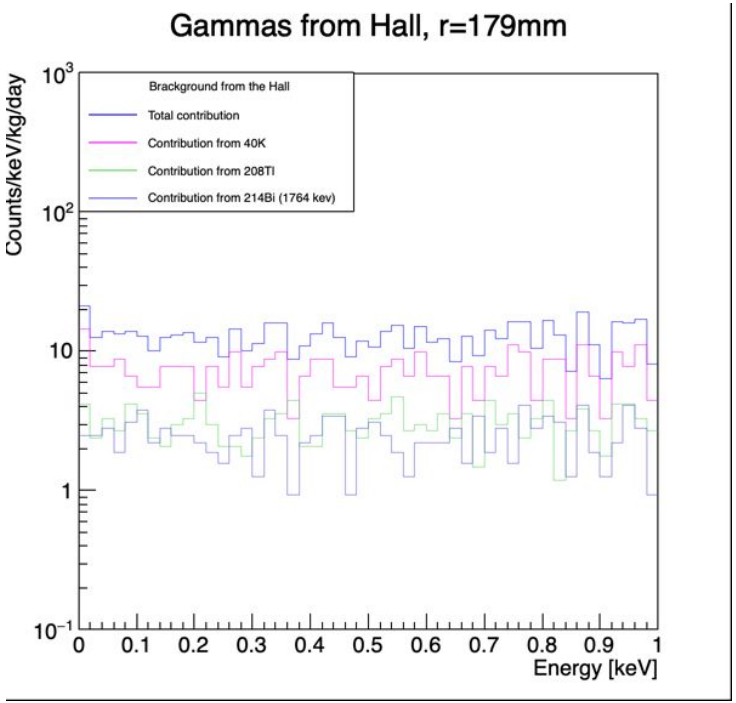
- Considering the external shielding plus the top part of the internal shielding
  - the rest of the internal shielding is made of air
- Main gamma contributions to the signal simulated

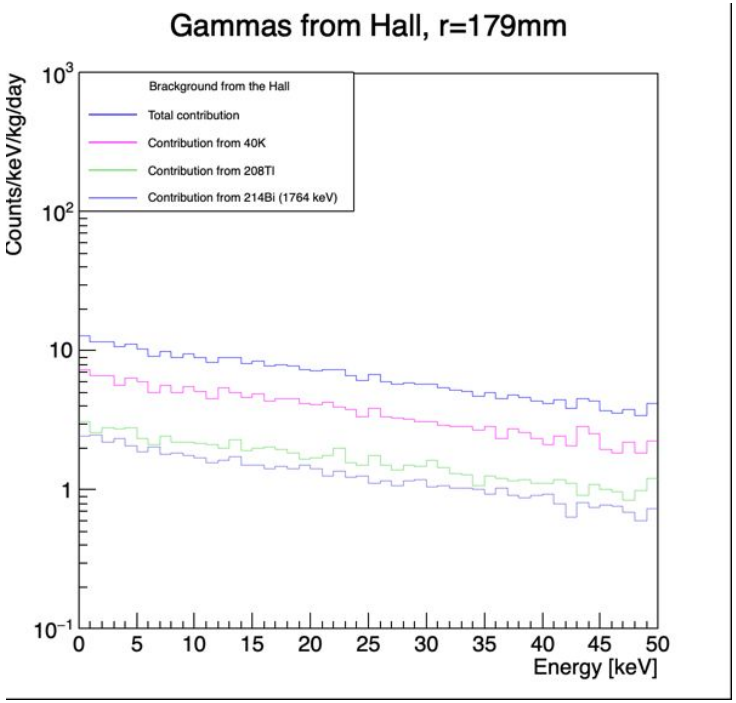
Isotope	Energy [keV]	Intensity [$cm^{-2}s^{-1}$] x 10^{-3}
^{208}Tl	2614	9.03
^{214}Bi	1764	9.49
^{40}K	1460	33.56



Internal shielding for BULLKID-DM

- Simulations considering a radius of 17.9 cm and a height of 10 cm
- Considering only the top Copper block for the internal shielding



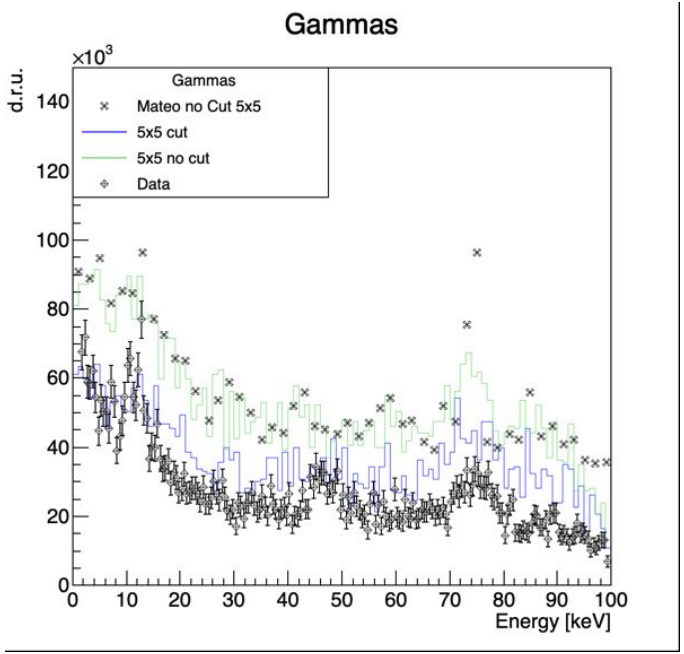


Summary and next steps

- Particles reaching BULLKID are coming from above and top sides of the detector
- The increase of the radius of the Copper block does not shows an effect without considering the rest of the internal shielding
- The Copper block will be raised some centimeters to search for a reduction in the events
    - if a reduction is observed, simulations with all the internal shield will be performed

Analysis with the mild shield for BULLKID at Sapienza

- Half moons and gaps excluded
- The analysis for the 5×5 dice array without cut of the 8 neighbor dice agrees with the analysis from Matteo
- Excluding signals when there are 2 or more events in the disk, is still above the data for energies bigger than 14 keV



We can now compare with Matteo analysis