KU LEUVEN

Update muX meeting 12/07

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Update on my G4 simulations

Overview of detectors I have simulated

Copy number	Corresponding detector
0	Leuven 75%
1	Leuven 70%
2	Romanian 100% det1
3	Romanian 100% det2
4	IFIN Clover A
5	IFIN Clover B
6	IFIN Clover C
7	IFIN Clover D
8	REGE7023MIXE
9	BEGE3820a
10	BEGE3820b
11	REGE7023MuX
12	MINIBALL A
13	MINIBALL B
14	MINIBALL C
15	BEGE3830
16	REGE TUM

Overview detectors muX

Name	Extra information	Owner	Contact person
BEGE3820	20% BEGe	MIXE PSI	michael.heiss@psi.ch
REGE9524	90% REGe coaxial	TUM	elizabeth.mondragon@tum.de
BEGE3830	34% BEGe	TUM	elizabeth.mondragon@tum.de
Leuven 70%	70% HPGe	KU Leuven	
Coax 5019	50% SEGe coaxial	JINR	d.zinatulina@gmail.com
Tigress clover	4x ~38% = 152% (~221% with addback) TIGRESS clover	IFIN-HH Romania	razvan.lica@nipne.ro
Miniball		KU Leuven	
IFIN det2 100%	100% coaxial	IFIN-HH Romania	razvan.lica@nipne.ro
BEGE3820	20% BEGe	MIXE PSI	michael.heiss@psi.ch
IFIN det1 100%	100% coaxial	IFIN-HH Romania	razvan.lica@nipne.ro
REGE7023	70% REGe coaxial	muX PSI	a.knecht@psi.ch
Leuven 75%	70% HPGe	KU Leuven	
REGE7023	70% REGe coaxial	MIXE PSI	michael.heiss@psi.ch
Electro cooled	GC5019 ("Rasputin")	JINR	d.zinatulina@gmail.com

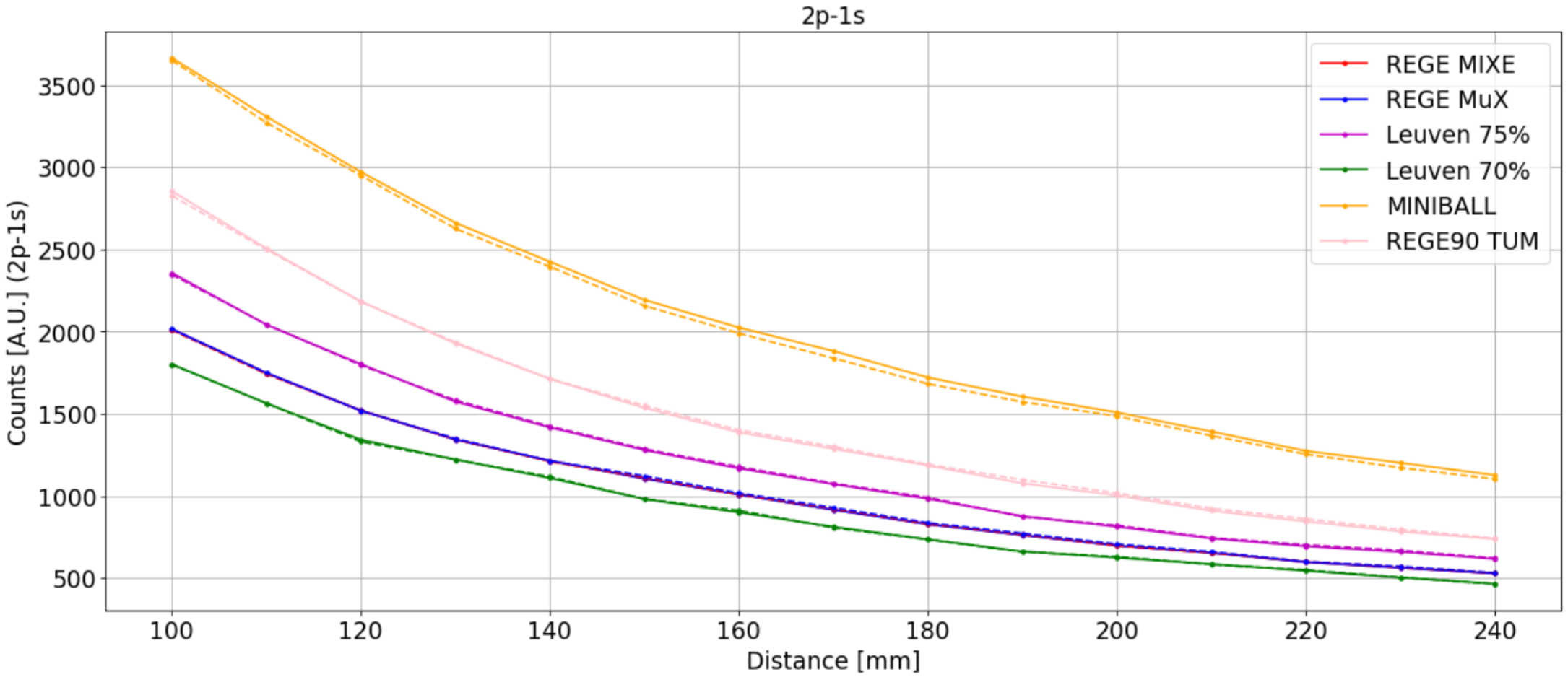
Lu preparation

- Energies from muDirac
- Intensities from Stella's cascade code
- PROBLEM:
  - muDirac does not calculate L3-M2 (3p1/2 to 2p3/2) and I am not sure why or if this is a big problem

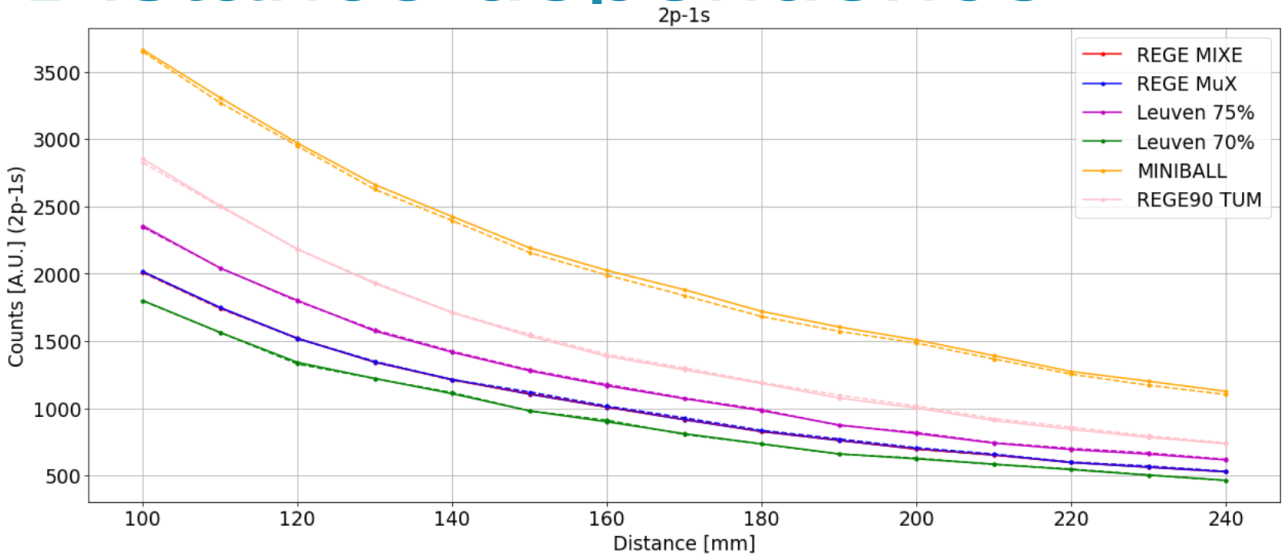
Lu preparation

Detector	Copy Number
REGE9524 (TUM)	16
REGE7023 MIXE	8
REGE7023 muX	11
Leuven 75%	0
Leuven 70%	1
Miniball	12, 13, 14
REGE 90% in repair	NOT YET SIMULATED

Distance dependence

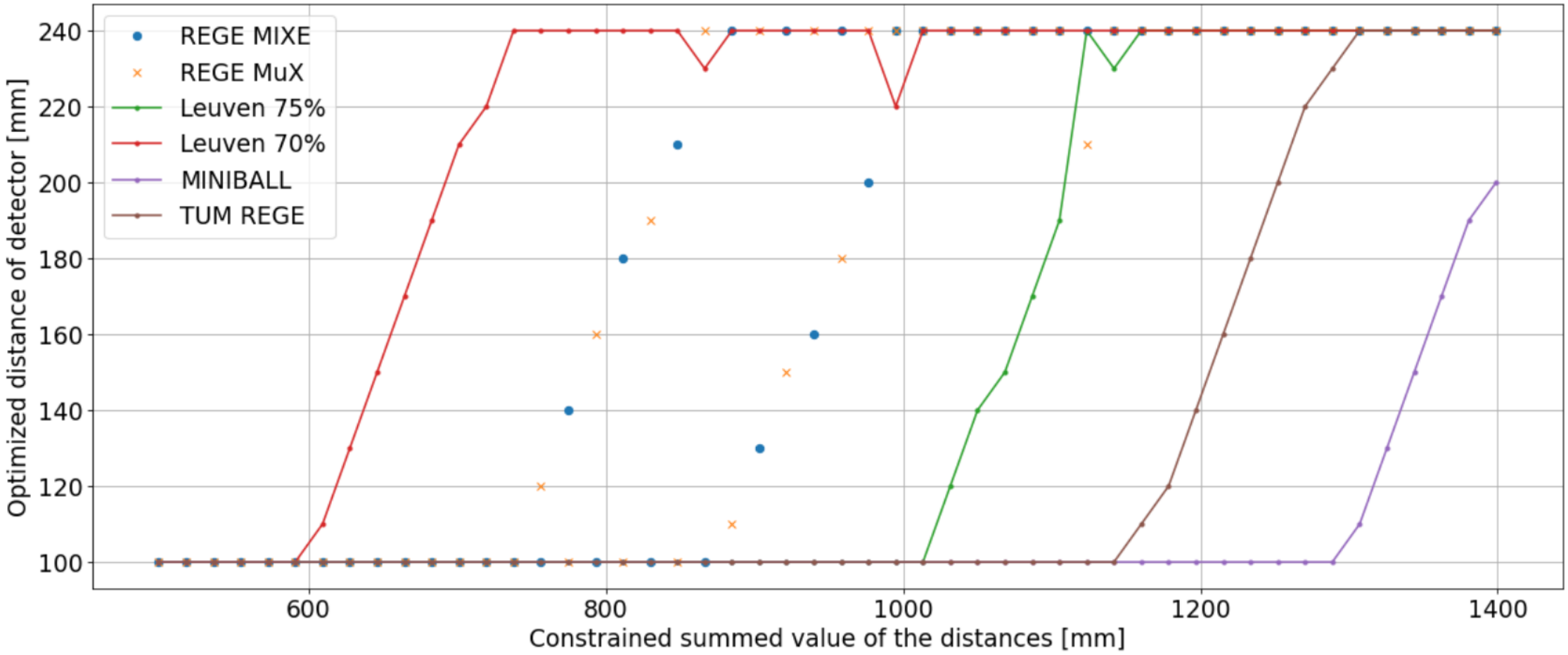


Distance dependence

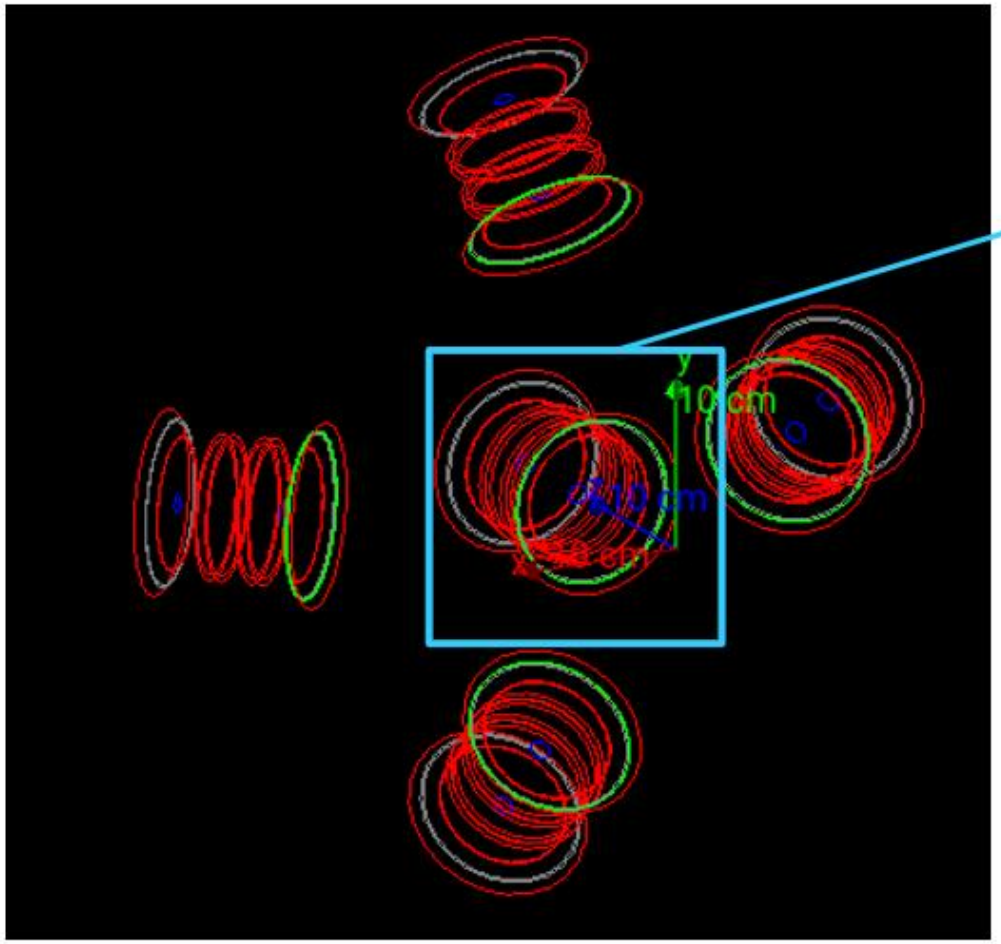


- We want to maximize 2p-1s counts → freely maximize leads to all detectors at 100mm… → Instead put a limit: e.g. $\sum_{all\ detectors}(distance) < x$ while minimizing → In this way, the detectors with huge improvement will stay closer than those with minor improvement

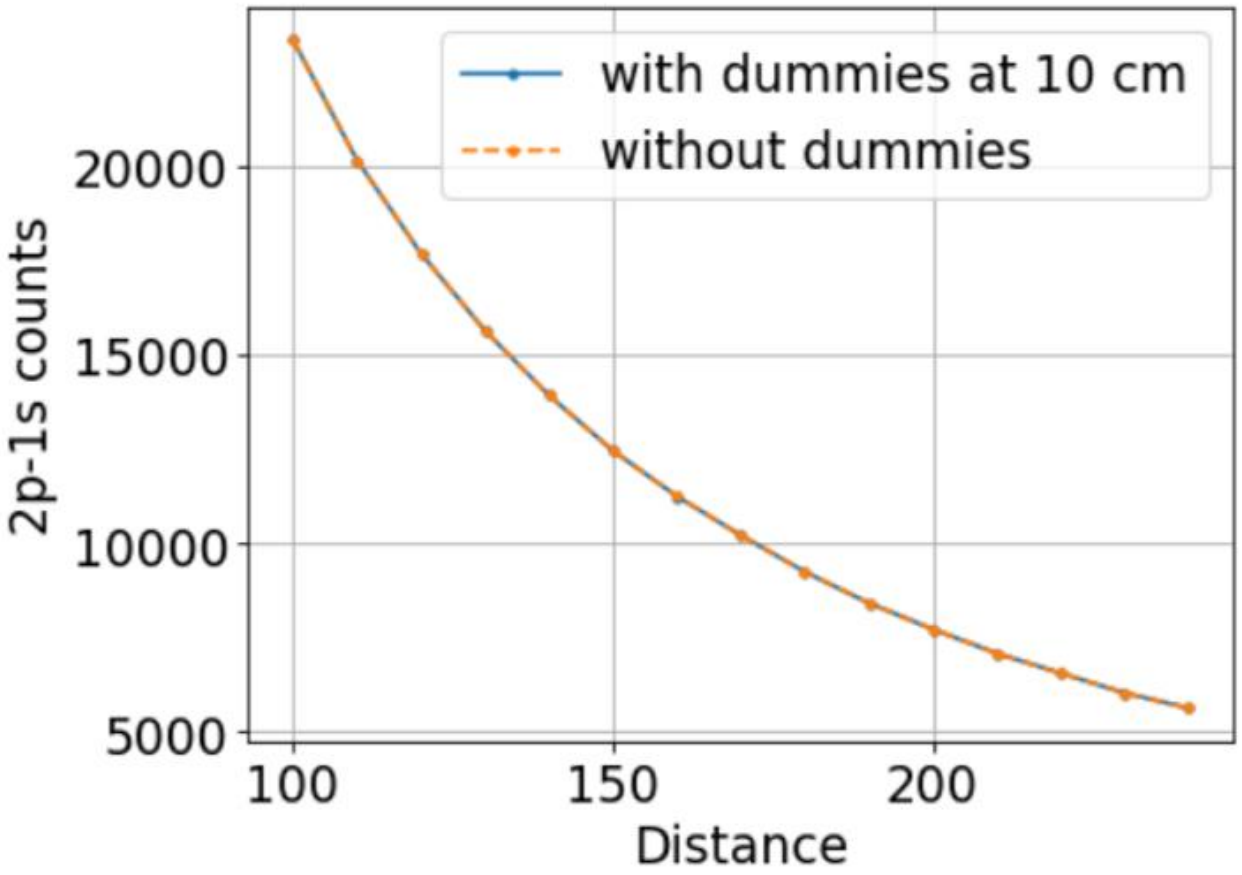
Distance dependence



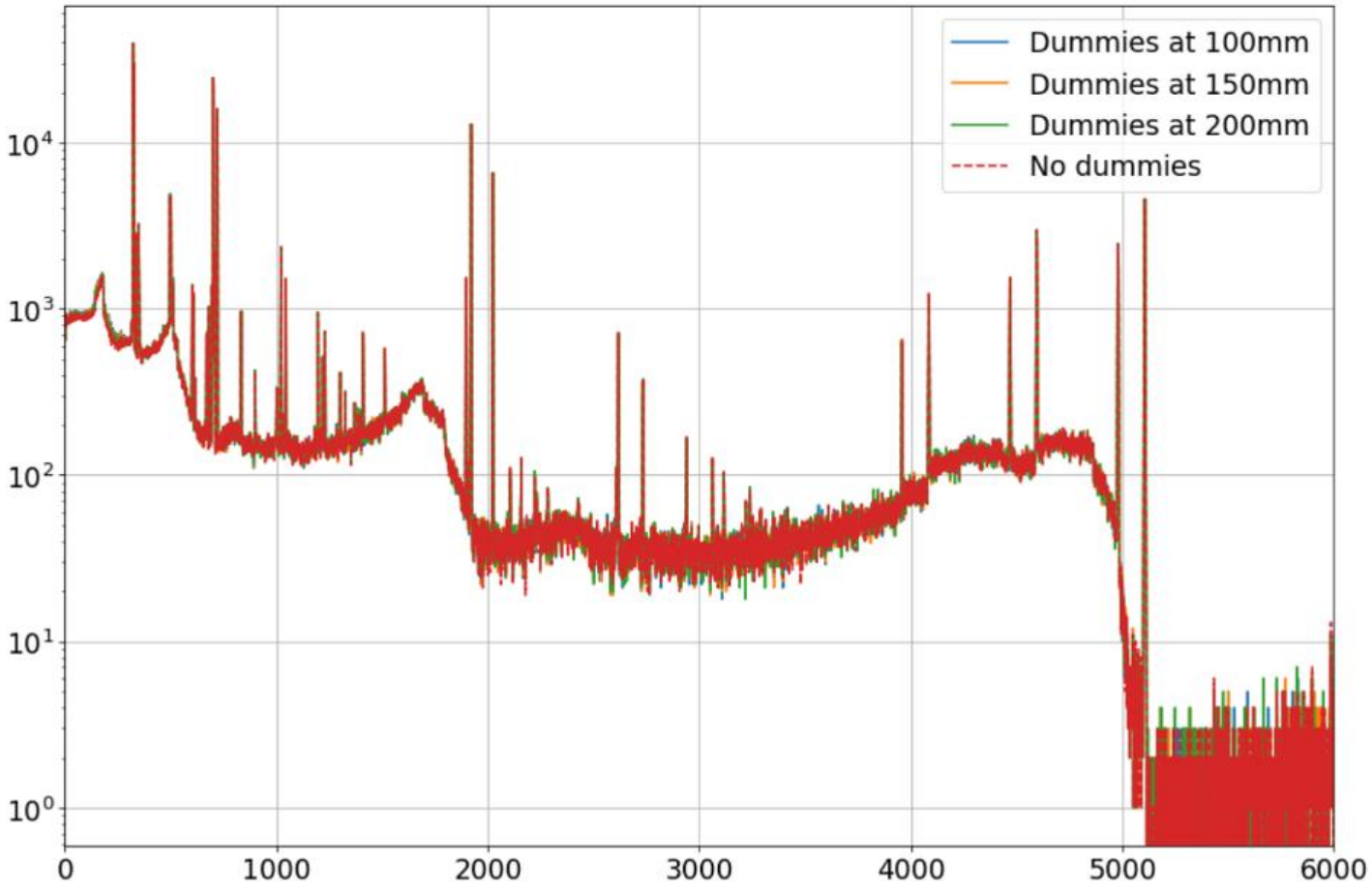
Effect of other nearby detectors



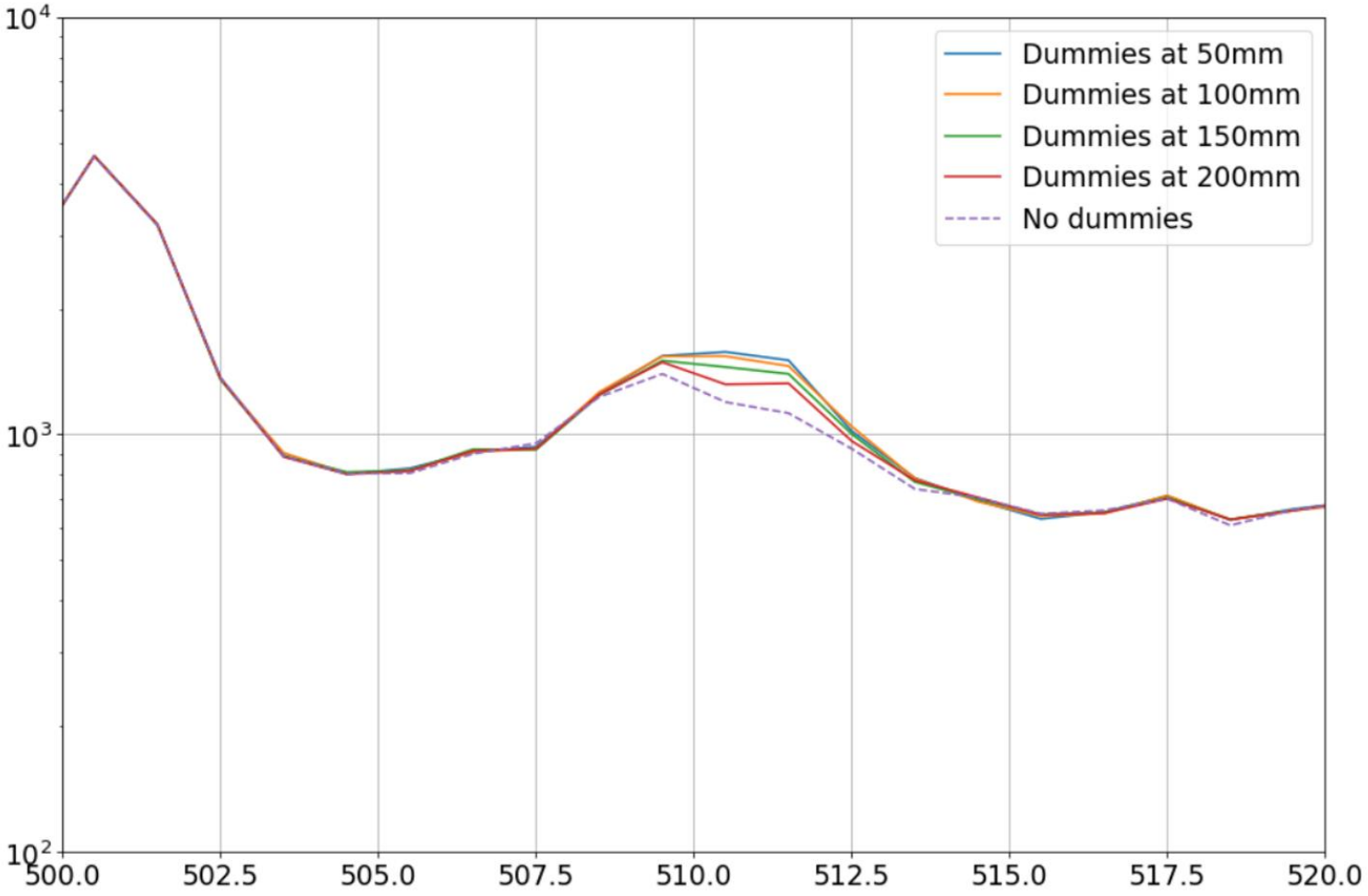
Effect of other nearby detectors



Effect of other nearby detectors



Effect of other nearby detectors



- Will we ever do addback between different detectors with the 511keV peak? In that case, the change of this peak should be investigated more

Future of the G4 simulations

- I am a bit puzzled on how to further optimize the positioning of the detectors:
  - Changing position and rotation of detector in the simulation I have now should not change things beyond our intuition → Becomes more a geometrical problem rather than a simulation problem???
- I am considering simulating the Michel electrons to see the effects of the scintillator coverage (electron-gamma coincidences) → would this be useful?
- Compton of Pb in our regions of interest (e.g. how much of the background in Ra region is due to Compton of Pb peaks)

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