News from the ^{207}Bi Contamination in the GeMPI III & IV Detector

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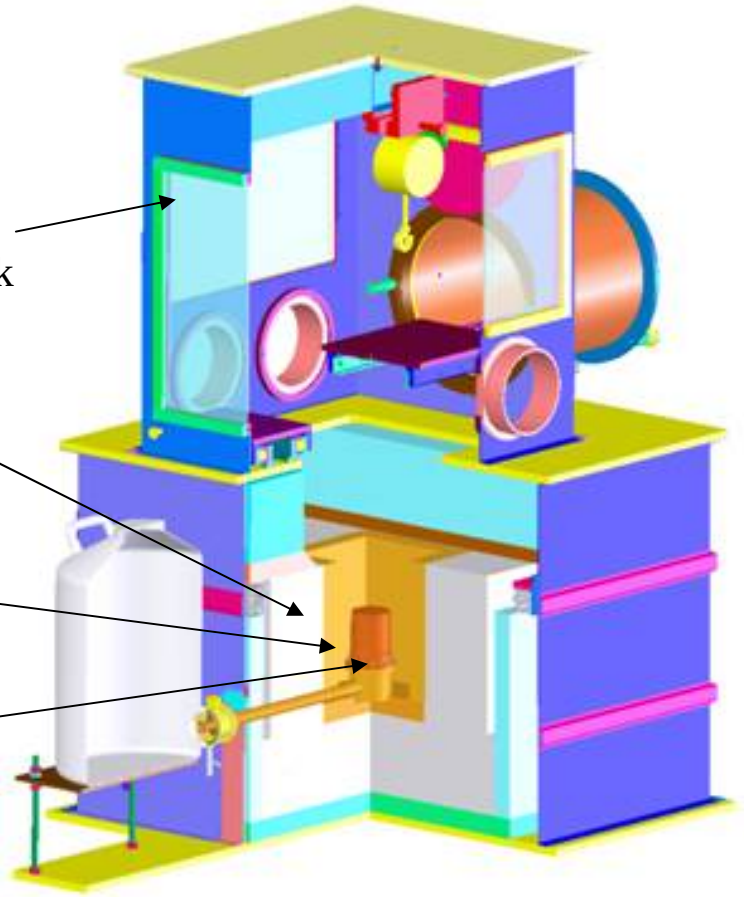
The GeMPI III Setup

^{222}Rn-tight Steel Casing with Airlock

Lead and Copper Shield

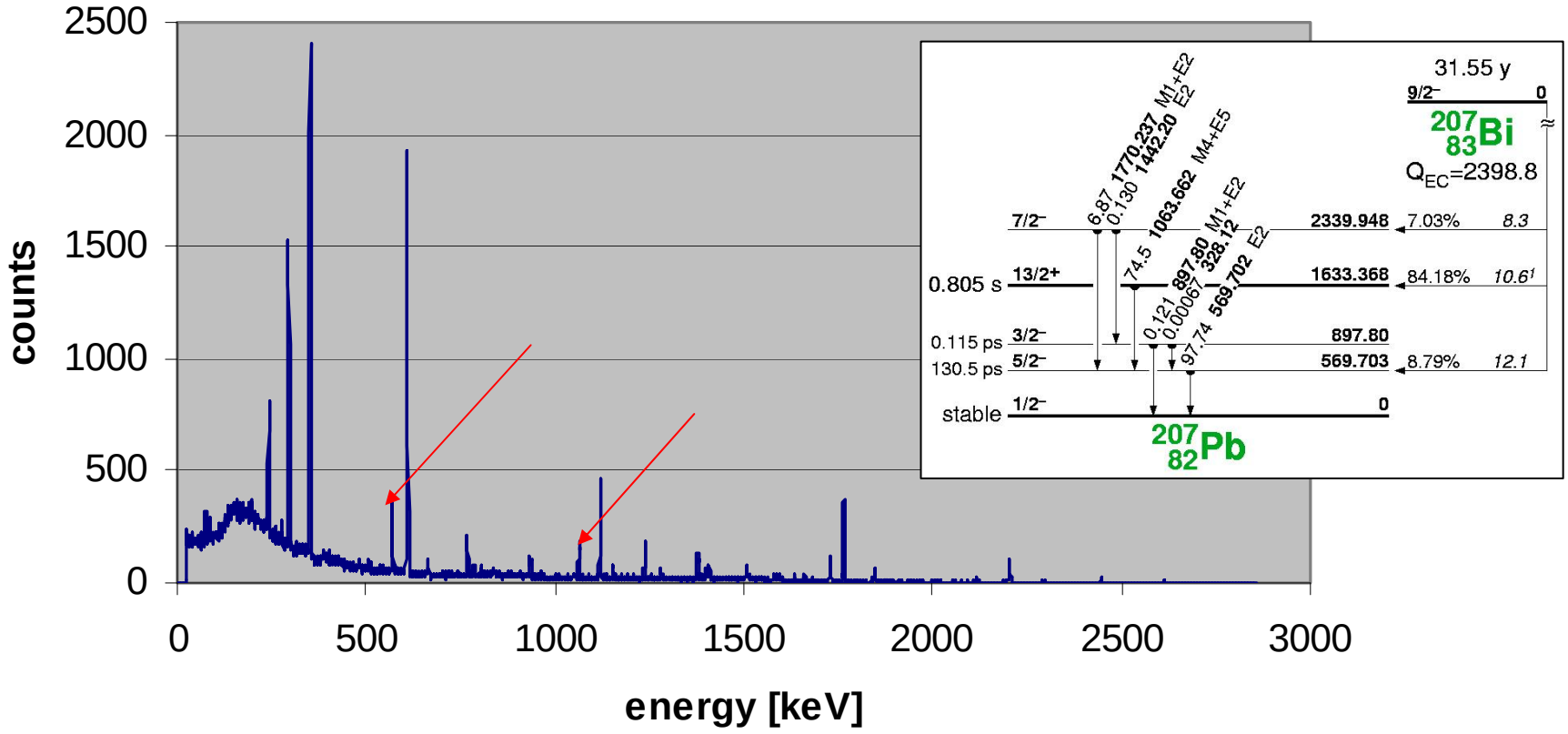
Sample Chamber

Ge-Detector in Cryostat



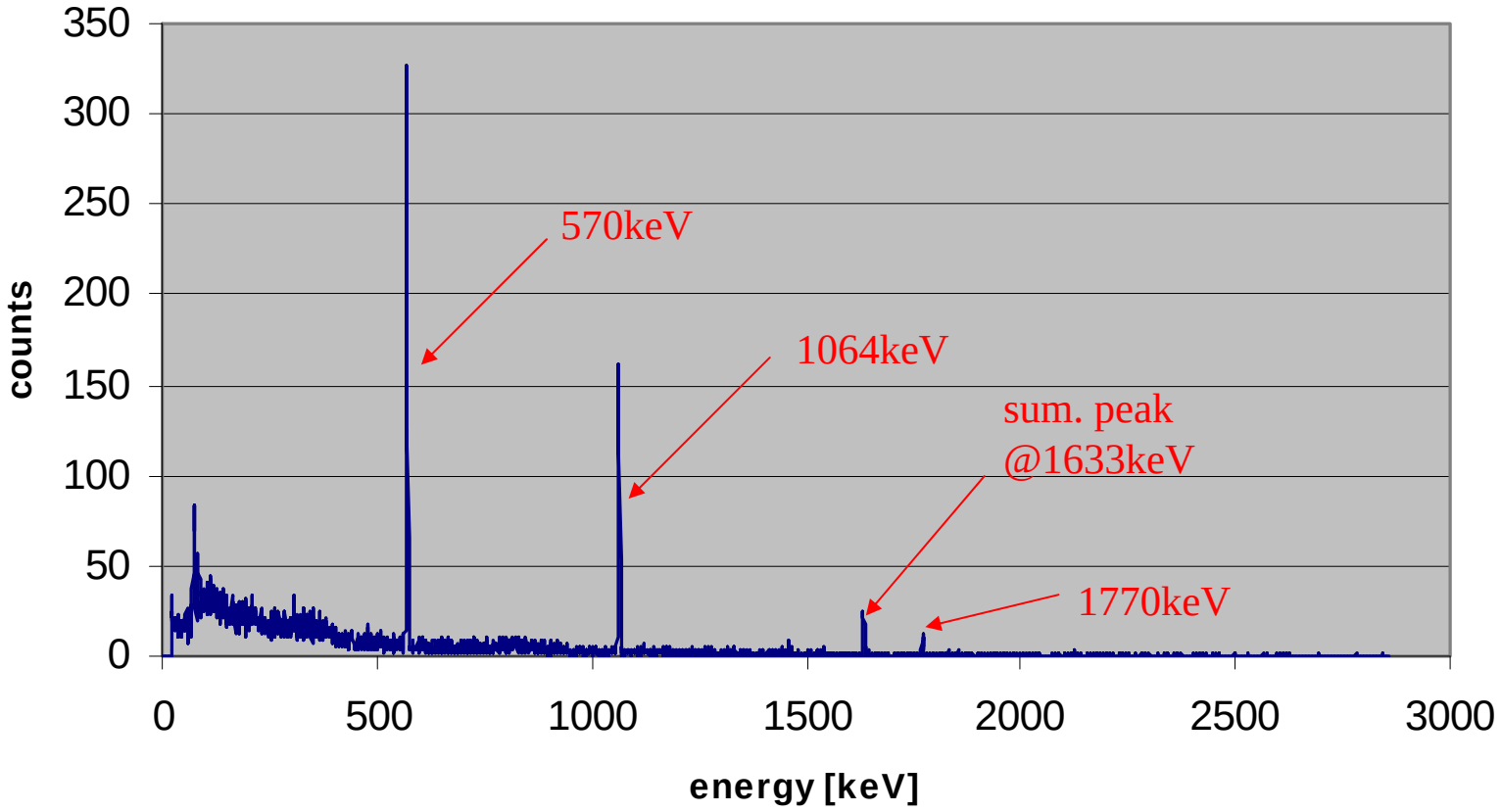
First ^{207}Bi-Spectrum

GeMPI III, t=41.6d, full shield, no nitrogen

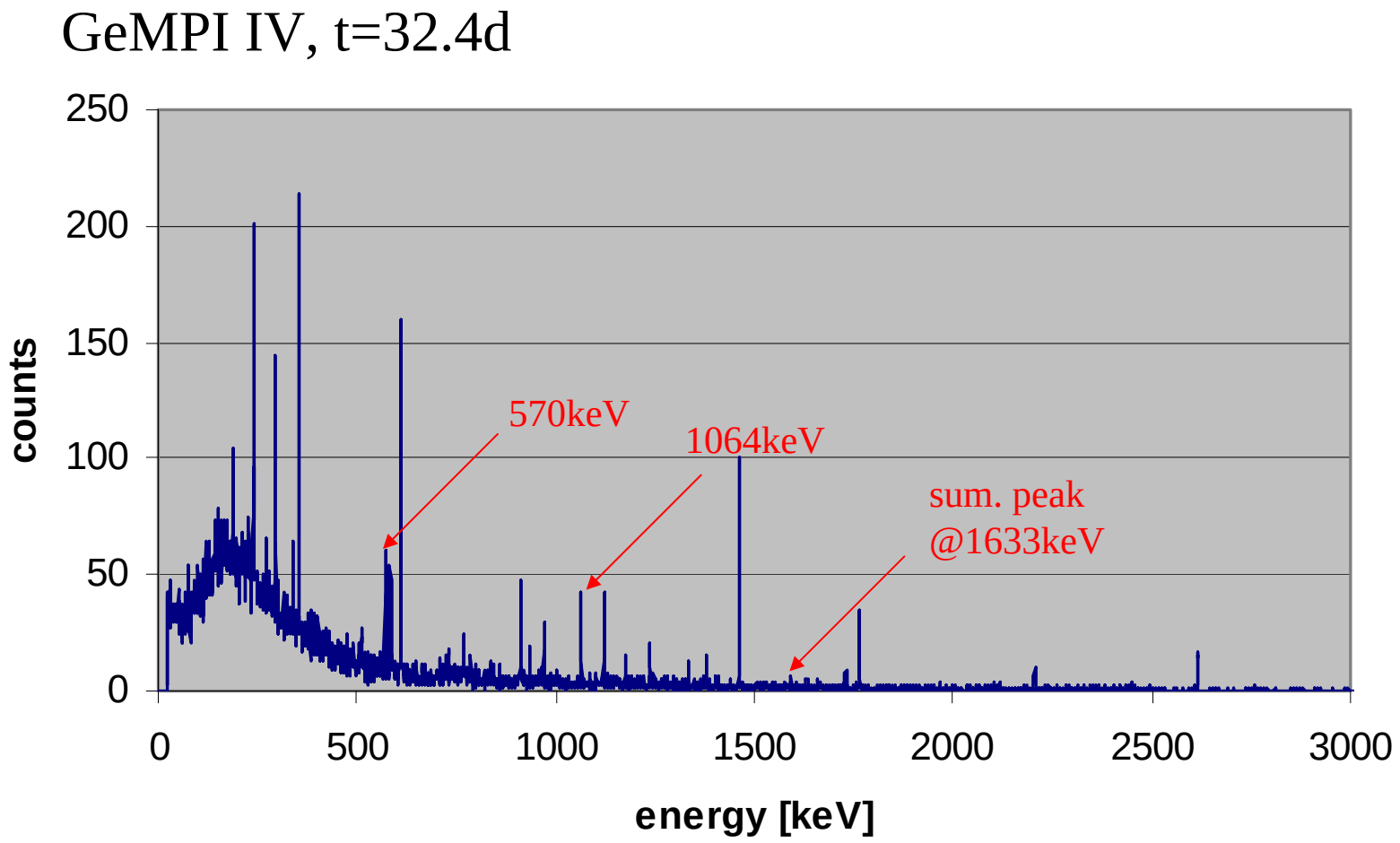


Spectrum with summation peak

GeMPI III, t=43.8d, Pb&Cu in chamber



GeMPI IV with provisional shielding



spectral information

		GeMPI III air in chamber	Pb & Cu in chamber	**GeMPI IV** provisional shielding
E[keV]	I_γ	[cts/day]	[cts/day]	[cts/day]
569,7	97,7%	42,13 +-1,30	40,60 +-0,99	3,92 +-0,57
1063,7	74,5%	21,74 +-0,94	21,49 +-0,72	3,52 +-0,42
1633,4	0,0%	3,26 +-0,43	2,70 +-0,26	0,42 +-0,18
2614,5	35,6%	0,70 +-0,14	0,11 +-0,06	
583,2	30,4%	1,93 +-0,84	-0,07 +-0,24	
72.8+75.0	57,1%	21,08 +-1,87	8,49 +-0,73	
84.5+87.3	16,3%	16,01 +-1,84	5,57 +-0,68	
609,3	44,6%	256,09 +-2,60		13,31 +-0,76
1120,3	14,7%	60,94 +-1,34		3,91 +-0,43

<u>total line ratio:</u>

GeMPI III: R_{207Bi}= 1,039 +-0,050

GeMPI IV: R_{207Bi}= 0,756 +-0,171

expected ratio change for 16mm of Cu:

R= 0,733

<u>activity estimation:</u>

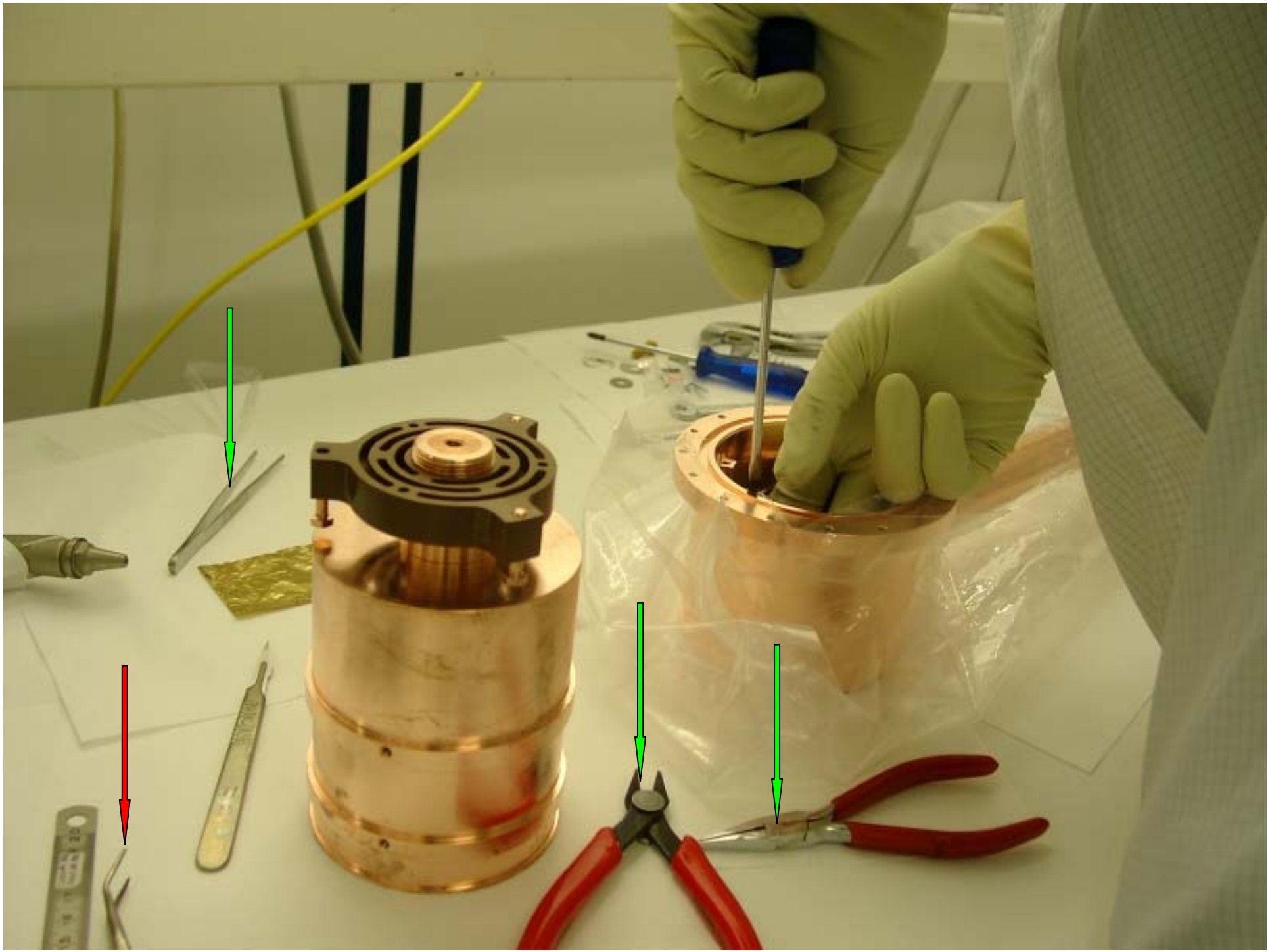
GeMPI III: (3.74 +- 0.39) mBq

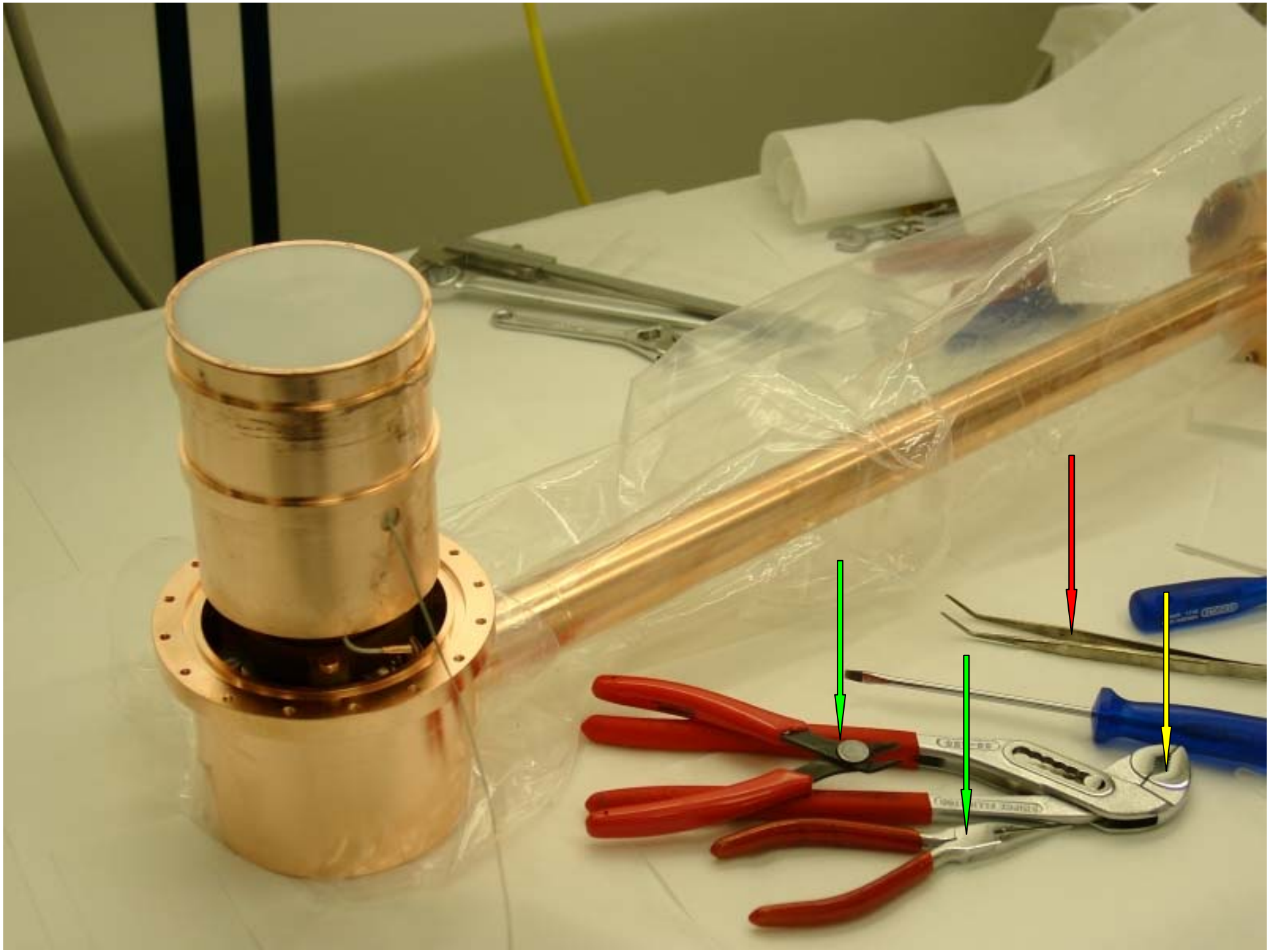
GeMPI IV: (0.38 +- 0.18) mBq

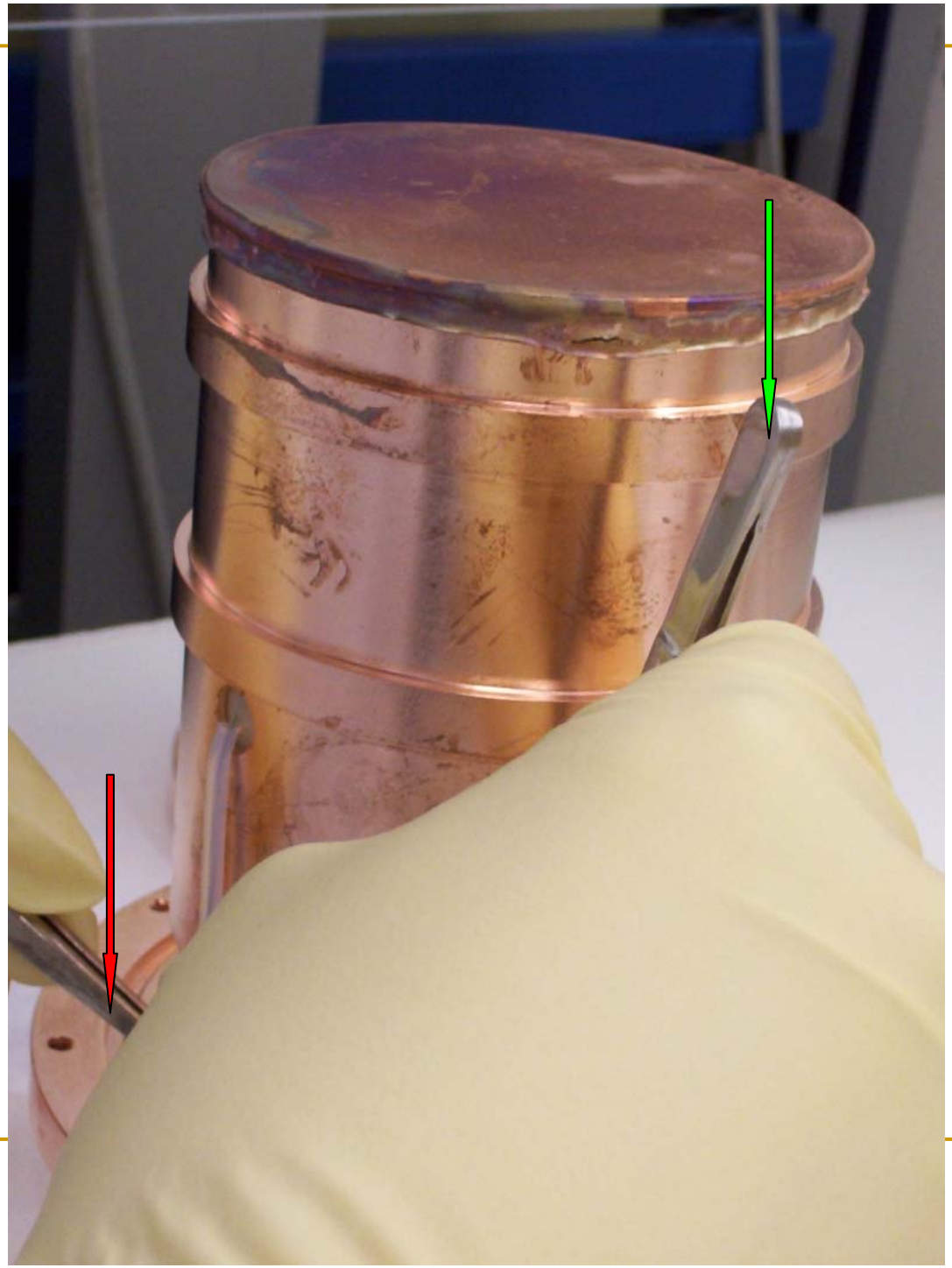
carrier of ^{207}Bi: `clean´ toolbox

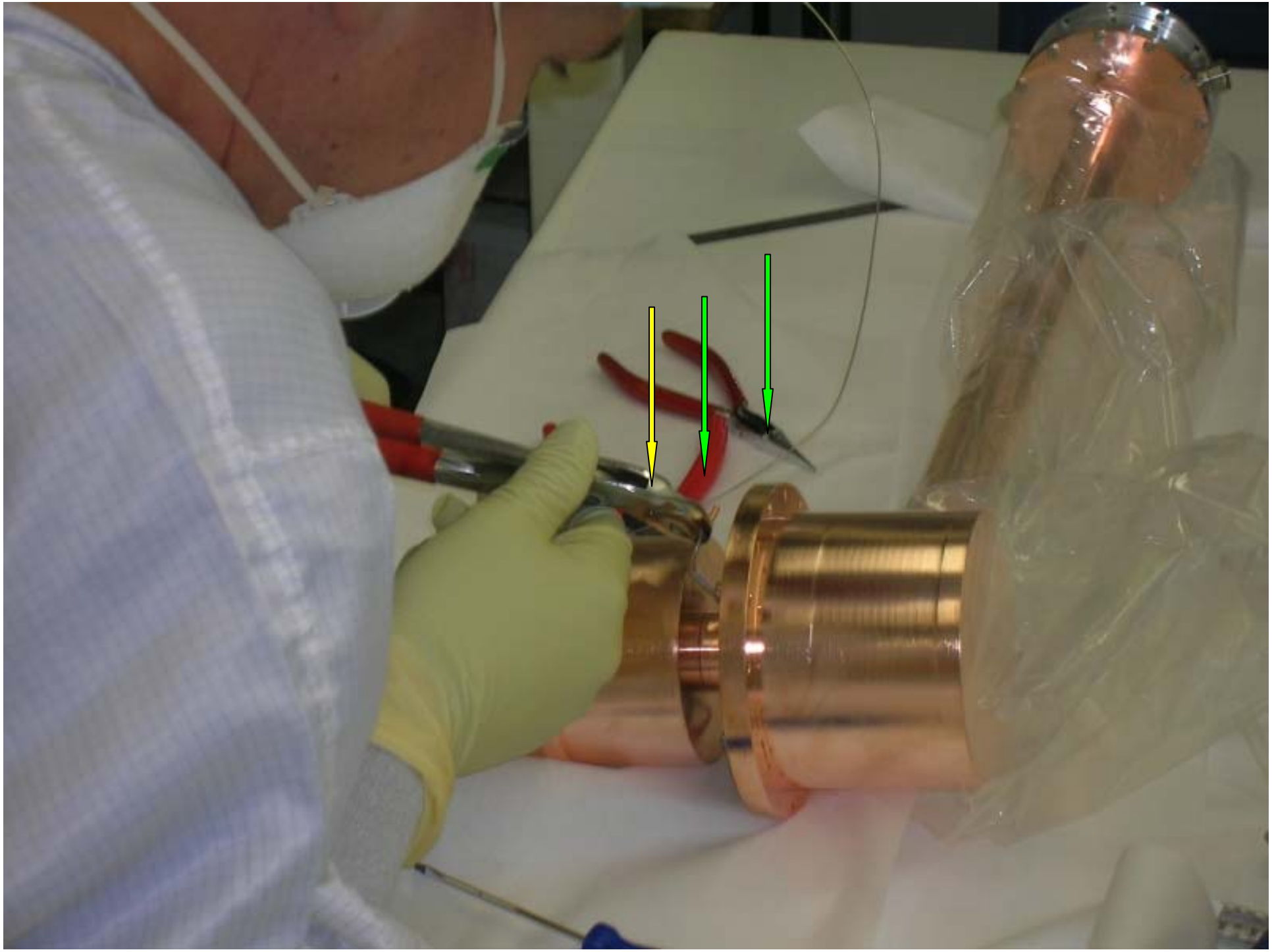
(incomplete) toolbox history:

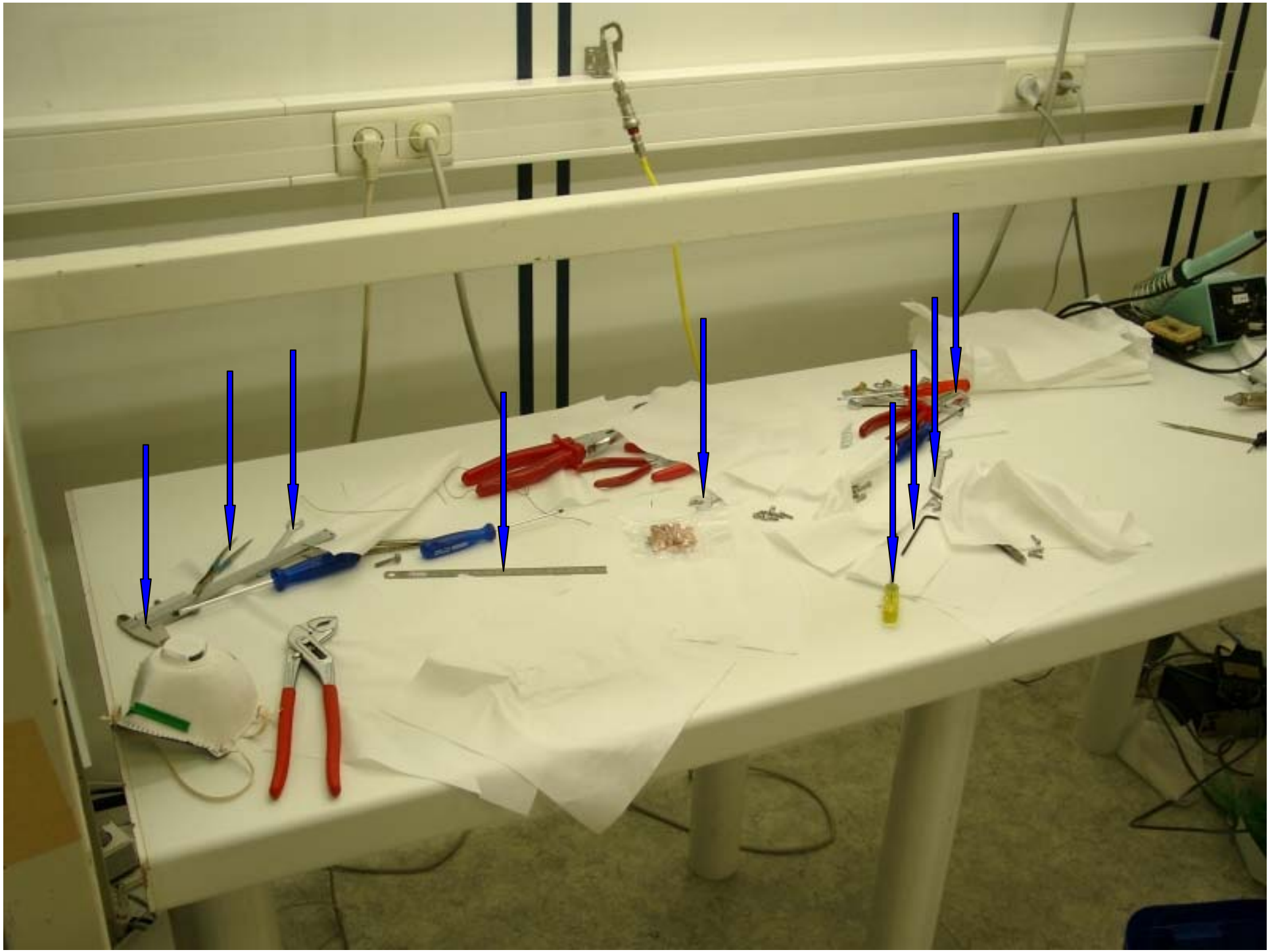
21/01/04	Klapdor detector →Bi-207 (140Bq) mounted, cleanroom/MPIK
-02/07/04	GeMPI 2, mounting at Canberra
03/07/04	Klapdor detector →Ra-226 (107Bq) mounted, cleanroom/MPIK
09/02/05	Klapdor detector →Bi-207 (105Bq) mounted, cleanroom/MPIK
Okt 05	GeMPI 3&4, mounting at Canberra
22/11/05	Klapdor detector →Ra-226 (250Bq) mounted, cleanroom/MPIK
Jan 06	GeMPI 4, repair at Canberra











Conclusion

- origin of ^{207}Bi contamination is identified as tools from `clean` toolbox
- MCs & improved GeMPI IV shielding will help to better localize the contamination
- reconstruct the full history of the toolbox including application of single tools
- review prevention measures for crosscontaminations