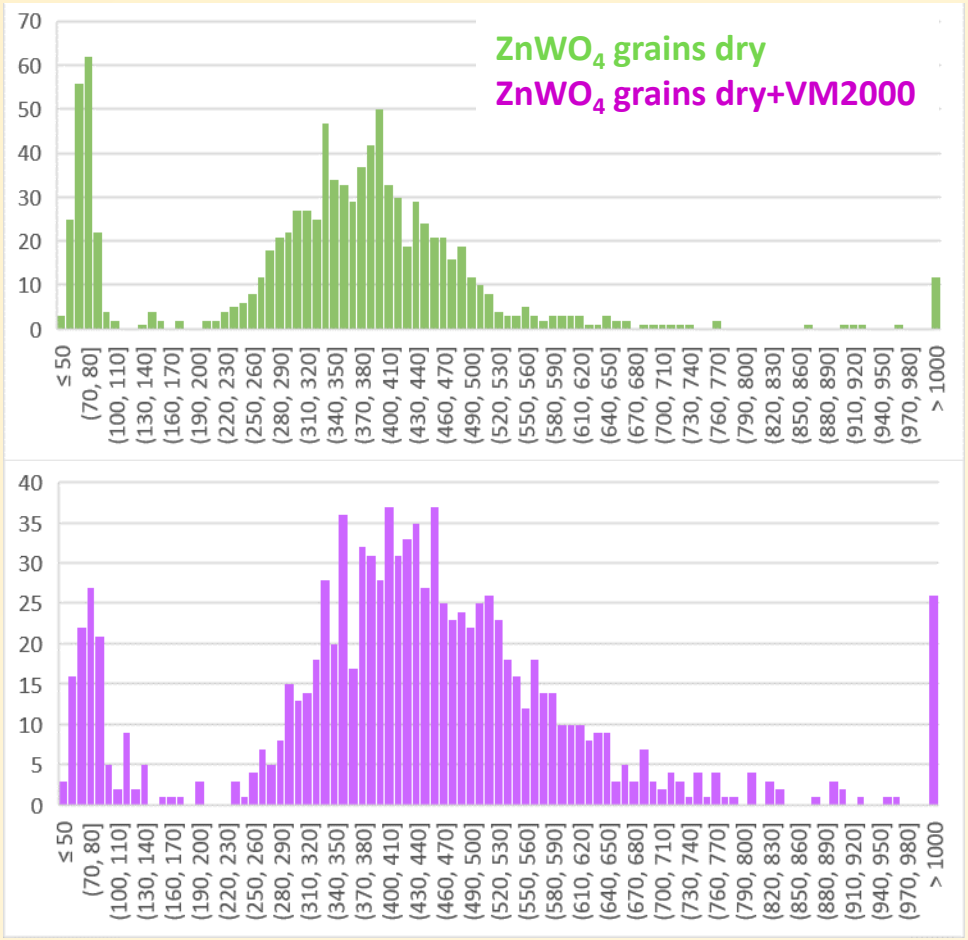
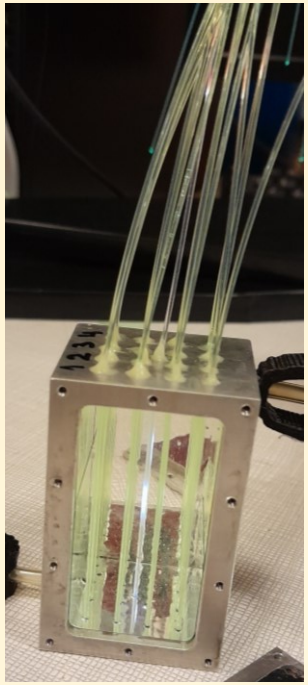
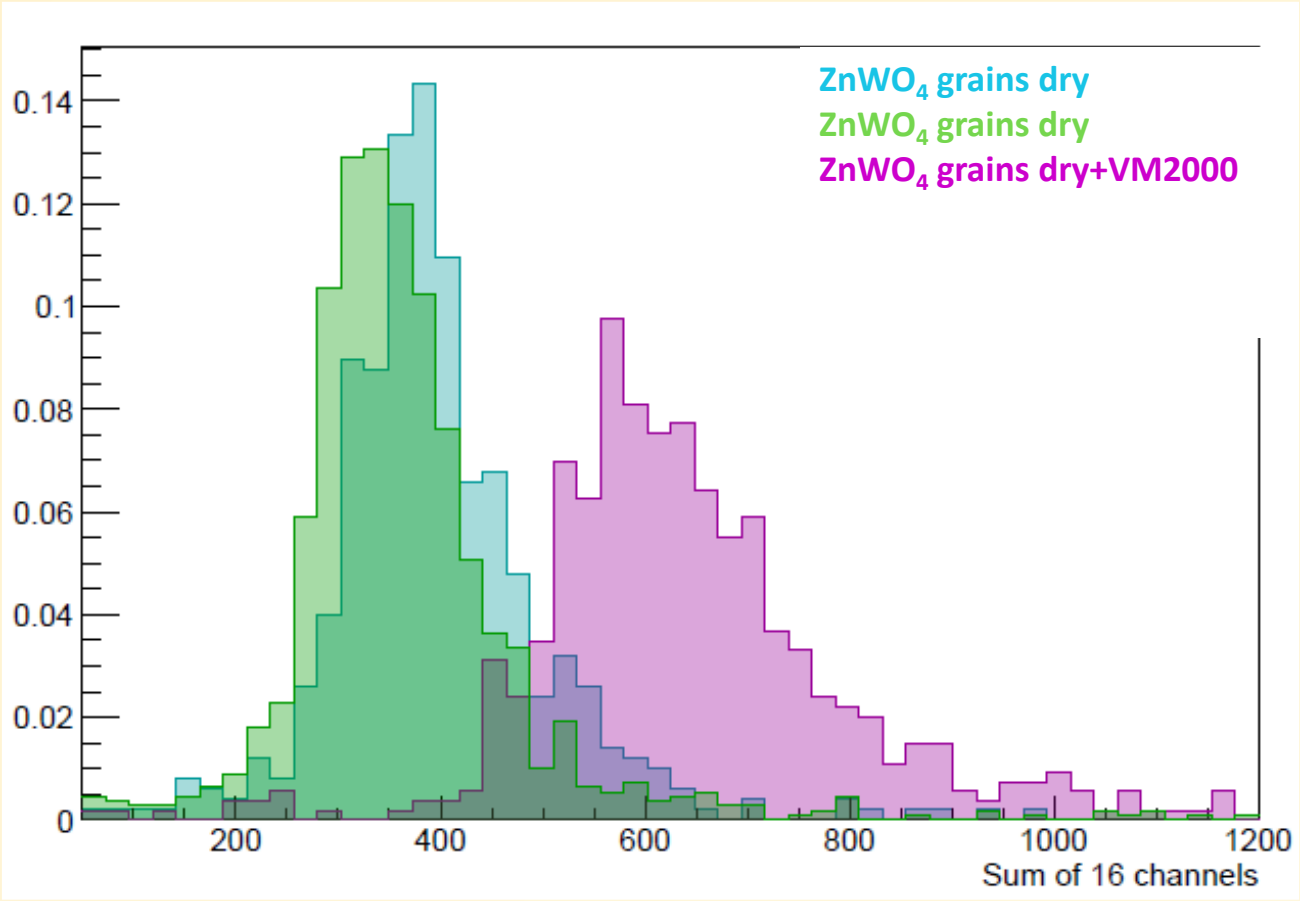
Pre-history: Cosmic muons tests, TROLL-3(Y-11(200)), February 2025

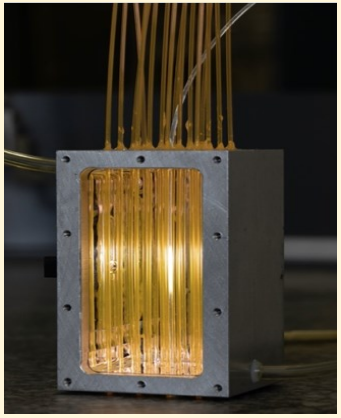




Negligible gain in N_{phe} when using specular reflector

Pre-history: Cosmic muons tests, TROLL-1(O-2(200)), October 2023

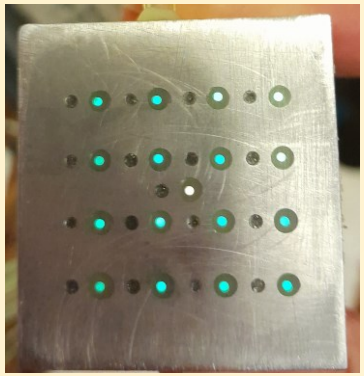


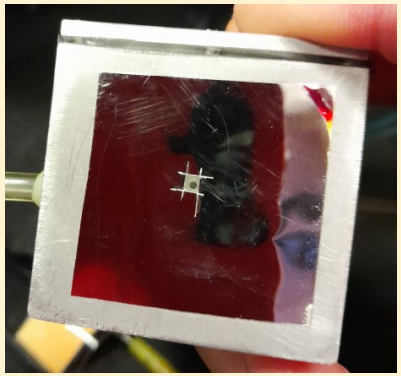


Essential gain in N_{phe} when using specular reflector

LED tests

TROLL-3(Y-11(200))



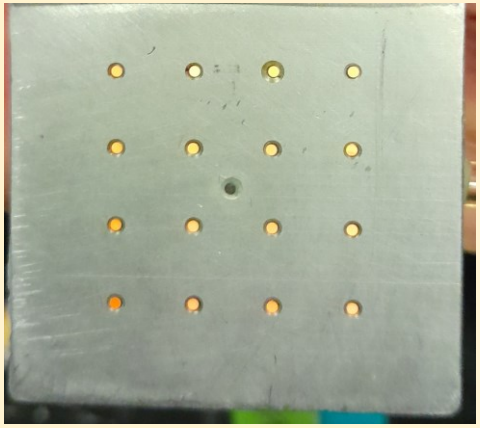


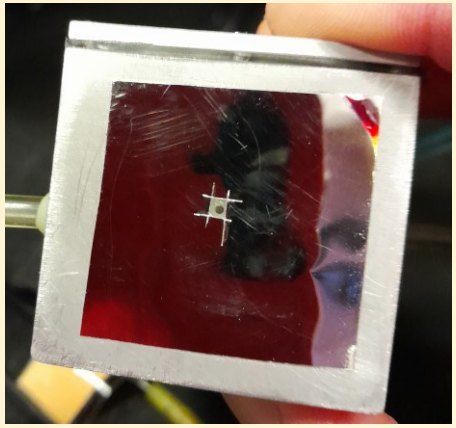
	Total N_{phe}, centrality		
	Before VM2000	With VM2000	Gain, %
Blue LED	806, 0.74	1014, 0.75	26
	764, 0.74	1282, 0.77	68
	794, 0.74	973, 0.76	22
	762, 0.76	974, 0.77	28
Green LED	726, 0.5	1455, 0.58	100
	697, 0.51	1544, 0.59	121
	680, 0.51	1073, 0.56	58
	679, 0.51	1028, 0.57	51

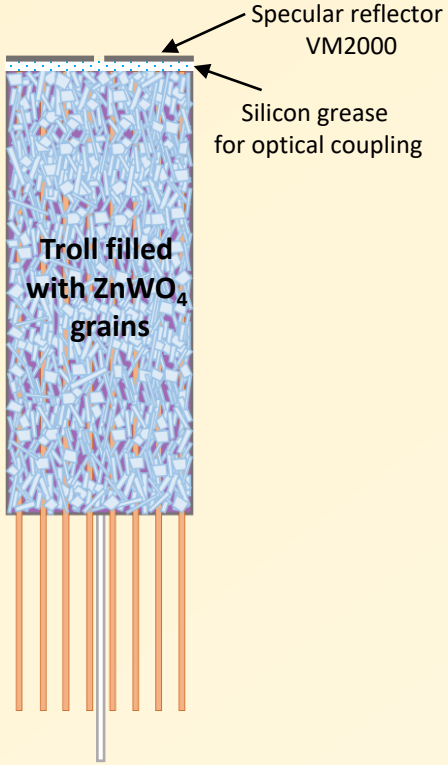
The gain differs from one measurement to another…
Essential non-uniformity for the gain among 16 different fibers…
???

LED tests

TROLL-2(O-2(300))





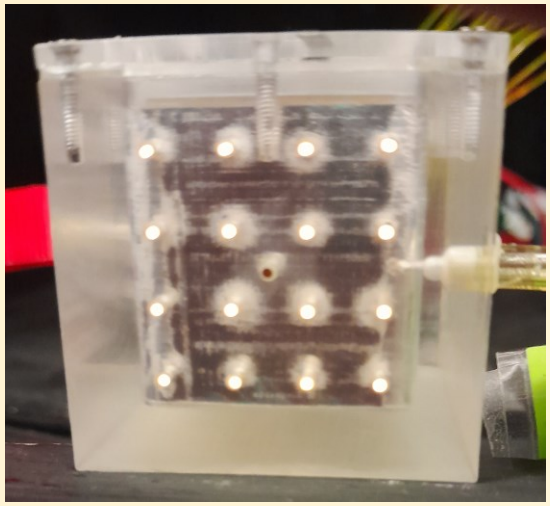


Total N_{phe}, centrality		
Before VM2000	With VM2000	Gain, %
924, 0.71	1323, 0.71	43
946, 0.70	1363, 0.71	44
942, 0.70	1373, 0.71	46

The gain is very similar for 16 different fibers =>VM2000 will not contribute to fiber to fiber variation

LED tests

TROLL-4(O-2(200)) PMMA



Total N_{phe}, centrality		
Before VM2000	With VM2000	Gain, %
1352, 0.70	2207, 0.68	63
1306, 0.69	2236, 0.68	71
1445, 0.69	2295, 0.68	59

The gain is higher than for the TROLL-2(O-2(200)) but the reproducibility is worse

Brief summary

Possible reasons for the observed "irreproducibility":

- ✓ WLS fibers defects (cracks etc.)
- ✓ Different quality of the WLS fibers surface (polishing) at the bottom of the Trolls
- ✓ Different quality of the optical coupling between WLS fibers and VM2000
- ✓ ("air pockets" in the grease => impossible to control)

Next steps to do:

- ✓ Discussing with mechanics to clear up the possible differences in the TROLLs' production
- ✓ Further LED tests to understand the source of the "irreproducibility"
- ✓ Cosmic muons tests for TROLL-2, Troll-4 with/without specular reflector