Update on cosmo comparison

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Main progress

- I discovered a memory leak of some kind that changed the behavior of the simulation in the middle of the simulation. The result was more nuclear recoils (and fewer muons) in the latter half of the simulations.
- The memory leak appear to have been solved. The numbers of particles no longer seems to change from beginning to end of simulation, but is steady throughout.
- It looks as though this problem only affected this direct comparison work (starting last summer). Need to verify that.
- I have run about half of the files Monica and I agreed to compare, and the numbers follow.

Muons and neutrons incident on top of water tank (LUX geometry)

File Number	# mu top water (MP)	#mu top water (AR)	#n top water (MP)	# n top water (AR)
119	1146		23	
140	1101	1155	32	34
144	1169		15	
145	1230		29	
146	1129	1214	19	36
148	1146	1150	57	88
149	1169		65	
151	1135		20	
153	1140		30	
161	1114	1160	47	40
165	1160		29	
186	1146		26	
187	1162		31	
204	1154	1114	36	35
214	1214	1138	18	23
215	1155	1104	29	87

Inside detector volume

# of neutrons (MP)	# neutrons (AR)	#NR events (MP)	# NR det events (AR)
56		21	
15	13	16	8
6		18	
63		18	
7	32	24	9
10	7	14	5
34		27	
30		16	
18		27	
13	22	21	7
34		18	
45		17	
17		19	
4	96	17	8
61	13	25	5
20	19	19	4

Next items

- Finish running comparison and average rates. Determine if mismatch in NR events is real.
- Rerun entire body of sim and analyze.
- Finish comparison with Raul's FLUKA sim data. Muon and neutron spectra look similar to geant4 spectra (which were not much affected by memory leak) so far.