

Chroma Simulation

8refelctortall

silicon-4reflector-tall-specular

July 23, 2024

Pocar Lab

Lab 21

nEXO Collaboration

1) Experiment Details

- Experiment Name: 8refelctortall
- Number of Particles: 1000000
- Random Seed: 1042
- Run ID: 1
- Excluded Geometry: ['reflector1', 'reflector3', 'reflector5', 'reflector7']
- PTE: 0.0023 ± 0.0000 .

2) Material Properties

2.1) Bulk Materials

name	refractive_index	absorption_length	scattering_length	density
liquid xenon	1.69	350000000000.0	35000000000000	2.941999999999997
copper	0.9733	0.05	1000000	8.96
silicon	0.682	1000000.0	10000000	2.329
steel	1.29	100000000.0	1000000000	7.75
teflon	0.0	100000000.0	1000000000	7.75
silica	1.6440000000000001	100000000.0	1000000000	2.202
aluminum	0.09216	1000000.0	10000000	2.7
killing material	1.0	100000000.0	1000000000	0.0

name	abs(r_i_error)	eta	k	abs(eta_error)	abs(k_error)
liquid xenon	0.0	0.0	0.0	0	0
copper	0.0	0.972	1.5004	0	0
silicon	0.0	0.8398700000000001	1.9019	0	0
steel	0.0	0.0	0.0	0	0
teflon	0.0	0.0	0.0	0	0
silica	0.0	0.0	0.0	0	0
aluminum	0.0	0.09216	1.9217	0	0
killing material	0.0	0.0	0.0	0	0

2.2) Surface Properties

name	outer_mat	inner_mat	model_id	reflect_specular	reflect_diffuse
FBK HD3	liquid xenon	silicon	5	0.0	0.0
Cu-Xe	liquid xenon	copper	8	0.0	1.0
silicon-Xe	liquid xenon	silicon	4	0.7	0.3
killing surface	None	None	8	0.0	0.0

3) Results

3.1) Photon Transmission Efficiency

The Photon Transmission Efficiency (PTE) for this experiment was 0.0023 ± 0.0000 .

3.2) Tallies

Tally	Count
NO_HIT	338349
BULK_ABSORB	16
SURFACE_DETECT	2292
SURFACE_ABSORB	659343
REFLECT_DIFFUSE	0
REFLECT_SPECULAR	0

4) Plots