Chroma Simulation
SiliconeFlippedSourceLower
silicon-lower-8reflector

July 23, 2024

Pocar Lab
Lab 21
nEXO Collaboration

1) Experiment Details

- Experiment Name: SiliconeFlippedSourceLower
- Number of Particles: 1000000
- Random Seed: 1042
- Run ID: 1
- Excluded Geometry: []
- PTE: 0.0069 ± 0.0001.

2) Material Properties

2.1) Bulk Materials

name	refractive_index	absorption_length	scattering_length	density
liquid xenon	1.69	350000000000.0	35000000000000	2.942
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	1.644	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	0.83987	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
Al-Xe	liquid xenon	aluminum	4	0.0	0.0
Cu-Xe	liquid xenon	copper	4	0.0	0.0
FBK HD3	liquid xenon	silicon	5	0.0	0.0
killing surface	None	None	8	0.0	0.0
silicon-Xe	liquid xenon	silicon	4	0.7	0.3
Steel-Xe	liquid xenon	steel	4	0.0	0.0
teflon-Xe	liquid xenon	teflon	9	0.0	0.0
teflon-Xe	liquid xenon	teflon	9	0.0	1.0

3) Results

3.1) Photon Transmission Efficiency

The Photon Transmission Efficiency (PTE) for this experiment was 0.0069 ± 0.0001.

3.2) Tallies

Tally	Count
NO_HIT	94600
BULK_ABSORB	8215
SURFACE_DETECT	6879
SURFACE_ABSORB	889862
REFLECT_DIFFUSE	0
REFLECT_SPECULAR	444

4) Plots

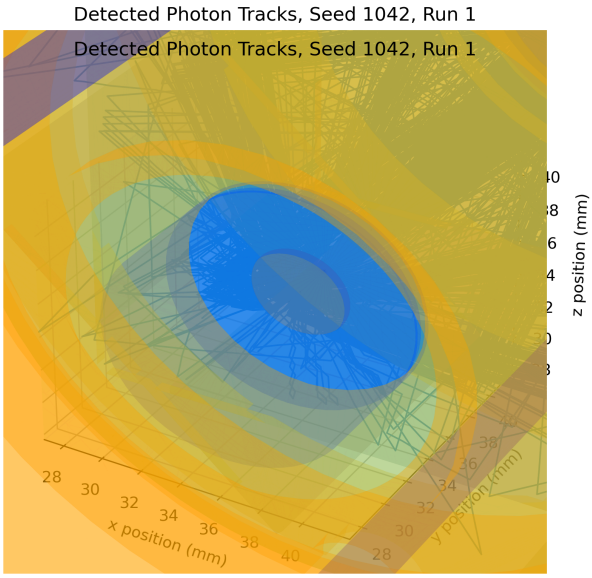

Figure 1: detected photon tracks, seed 1042, run 1 seed 1042 run 1

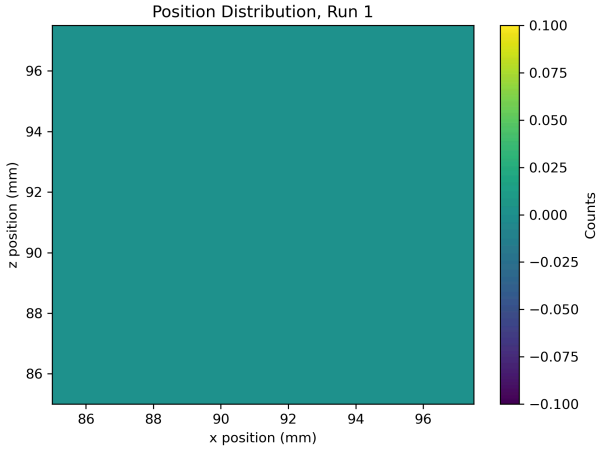

Figure 2: position distribution seed 1042 run 1

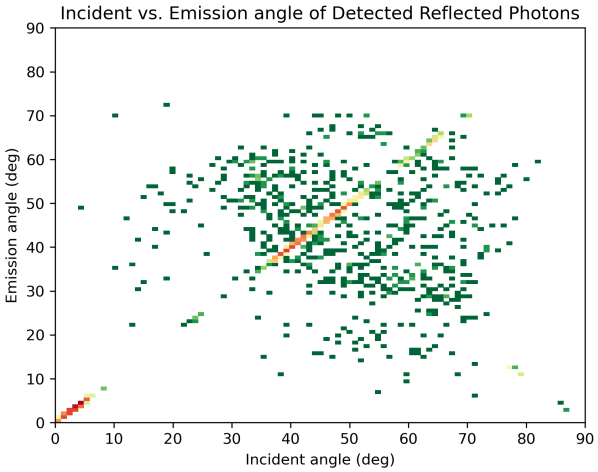

Figure 3: incident vs emission angle seed 1042 run 1

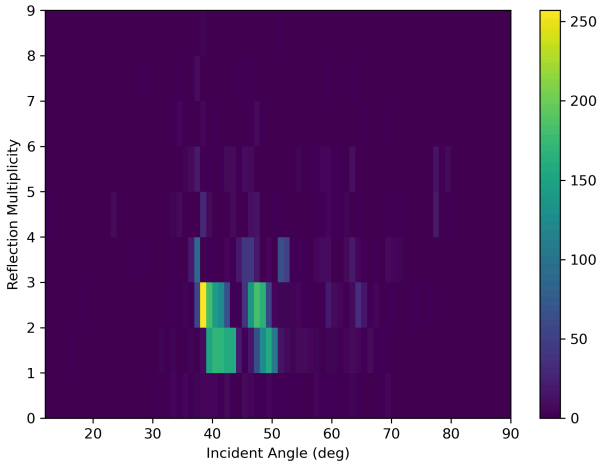

Figure 4: reflection angle distribution seed 1042 run 1

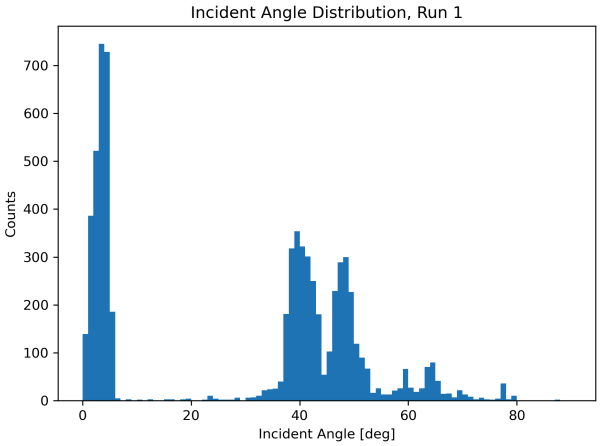

Figure 5: incident angle distribution seed 1042 run 1

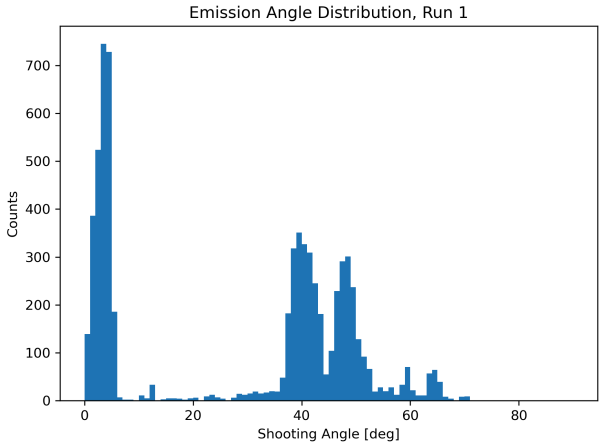

Figure 6: emission angle distribution seed 1042 run 1