Sample directory:
/disk/bulk_atp/gator/Sample_Sim_and_Analysis_Results/Tetratex_LEGEND

========= Simulation input =========
(See geometry below)
gatordir="/disk/bulk_atp/gator"
binary="/disk/bulk_atp/gator/simulations/gator_v2.0/bin/Linux-g++/gator_1.2"
datadir="/disk/bulk_atp/gator/Sample_Sim_and_Analysis_Results"
sample="Tetratex_LEGEND"
queue="2:00:00"
maxnodes=50
totevents= 100000000
n_beamOn= 1000000
isotope_list=["238U","232Th","40K","60Co","137Cs","226Ra","235U","228Th","110mA
g","207Bi","54Mn","58Co","57Co","134Cs","46Sc"]

========= Line efficiency =========
See values in Table 1.

========= Livetime and inputs for the analysis =========

Measure life time: 4.32e+06 s = 50 d
Background life time: 3.24e+06 s = 37.5 d

Background folder:
/disk/bulk_atp/gator/background/bkg_2019_10_red_clean_excludefirstfiles
Calibration folder: /disk/bulk_atp/gator/Calibrations/2015.08.07
Amount of material (kg or pieces): 1.06

=== List of SPE files used for the analysis ===
Tetratex_20191125_v1_008.SPE
Tetratex_20191125_v1_009.SPE
Tetratex_20191125_v1_010.SPE
Tetratex_20191125_v1_011.SPE
Tetratex_20191125_v1_012.SPE
Tetratex_20191125_v1_014.SPE
Tetratex_20191125_v1_015.SPE
Tetratex_20191125_v1_016.SPE
Tetratex_20191125_v1_017.SPE
Tetratex_20191125_v1_018.SPE
Tetratex_20191125_v1_019.SPE
Tetratex_20191125_v1_020.SPE
Tetratex_20191125_v1_021.SPE
Tetratex_20191125_v1_022.SPE
Tetratex_20191125_v1_024.SPE
Tetratex_20191125_v1_025.SPE
Tetratex_20191125_v1_026.SPE
Tetratex_20191125_v1_027.SPE
Tetratex_20191125_v1_028.SPE
Tetratex_20191125_v1_029.SPE
Tetratex_20191125_v1_031.SPE
Tetratex_20191125_v1_032.SPE
Tetratex_20191125_v1_033.SPE
Tetratex_20191125_v1_034.SPE
Tetratex_20191125_v1_036.SPE
Tetratex_20191125_v1_037.SPE
Tetratex_20191125_v1_038.SPE
Tetratex_20191125_v1_039.SPE
Tetratex_20191125_v1_040.SPE
Tetratex_20191125_v1_042.SPE
Tetratex_20191125_v1_043.SPE
Tetratex_20191125_v1_044.SPE
Tetratex_20191125_v1_045.SPE

Tetratex_20191125_v1_046.SPE
Tetratex_20191125_v1_047.SPE
Tetratex_20191125_v1_048.SPE
Tetratex_20191125_v1_050.SPE
Tetratex_20191125_v1_051.SPE
Tetratex_20191125_v1_052.SPE
Tetratex_20191125_v1_053.SPE
Tetratex_20191125_v1_054.SPE
Tetratex_20191125_v1_056.SPE
Tetratex_20191125_v1_057.SPE
Tetratex_20191125_v1_058.SPE
Tetratex_20191125_v1_059.SPE
Tetratex_20191125_v1_060.SPE
Tetratex_20191125_v1_061.SPE
Tetratex_20191125_v1_062.SPE
Tetratex_20191125_v1_064.SPE
Tetratex_20191125_v1_065.SPE
Tetratex_20191125_v1_066.SPE
Tetratex_20191125_v1_067.SPE
Tetratex_20191125_v1_068.SPE
Tetratex_20191125_v1_070.SPE
Tetratex_20191125_v1_071.SPE
Tetratex_20191125_v1_072.SPE
Tetratex_20191125_v1_073.SPE
Tetratex_20191125_v1_074.SPE
Tetratex_20191125_v1_075.SPE
Tetratex_20191125_v1_077.SPE
Tetratex_20191125_v1_078.SPE
Tetratex_20191125_v1_079.SPE
Tetratex_20191125_v1_080.SPE
Tetratex_20191125_v1_081.SPE
Tetratex_20191125_v1_082.SPE
Tetratex_20191125_v1_084.SPE
Tetratex_20191125_v1_085.SPE
Tetratex_20191125_v1_086.SPE
Tetratex_20191125_v1_087.SPE
Tetratex_20191125_v1_088.SPE
Tetratex_20191125_v1_089.SPE
Tetratex_20191125_v1_090.SPE
Tetratex_20191125_v1_091.SPE
Tetratex_20191125_v1_093.SPE
Tetratex_20191125_v1_094.SPE
Tetratex_20191125_v1_095.SPE
Tetratex_20191125_v1_096.SPE
Tetratex_20191125_v1_098.SPE
Tetratex_20191125_v1_099.SPE
Tetratex_20191125_v1_100.SPE
Tetratex_20191125_v1_101.SPE
Tetratex_20191125_v1_102.SPE
Tetratex_20191125_v1_103.SPE
Tetratex_20191125_v1_104.SPE
Tetratex_20191125_v1_106.SPE
Tetratex_20191125_v1_107.SPE
Tetratex_20191125_v1_108.SPE
Tetratex_20191125_v1_109.SPE
Tetratex_20191125_v1_110.SPE
Tetratex_20191125_v1_112.SPE
Tetratex_20191125_v1_113.SPE
Tetratex_20191125_v1_114.SPE
Tetratex_20191125_v1_115.SPE
Tetratex_20191125_v1_116.SPE
Tetratex_20191125_v1_117.SPE
Tetratex_20191125_v1_118.SPE
Tetratex_20191125_v1_120.SPE

Tetratex_20191125_v1_121.SPE
Tetratex_20191125_v1_122.SPE
Tetratex_20191125_v1_123.SPE

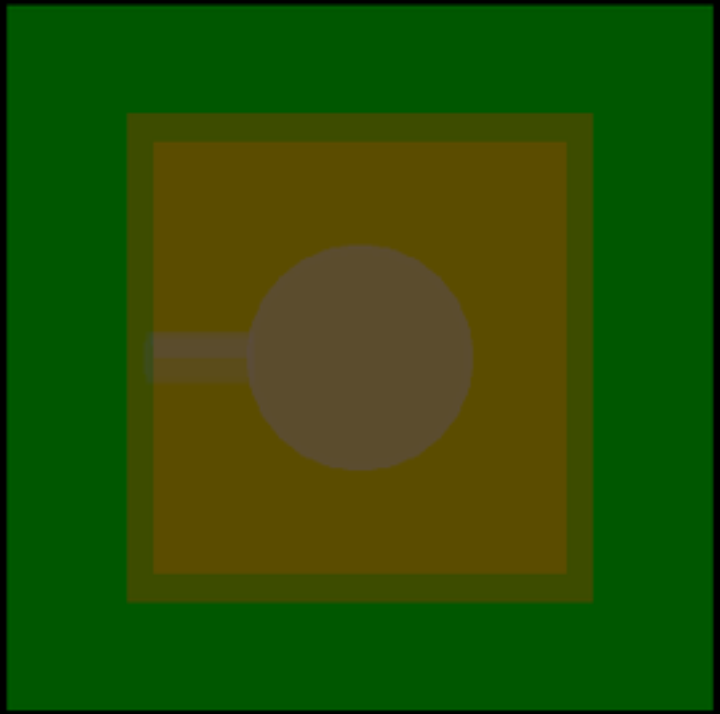
 === List of SPE files excluded from the analysis ===
Tetratex_20191125_v1_000.SPE
Tetratex_20191125_v1_001.SPE
Tetratex_20191125_v1_002.SPE
Tetratex_20191125_v1_003.SPE
Tetratex_20191125_v1_004.SPE
Tetratex_20191125_v1_005.SPE
Tetratex_20191125_v1_006.SPE
Tetratex_20191125_v1_007.SPE
Tetratex_20191125_v1_013.SPE
Tetratex_20191125_v1_023.SPE
Tetratex_20191125_v1_030.SPE
Tetratex_20191125_v1_035.SPE
Tetratex_20191125_v1_041.SPE
Tetratex_20191125_v1_049.SPE
Tetratex_20191125_v1_055.SPE
Tetratex_20191125_v1_063.SPE
Tetratex_20191125_v1_069.SPE
Tetratex_20191125_v1_076.SPE
Tetratex_20191125_v1_083.SPE
Tetratex_20191125_v1_092.SPE
Tetratex_20191125_v1_097.SPE
Tetratex_20191125_v1_105.SPE
Tetratex_20191125_v1_111.SPE
Tetratex_20191125_v1_119.SPE
Tetratex_20191125_v1_124.SPE
Tetratex_20191125_v1_125.SPE

 ========= Geometry of the sample =========
See figure of the geometry below.
 The .wrl file is also saved in the sample directory. And the
dimensions/material and position are specified in the code below.

---------------------- icc file code ----------------

```
// Set visibility properties for all the samples
G4VisAttributes* sample_vis = new G4VisAttributes(red);
sample_vis -> SetVisibility(true);
sample_vis -> SetForceSolid(false);

//---------- volume Tetratex_LEGEND ----------

//Dimensions of the sample in box and definition of the geometry
 G4double box_Tetratex_LEGEND_x= 190*mm;
 G4double box_Tetratex_LEGEND_y= 200*mm;
 G4double box_Tetratex_LEGEND_z= 70*mm;
 G4Box* Tetratex_LEGEND= new
G4Box("Tetratex_LEGEND",0.5*box_Tetratex_LEGEND_x,0.5*box_Tetratex_LEGEND_y,0.5*
box_Tetratex_LEGEND_z);

//Construct the logical volume
 G4LogicalVolume* Tetratex_LEGEND_log = new
G4LogicalVolume(Tetratex_LEGEND,Tetratex_mat,"Tetratex_LEGEND_log");

// Set visibility for the sample (all are set to the same color, change it if
necessary)
Tetratex_LEGEND_log -> SetVisAttributes(sample_vis);

// Set coordinates for the position of the sample at the top of the detector
```

```
G4double Tetratex_LEGEND_Pos_x =0*mm;
G4double Tetratex_LEGEND_Pos_y =0*mm;
G4double Tetratex_LEGEND_Pos_z=
endcapPos_z+0.5*endcapHeight1+0.5*box_Tetratex_LEGEND_z+0.01*mm;

// Define the position vector
G4ThreeVector
Tetratex_LEGEND_Pos(Tetratex_LEGEND_Pos_x,Tetratex_LEGEND_Pos_y,Tetratex_LEGEND_
Pos_z);

// Define the physical volume
G4VPhysicalVolume* Tetratex_LEGEND_phys = new
G4PVPlacement(0,Tetratex_LEGEND_Pos,Tetratex_LEGEND_log,"Tetratex_LEGEND_phys",c
avity1_log,false,0,true);
```



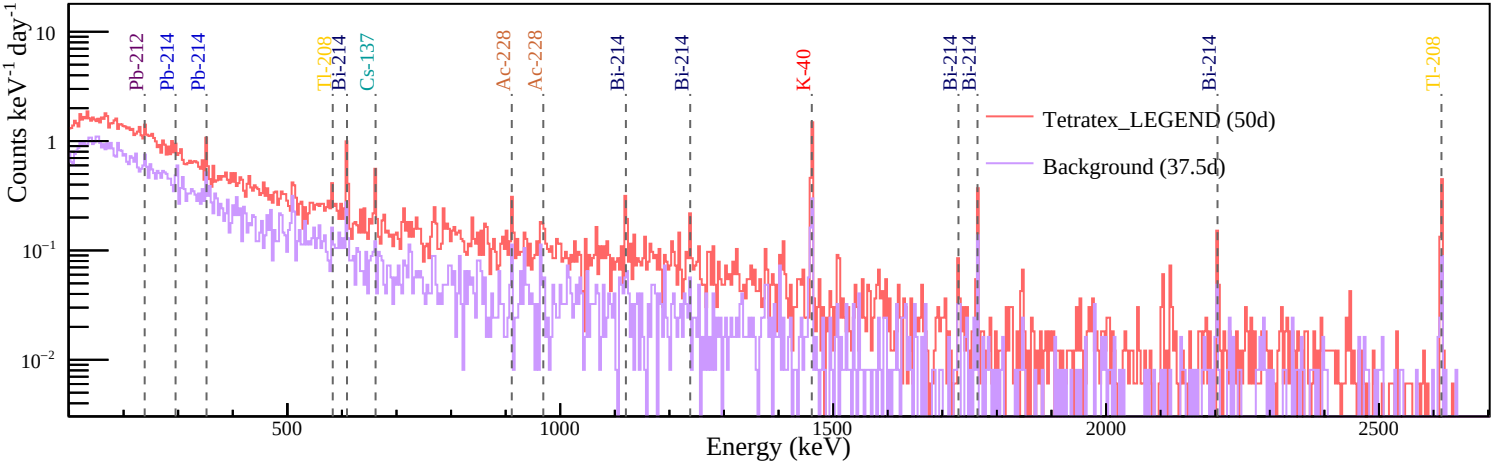
D775.0070 XY 7

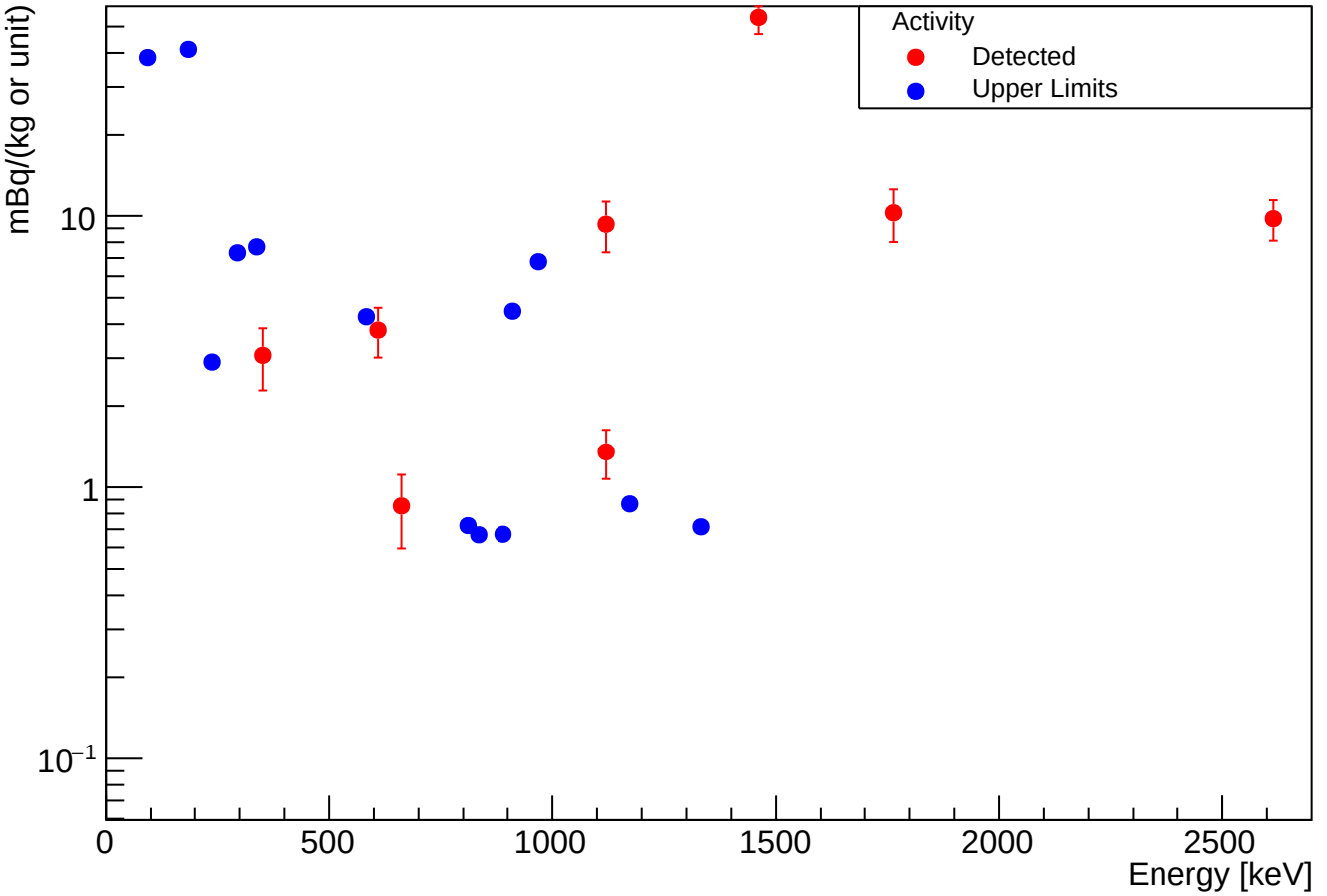
Isotope	Energy (keV)	Line BR	Effic	BRxEffic
^{234}Th	92.6	0.0433	0.0111	0.000483
^{235}U	185.72	0.572	0.000995	0.000569
^{212}Pb	238.632	0.436	0.0184	0.00803
^{214}Pb	295.224	0.184	0.0187	0.00345
^{228}Ac	338.32	0.114	0.0179	0.00204
^{214}Pb	351.932	0.356	0.0176	0.00625
^{208}Tl	583.187	0.3054	0.0120	0.00365
^{214}Bi	609.312	0.4549	0.0126	0.00573
^{137}Cs	661.657	0.8499	0.0140	0.0119
^{54}Mn	834.838	0.999746	0.0125	0.0125
^{46}Sc	889.271	0.99984	0.0113	0.0113
^{228}Ac	911.196	0.262	0.00990	0.00259
^{228}Ac	968.96	0.159	0.00985	0.00157
^{214}Bi	1120.29	0.1491	0.00937	0.00140
^{46}Sc	1120.54	0.99987	0.0100	0.0100
^{60}Co	1173.23	0.9985	0.00988	0.00986
^{60}Co	1332.49	0.9998	0.00924	0.00924
^{58}Co	810.775	0.99	0.0124	0.0123
^{40}K	1460.88	0.1055	0.00939	0.000990
^{214}Bi	1764.49	0.1531	0.00786	0.00120
^{208}Tl	2614.51	0.3584	0.00521	0.00187

Table 1: Efficiency Table, as calculated by the simulation.

Isotope	E(keV)	PeakCnts	CompCnts	BkCnts	isBkdet	LineCnts	LdCnts	LdActiv	Activity (mBq/u.)
^{234}Th	92.6	141 +- 12	139 +- 12	-24 +- 13	T	2 +- 22	75.1	37.8	< 38.5
^{235}U	185.72	219 +- 15	216 +- 15	-8 +- 17	T	3 +- 27	94.0	40.0	< 41.2
^{212}Pb	238.632	198 +- 14	173 +- 13	17 +- 16	T	7 +- 25	89.3	2.70	< 2.90
^{214}Pb	295.224	146 +- 12	113 +- 11	-3 +- 14	T	34 +- 21	73.7	5.19	< 7.32
^{228}Ac	338.32	91.0 +- 9.6	89.7 +- 9.5	25 +- 11	T	-24 +- 17	64.7	7.69	< 7.69
^{214}Pb	351.932	186 +- 14	68.4 +- 8.3	30 +- 13	T	88 +- 21	67.1	2.60	3.07 +- 0.79
^{208}Tl	583.187	75.8 +- 8.8	39.8 +- 6.4	17.4 +- 8.2	T	19 +- 14	47.3	3.15	< 4.26
^{214}Bi	609.312	186 +- 14	48.6 +- 7.0	37.3 +- 9.7	T	100 +- 18	55.2	2.34	3.80 +- 0.79
^{137}Cs	661.657	96.5 +- 9.9	36.7 +- 6.1	13.4 +- 6.4	T	46 +- 13	42.2	0.863	0.85 +- 0.26
^{54}Mn	834.838	24.4 +- 5.0	21.9 +- 4.8	5.3 +- 5.7	T	-2.8 +- 9.0	34.4	0.668	< 0.668
^{46}Sc	889.271	18.0 +- 4.4	16.5 +- 4.2	3.5 +- 5.3	T	-2.1 +- 8.1	31.2	0.671	< 0.671
^{228}Ac	911.196	56.7 +- 7.6	28.2 +- 5.4	20.0 +- 6.1	T	9 +- 11	40.0	3.74	< 4.46
^{228}Ac	968.96	43.4 +- 6.7	23.1 +- 4.9	10.7 +- 5.3	T	9.6 +- 9.8	35.2	5.45	< 6.79
^{214}Bi	1120.29	78.3 +- 8.9	9.4 +- 3.2	9.3 +- 5.8	T	60 +- 11	30.5	5.31	9.3 +- 2.0
^{46}Sc	1120.54	78.9 +- 8.9	10.4 +- 3.4	6.3 +- 5.9	T	62 +- 11	30.4	0.736	1.35 +- 0.28
^{60}Co	1173.23	20.9 +- 4.7	16.1 +- 4.1	-0.1 +- 5.7	T	4.7 +- 8.4	31.1	0.764	< 0.868
^{60}Co	1332.49	10.7 +- 3.4	10.3 +- 3.4	5.3 +- 4.6	T	-5.0 +- 6.7	27.2	0.715	< 0.715
^{58}Co	810.775	29.6 +- 5.5	25.0 +- 5.1	-0.6 +- 4.7	T	4.6 +- 8.9	32.5	0.640	< 0.722
^{40}K	1460.88	316 +- 18	9.2 +- 3.2	62 +- 11	T	245 +- 21	51.1	12.5	54.0 +- 7.1
^{214}Bi	1764.49	82.1 +- 9.1	1.9 +- 1.7	23.6 +- 6.0	T	57 +- 11	30.9	6.23	10.3 +- 2.3
^{208}Tl	2614.51	97.5 +- 9.9	0.5 +- 1.2	13.3 +- 5.7	T	84 +- 11	27.0	3.51	9.8 +- 1.7

Table 2: Activity Table, as calculated by the analysis code and given per unit, as indicated in the analysis input. Limits are given at 95CL, activities at one sigma.


Counts keV^{-1} day^{-1}
10
1
10^{-1}
10^{-2}
Pb-212
Pb-214
Pb-214
Tl-208
Bi-214
Cs-137
Ac-228
Ac-228
Bi-214
Bi-214
K-40
Bi-214
Bi-214
Bi-214
Tl-208
Tetratex_LEGEND (50d)
Background (37.5d)
500
1000
1500
2000
2500
Energy (keV)


Activity
Detected
Upper Limits
mBq/(kg or unit)
10
1
10^{-1}
0
500
1000
1500
2000
2500
Energy [keV]