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

========= 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_highdens"
queue="5:00:00"
maxnodes=100
totevents= 10000000
n_beamOn= 100000
isotope_list=["232Th"]

========= 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: 3.4128e+06 s = 39.5 d

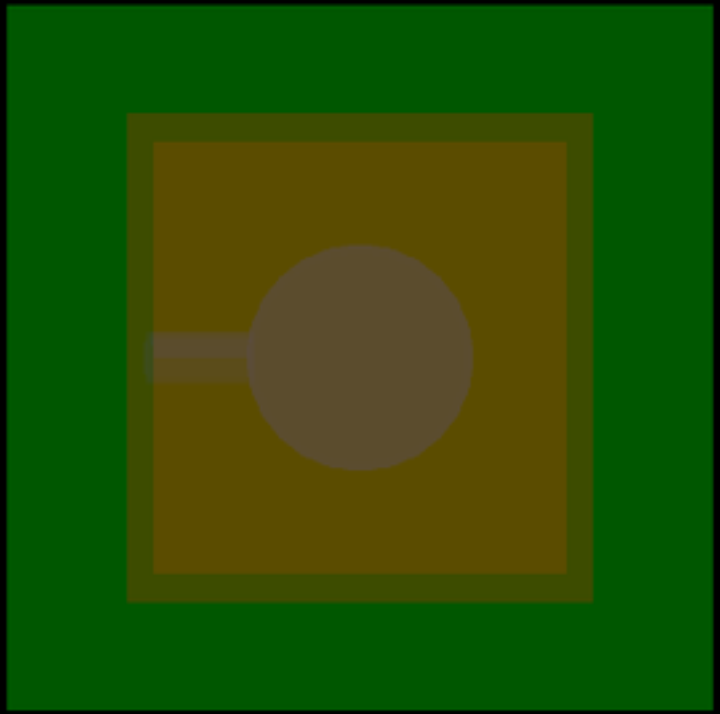
Background folder: /disk/bulk_atp/gator/background/bkg_2019_10_red_clean
Calibration folder: /disk/bulk_atp/gator/Calibrations/2015.08.07
Amount of material (kg or pieces): 1.06

=== 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_highdens ----------

//Dimensions of the sample in box and definition of the geometry
 G4double box_Tetratex_highdens_x= 190*mm;
 G4double box_Tetratex_highdens_y= 200*mm;
 G4double box_Tetratex_highdens_z= 70*mm;
 G4Box* Tetratex_highdens= new
G4Box("Tetratex_highdens",0.5*box_Tetratex_highdens_x,0.5*box_Tetratex_highdens_
y,0.5*box_Tetratex_highdens_z);

//Construct the logical volume
 G4LogicalVolume* Tetratex_highdens_log = new
G4LogicalVolume(Tetratex_highdens,Tetratex_newmat,"Tetratex_highdens_log");

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

// Set coordinates for the position of the sample at the top of the detector
G4double Tetratex_highdens_Pos_x =0*mm;
G4double Tetratex_highdens_Pos_y =0*mm;
```

```
G4double Tetratex_highdens_Pos_z=
endcapPos_z+0.5*endcapHeight1+0.5*box_Tetratex_highdens_z+0.01*mm;

// Define the position vector
G4ThreeVector
Tetratex_highdens_Pos(Tetratex_highdens_Pos_x,Tetratex_highdens_Pos_y,Tetratex_h
ighdens_Pos_z);

// Define the physical volume
G4VPhysicalVolume* Tetratex_highdens_phys = new
G4PVPlacement(0,Tetratex_highdens_Pos,Tetratex_highdens_log,"Tetratex_highdens_p
hys",cavity1_log,false,0,true);
```

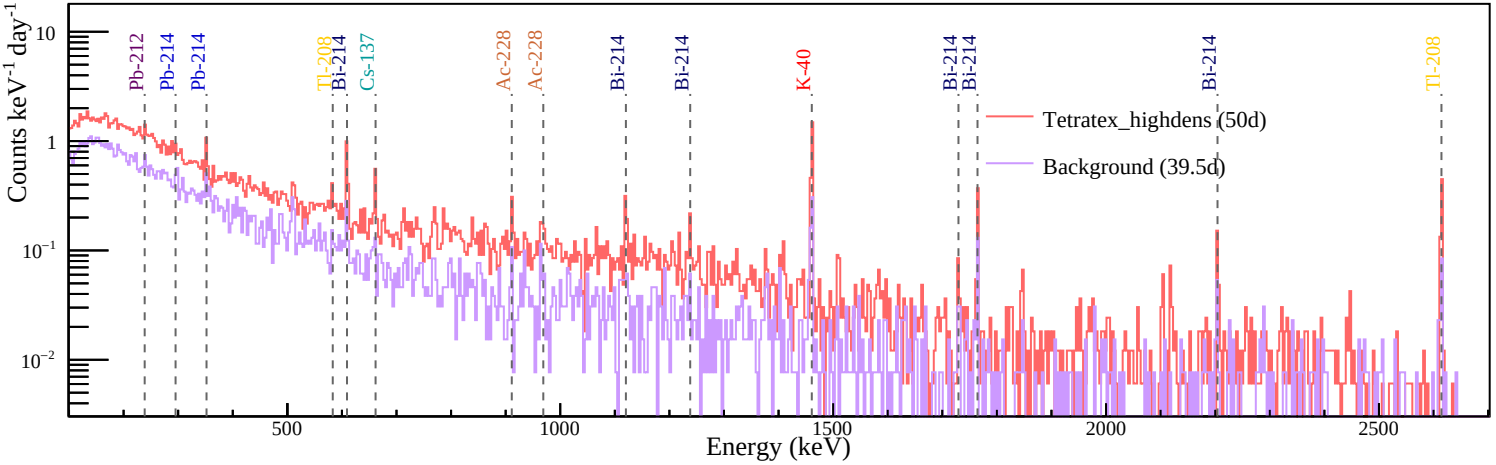


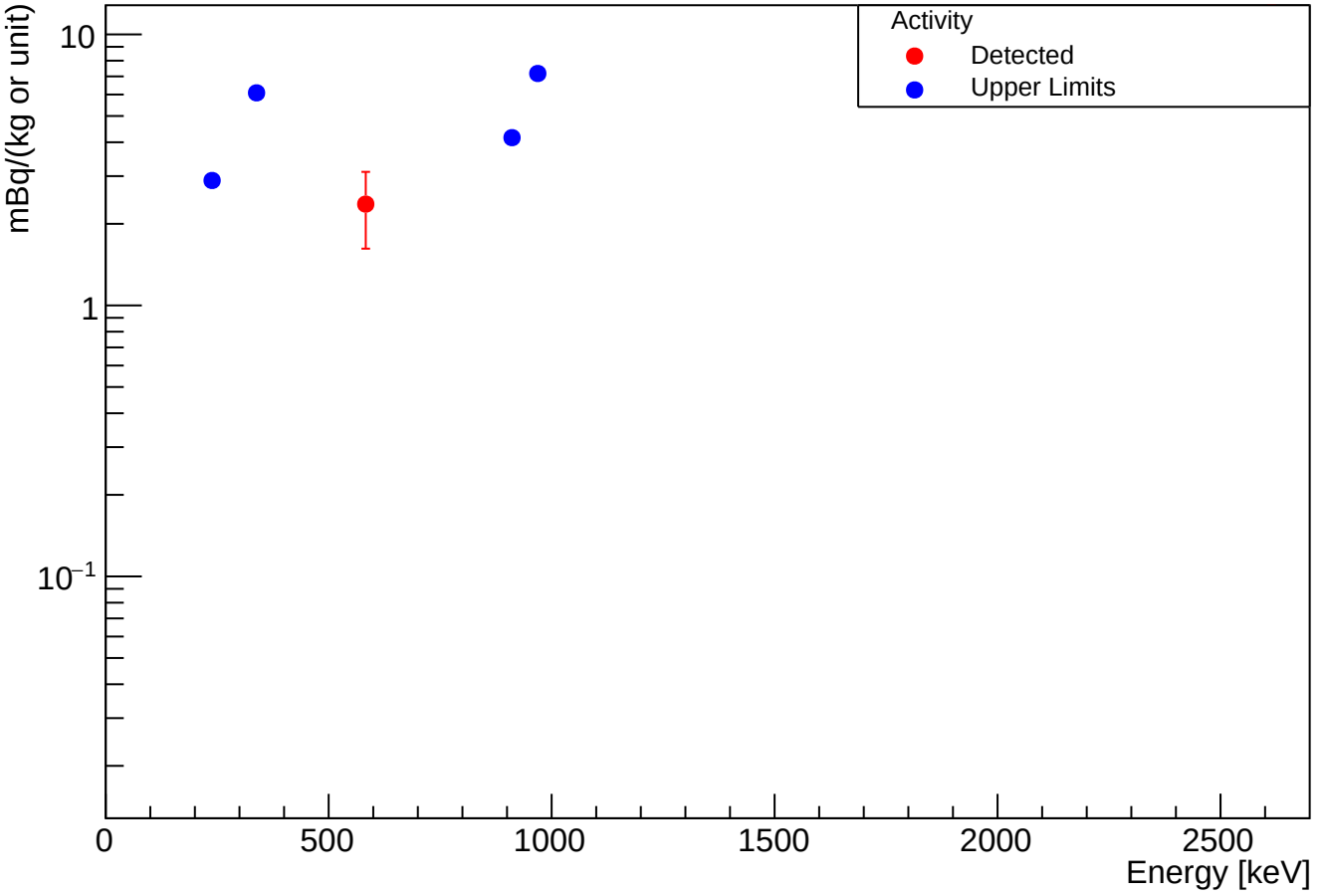
Isotope	Energy (keV)	Line BR	Effic	BRxEffic
^{212}Pb	238.632	0.436	0.0159	0.00695
^{228}Ac	338.32	0.114	0.0159	0.00181
^{208}Tl	583.187	0.3054	0.0109	0.00332
^{228}Ac	911.196	0.262	0.00929	0.00243
^{228}Ac	968.96	0.159	0.00903	0.00144
^{208}Tl	2614.51	0.3584	0.00498	0.00178

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

Isotope	E(keV)	PeakCnts	CompCnts	BkCnts	isBkdet	LineCnts	LdCnts	LdActiv	Activity (mBq/u.)
^{212}Pb	238.632	198 +- 14	173 +- 13	21 +- 16	F	25 +- 19	67.2	2.11	< 2.89
^{228}Ac	338.32	91.0 +- 9.5	89.7 +- 9.5	24 +- 10	F	1 +- 13	49.3	5.94	< 6.09
^{208}Tl	583.187	75.8 +- 8.7	39.8 +- 6.3	15.2 +- 7.7	F	36 +- 11	34.1	2.24	2.36 +- 0.75
^{228}Ac	911.196	56.7 +- 7.5	28.2 +- 5.3	19.0 +- 5.5	T	10 +- 11	36.8	3.30	< 4.16
^{228}Ac	968.96	43.4 +- 6.6	23.1 +- 4.8	12.7 +- 5.1	F	20.2 +- 8.2	27.0	4.10	< 7.17
^{208}Tl	2614.51	97.5 +- 9.9	0.54 +- 0.74	11.4 +- 5.2	F	96.9 +- 9.9	9.57	1.17	11.9 +- 1.7

Table 2: Activity Table, as calculated by the analysis code and given per unit, as indicated in the analysis input.


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_highdens (50d)
Background (39.5d)
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]