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## Background Noise Integrated

In this section the slope and the y-intercept were taken from the custom gaussian (gaus) + first order polynomial (pol1) fit of the energy peak and integrating over an energy range determined by  $\pm 2\sigma$  the mean of the signal. The integral will give the area of the background noise under the signal.

898 keV

r6978

```
In[1814]:= n1 = Integrate[-0.274308 * x + 256.727, {x, 895, 900}]
```

```
Out[1814]= 52.67785
```

r6980

```
In[1815]:= n2 = Integrate[-0.466126 * x + 626.402, {x, 893, 898}]
```

```
Out[1815]= 1044.930835
```

r7022

```
In[1816]:= n3 = Integrate[0.00185989 * x + 17.1513, {x, 895, 899}]
```

```
Out[1816]= 75.27848532
```

r7023

```
In[1817]:= n4 = Integrate[-0.148602 * x + 184.187, {x, 894, 899}]
```

```
Out[1817]= 254.826535
```

r7107

```
In[1818]:= n5 = Integrate[-0.345539 * x + 323.534, {x, 895, 900}]
```

```
Out[1818]= 67.0637375
```

r7108

```
In[1819]:= n6 = Integrate[-0.0223200 * x + 82.6422, {x, 894, 900}]
```

```
Out[1819]= 375.72696
```

r7203

```
In[1820]:= n7 = Integrate[0.0369262 * x - 23.8649, {x, 891, 904}]
```

```
Out[1820]= 120.5927385
```

r7204

```
In[1821]:= n8 = Integrate[1.02463 * x - 833.156, {x, 901, 907}]
```

```
Out[1821]= 558.65712
```

r7235

```
In[1822]:= n9 = Integrate[-0.299602 * x + 282.736, {x, 901, 906}]
```

```
Out[1822]= 60.227965
```

r7236

```
In[1823]:= n10 = Integrate[0.339331 * x - 219.879, {x, 903, 908}]
```

```
Out[1823]= 436.9261025
```

**1836.1 keV**

r6978

```
In[1824]:= n11 = Integrate[-0.0367690 * x + 69.5478, {x, 1835, 1840}]
```

```
Out[1824]= 9.9238125
```

r6980

```
In[1825]:= n12 = Integrate[-0.0289860 * x + 73.3522, {x, 1829, 1837}]
```

```
Out[1825]= 161.766896
```

r7022

```
In[1826]:= n13 = Integrate[0.00899005 * x - 15.1294, {x, 1835, 1841}]
```

```
Out[1826]= 8.3658714
```

r7023

```
In[1827]:= n14 = Integrate[-0.0806490 * x + 155.393, {x, 1832, 1840}]
```

```
Out[1827]= 58.571488
```

r7107

```
In[1828]:= n15 = Integrate[0.0595069 * x - 107.776, {x, 1836, 1841}]
```

```
Out[1828]= 8.13717825
```

r7108

```
In[1829]:= n16 = Integrate[-0.0245740 * x + 56.6525, {x, 1834, 1842}]
```

```
Out[1829]= 91.883904
```

r7203

```
In[1830]:= n17 = Integrate[-0.00212520 * x + 5.14499, {x, 1829, 1849}]
```

```
Out[1830]= 24.734944
```

r7204

```
In[1831]:= n18 = Integrate[0.295440 * x - 526.173, {x, 1820, 1828}]
```

```
Out[1831]= 101.67648
```

r7235

```
In[1832]:= n19 = Integrate[0.154287 * x - 281.948, {x, 1847, 1853}]
```

```
Out[1832]= 20.8977
```

r7236

```
In[1833]:= n20 = Integrate[-0.0468562 * x + 97.7438, {x, 1850, 1859}]
```

```
Out[1833]= 97.6407939
```

## Integrating Gaussian

$$f = \frac{A}{\sigma\sqrt{2+\pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x-\mu}{\sigma}\right)^2\right]$$

Used the equation for a gaussian with an unknown area along with values obtained from fitting the signals peak after the background noise had been subtracted to find the area under the curve. Values calculated are smaller than those given by the ROOT fit.

## 898 keV:

## ■ Singles:

r6978

```
In[1834]:=  $\mu = 897.416;$   

 $\sigma = 1.12141;$   

g1 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 292.5, A] [[  

1]][[1]][[2]]
```

Out[1836]= 822.2052189

r7022

```
In[1837]:=  $\mu = 897.481;$   

 $\sigma = 0.750439;$   

g2 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 362.7, A] [[  

1]][[1]][[2]]
```

Out[1839]= 682.264675

r7107

```
In[1840]:=  $\mu = 897.581;$   

 $\sigma = 1.09091;$   

g3 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 130.5, A] [[  

1]][[1]][[2]]
```

Out[1842]= 356.8530136

r7203

```
In[1843]:=  $\mu = 897.352;$   

 $\sigma = 2.97881;$   

g4 =  

Solve [A * MaxValue [ $\frac{1}{\sigma * \sqrt{2 * \pi}}$  * Exp [ $-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2$ ], x] == 17.4328, A] [[  

  1]] [[1]] [[2]]
```

```
Out[1845]= 130.1666971
```

r7235

```
In[1846]:=  $\mu = 903.390;$   

 $\sigma = 0.952662;$   

g5 = Solve [A * MaxValue [ $\frac{1}{\sigma * \sqrt{2 * \pi}}$  * Exp [ $-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2$ ], x] == 81.4, A] [[  

  1]] [[1]] [[2]]
```

```
Out[1848]= 194.3807177
```

#### ■ Coincidence:

r6980

```
In[1849]:=  $\mu = 895.417;$   

 $\sigma = 1.19573;$   

g6 =  

Solve [A * MaxValue [ $\frac{1}{\sigma * \sqrt{2 * \pi}}$  * Exp [ $-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2$ ], x] == 4132.5, A] [[  

  1]] [[1]] [[2]]
```

```
Out[1851]= 12 386.13822
```

r7023

```
In[1852]:=  $\mu = 896.893;$   

 $\sigma = 1.00875;$   

g7 =  

Solve [A * MaxValue [ $\frac{1}{\sigma * \sqrt{2 * \pi}}$  * Exp [ $-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2$ ], x] == 1232.2, A] [[  

  1]] [[1]] [[2]]
```

```
Out[1854]= 3115.693199
```

r7108

```
In[1855]:=  $\mu = 897.483;$   

 $\sigma = 1.24805;$   

g8 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 707.85, A][[1]][[1]][[2]]
```

```
Out[1857]= 2214.436112
```

r7204

```
In[1858]:=  $\mu = 903.99;$   

 $\sigma = 1.06558;$   

g9 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 309, A][[1]][[1]][[2]]
```

```
Out[1860]= 825.3430037
```

r7236

```
In[1861]:=  $\mu = 905.750;$   

 $\sigma = 1.09901;$   

g10 =  

Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 519, A][[1]][[1]][[2]]
```

```
Out[1863]= 1429.746151
```

### 1836.1 keV:

- Singles:

r6978

In[1864]:=

```
 $\mu = 1837.6;$   
 $\sigma = 1.19410;$   
g11 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 185, A][[1]][[1]]
```

Out[1866]=

553.7354922

r7022

In[1867]:=

```
 $\mu = 1837.72;$   
 $\sigma = 1.28517;$   
g12 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 174.2, A][[1]][[1]][[2]]
```

Out[1869]=

561.1754507

r7107

In[1870]:=

```
 $\mu = 1838.56;$   
 $\sigma = 1.22172;$   
g13 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 71.8, A][[1]][[1]][[2]]
```

Out[1872]=

219.8801689

r7203

In[1873]:=

```
 $\mu = 1839.05;$   
 $\sigma = 4.91678;$   
g14 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 6.75824, A][[1]][[1]][[2]]
```

Out[1875]=

83.29219764

r7235

In[1876]:=

```
 $\mu = 1850.02;$   
 $\sigma = 1.13536;$   
g15 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 28.9, A][[1]][[1]][[2]]
```

Out[1878]=

82.24724631

- Coincidence:

r6980

In[1879]:=

```
 $\mu = 1833.39;$   
 $\sigma = 1.72362;$   
g16 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 2160.9, A][[1]][[1]][[2]]
```

Out[1881]=

9336.113621

r7023

In[1882]:=

```
 $\mu = 1836.02;$   
 $\sigma = 1.63517;$   
g17 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 515.5, A][[1]][[1]][[2]]
```

Out[1884]=

2112.91251

r7108

In[1885]:=

```
 $\mu = 1838.12;$   
 $\sigma = 1.87659;$   
g18 =
```

```
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 402, A][[1]][[1]][[2]]
```

Out[1887]=

1890.973249



r7204

```
In[1888]:=
μ = 1824.15;
σ = 1.66372;
g19 =
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 226.5, A][[1]][[1]][[2]]
```

```
Out[1890]= 944.5791998
```

r7236

```
In[1891]:=
μ = 1854.44;
σ = 1.94463;
g20 =
Solve[A * MaxValue[ $\frac{1}{\sigma * \sqrt{2 * \pi}} * \text{Exp}\left[-\frac{1}{2} \left(\frac{x - \mu}{\sigma}\right)^2\right]$ , x] == 379.5, A][[1]][[1]][[2]]
```

```
Out[1893]= 1849.859294
```

## Activity

Using the area of the gaussian for each peak found above, I divided by the time of counting run to get the activity. I also graphed the activity vs. the days since activation.

## 898 keV

## ■ Singles:

```
In[1894]:= a1 = g1 / 279 // N
           a2 = g2 / 359 // N
           a3 = g3 / 283 // N
           a4 = g4 / 236 // N
           a5 = g4 / 244 // N
```

```
Out[1894]= 2.946972111
```

```
Out[1895]= 1.900458705
```

```
Out[1896]= 1.260964712
```

```
Out[1897]= 0.5515538012
```

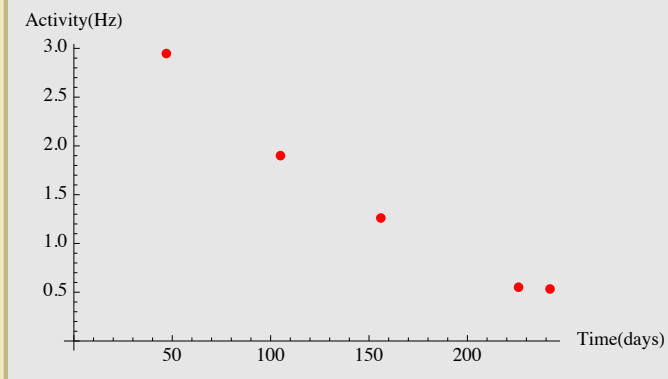
```
Out[1898]= 0.53347007
```

## □ Decay Plot

```
In[1899]:= decay1 = {{47, a1}, {105, a2}, {156, a3}, {226, a4}, {242, a5}};
```

```
In[1900]:= ListPlot[decay1, AxesOrigin -> {0, 0},
                    PlotStyle -> Directive[PointSize[Medium], Red],
                    AxesLabel -> {Time [days], Activity [Hz]}]
```

```
Out[1900]=
```



### ■ Coincidence:

```
In[1901]:= a6 = g6 / 80 612 // N
           a7 = g7 / 63 417 // N
           a8 = g8 / 82 004 // N
           a9 = g9 / 84 303 // N
           a10 = g10 / 139 245 // N
```

```
Out[1901]= 0.1536512953
```

```
Out[1902]= 0.04913025213
```

```
Out[1903]= 0.02700400118
```

```
Out[1904]= 0.009790197308
```

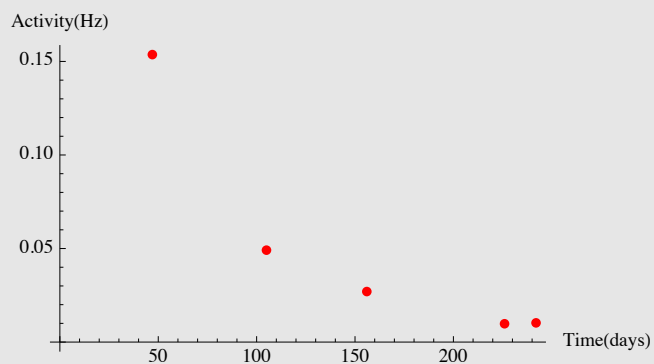
```
Out[1905]= 0.01026784553
```

### □ Decay Plot

```
In[1906]:= decay2 = {{47, a6}, {105, a7}, {156, a8}, {226, a9}, {242, a10}};
```

```
In[1907]:= ListPlot[decay2, AxesOrigin -> {0, 0},
                    PlotStyle -> Directive[PointSize[Medium], Red],
                    AxesLabel -> {Time [days], Activity [Hz]}]
```

```
Out[1907]=
```



## 1836.1 keV

## ■ Singles:

```
In[1908]:= a11 = g11 / 279 // N
           a12 = g12 / 359 // N
           a13 = g13 / 283 // N
           a14 = g14 / 236 // N
           a15 = g15 / 244 // N
```

```
Out[1908]= 1.984715026
```

```
Out[1909]= 1.563162815
```

```
Out[1910]= 0.7769617276
```

```
Out[1911]= 0.3529330409
```

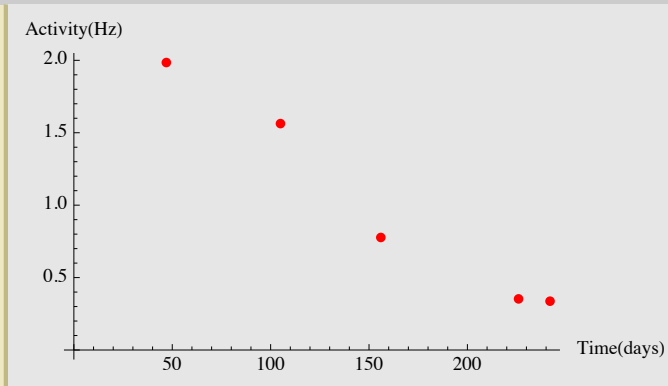
```
Out[1912]= 0.3370788783
```

## □ Decay Plot

```
In[1913]:= decay3 = {{47, a11}, {105, a12}, {156, a13}, {226, a14}, {242, a15}};
```

```
In[1914]:= ListPlot[decay3, AxesOrigin -> {0, 0},
                   PlotStyle -> Directive[PointSize[Medium], Red],
                   AxesLabel -> {Time [days], Activity [Hz]}]
```

```
Out[1914]=
```



### ■ Coincidence

```
In[1915]:= a16 = g16 / 80 612 // N
           a17 = g17 / 63 417 // N
           a18 = g18 / 82 004 // N
           a19 = g19 / 84 303 // N
           a20 = g20 / 139 245 // N
```

```
Out[1915]= 0.1158154322
```

```
Out[1916]= 0.03331776196
```

```
Out[1917]= 0.02305952452
```

```
Out[1918]= 0.01120457398
```

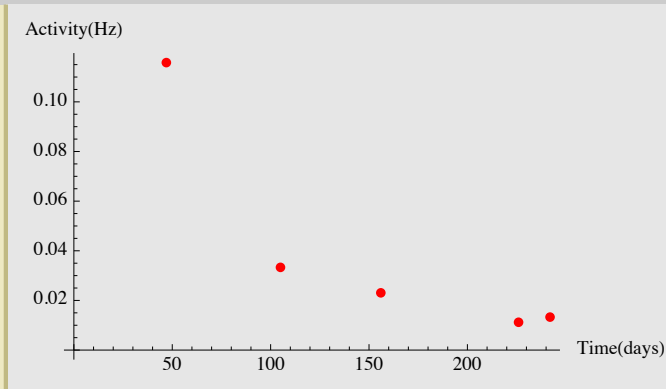
```
Out[1919]= 0.01328492437
```

### □ Decay Plot

```
In[1920]:= decay4 = {{47, a16}, {105, a17}, {156, a18}, {226, a19}, {242, a20}};
```

```
In[1921]:= ListPlot[decay4, AxesOrigin -> {0, 0},
                   PlotStyle -> Directive[PointSize[Medium], Red],
                   AxesLabel -> {Time [days], Activity [Hz]}]
```

```
Out[1921]=
```



## Plots and Fits

Graphs of  $\frac{\text{Signal}}{\text{Noise}}$  vs. Activity along with linear fits. After the first runs, 6978 and 6980, where taken, the base platform was changed from cinder blocks to poly-wax blocks to try to reduce background noise. This is a change of the set-up that would affect the area of the background. At the end of each subsection I removed these points to see how the fit changed.

Things to note. Some additional considerations may be needed for the last run, 7236, that has a broad peak that was shifted to higher energies during the run. The liquid nitrogen tank on the HpGe detector was refilled at some point during the run. Possibly a time cut will be needed. Errors also need to be included.

898 keV

■ Singles:

In[1922]:=

```
signalnoise1 = {{a1, g1 / n1}, {a2, g2 / n3},  
                {a3, g3 / n5}, {a4, g4 / n7}, {a5, g5 / n9}} // N
```

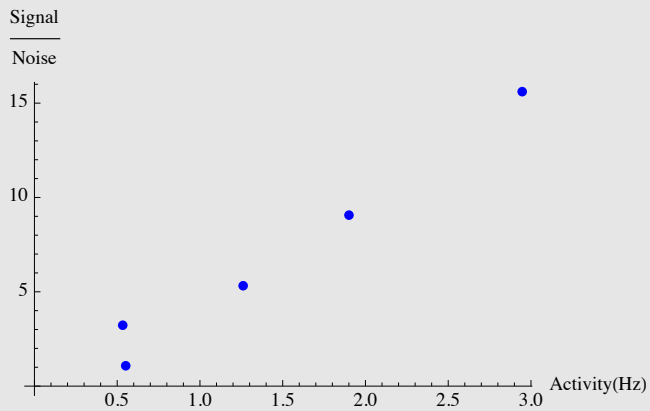
Out[1922]=

```
{ {2.946972111, 15.60817723}, {1.900458705, 9.06320939},  
  {1.260964712, 5.321102385}, {0.5515538012, 1.079390838}, {0.53347007, 3.22741633} }
```

In[1923]:=

```
p1 = ListPlot[signalnoise1, AxesOrigin -> {0, 0},  
  PlotStyle -> Directive[PointSize[Medium], Blue],  
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$ }]  
  
line1 = Fit[signalnoise1, {1, x}, x]  
p2 = Plot[{line1}, {x, 0, 2}];  
Show[{p1, p2}]
```

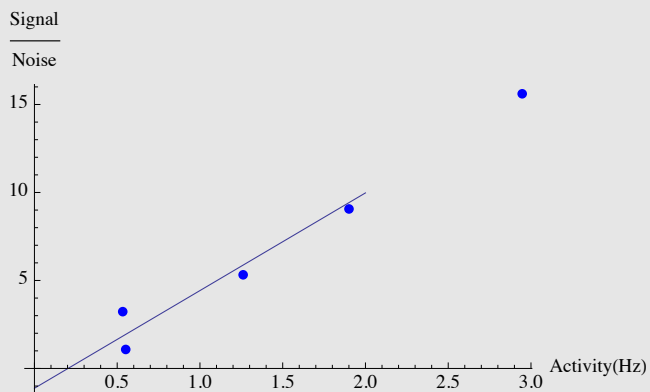
Out[1923]=



Out[1924]=

$$-1.125481608 + 5.550448542 x$$

Out[1926]=



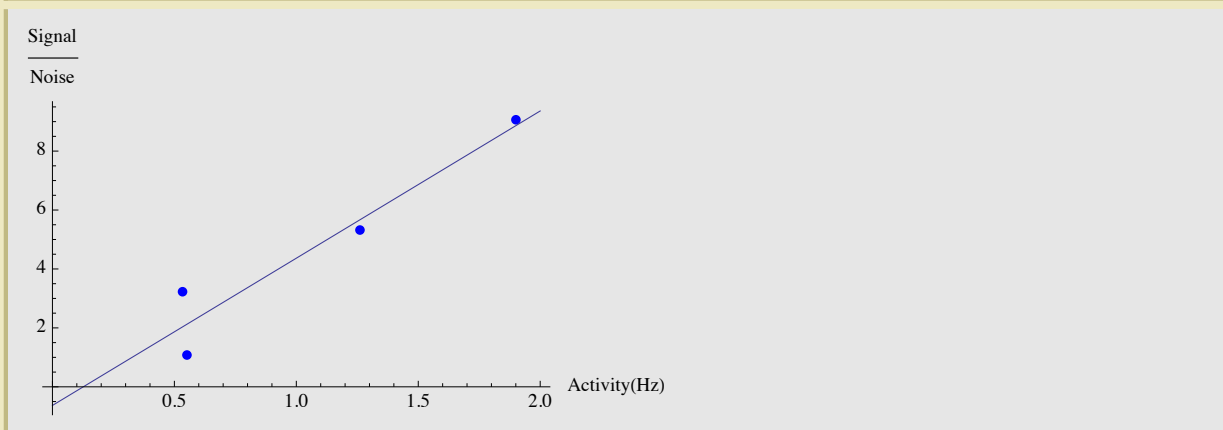
▫ Removing first run (r6978)

```
In[1927]:= sn1 = {{a2, g2 / n3}, {a3, g3 / n5}, {a4, g4 / n7}, {a5, g5 / n9}} // N
plot1 = ListPlot[sn1, AxesOrigin -> {0, 0},
  PlotStyle -> Directive[PointSize[Medium], Blue],
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$  }];
l1 = Fit[sn1, {1, x}, x]
plot2 = Plot[{l1}, {x, 0, 2}];
Show[{plot1, plot2}]
```

```
Out[1927]:= {{1.900458705, 9.06320939}, {1.260964712, 5.321102385},
  {0.5515538012, 1.079390838}, {0.53347007, 3.22741633}}
```

```
Out[1929]:= -0.631839171 + 4.996759452 x
```

```
Out[1931]=
```



■ Coincidence

```
In[1932]:= signalnoise2 = {{a6, g6 / n2}, {a7, g7 / n4},
  {a8, g8 / n6}, {a9, g9 / n8}, {a10, g10 / n10}} // N
```

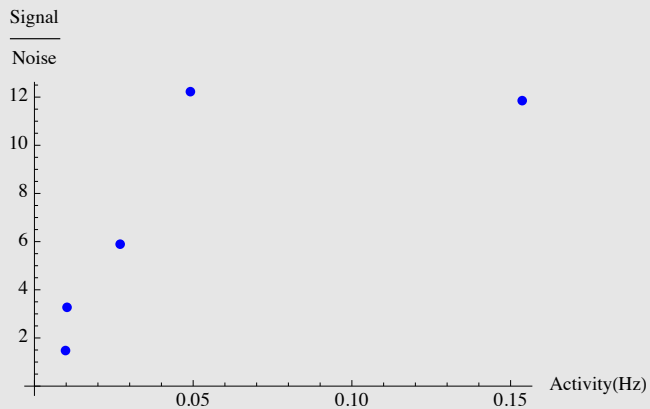
```
Out[1932]:= {{0.1536512953, 11.85354839}, {0.04913025213, 12.22672199},
  {0.02700400118, 5.893737603}, {0.009790197308, 1.477369524}, {0.01026784553, 3.272283673}}
```



In[1933]:=

```
p3 = ListPlot[signalnoise2, AxesOrigin -> {0, 0},  
  PlotStyle -> Directive[PointSize[Medium], Blue],  
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$ }]  
  
line2 = Fit[signalnoise2, {1, x}, x]  
p4 = Plot[{line2}, {x, 0, 0.16}];  
Show[{p3, p4}]
```

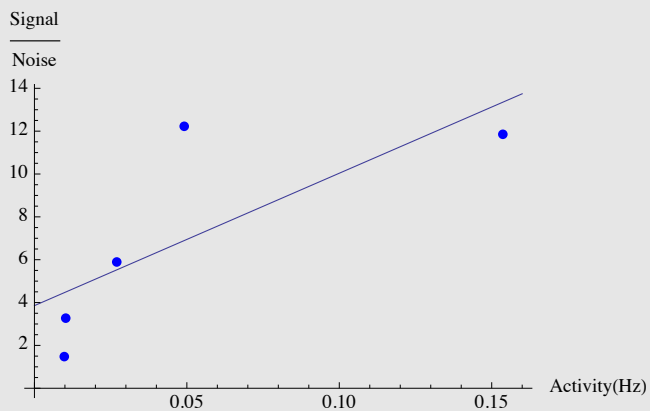
Out[1933]=



Out[1934]=

$$3.856754183 + 61.79822415 x$$

Out[1936]=



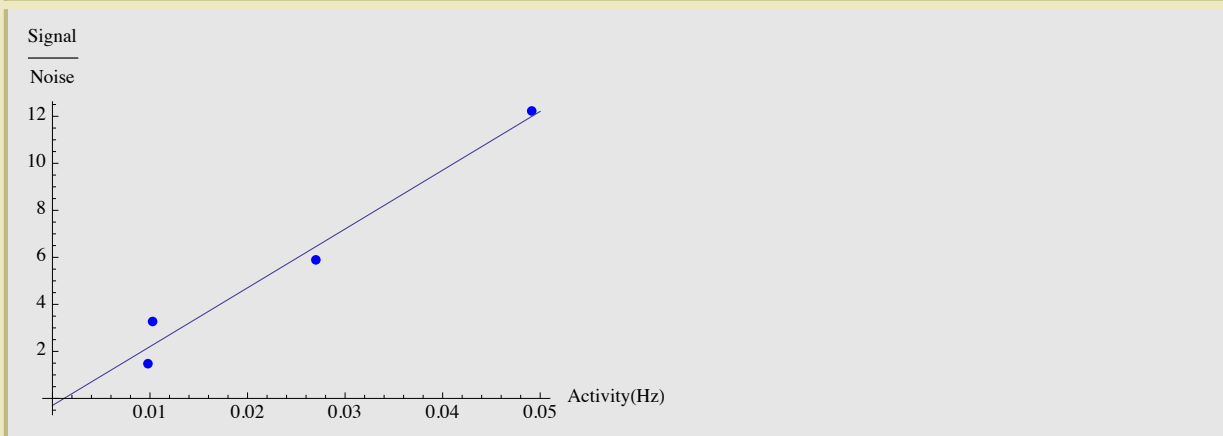
▫ Remove first run (r6980)

```
In[1937]:= sn2 = {{a7, g7 / n4}, {a8, g8 / n6}, {a9, g9 / n8}, {a10, g10 / n10}} // N
plot3 = ListPlot[sn2, AxesOrigin -> {0, 0},
  PlotStyle -> Directive[PointSize[Medium], Blue],
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$  }];
l2 = Fit[sn2, {1, x}, x]
plot4 = Plot[{l2}, {x, 0, 0.05}];
Show[{plot3, plot4}]
```

```
Out[1937]= {{0.04913025213, 12.22672199}, {0.02700400118, 5.893737603},
  {0.009790197308, 1.477369524}, {0.01026784553, 3.272283673}}
```

```
Out[1939]= -0.2986555655 + 250.1732053 x
```

```
Out[1941]=
```



1836.1 keV

■ Singles

```
In[1942]:= signalnoise3 = {{a11, g11 / n11}, {a12, g12 / n13},
  {a13, g13 / n15}, {a14, g14 / n17}, {a15, g15 / n19}} // N
```

```
Out[1942]= {{1.984715026, 55.7986653}, {1.563162815, 67.07913902},
  {0.7769617276, 27.02167289}, {0.3529330409, 3.36738978}, {0.3370788783, 3.935708059}}
```

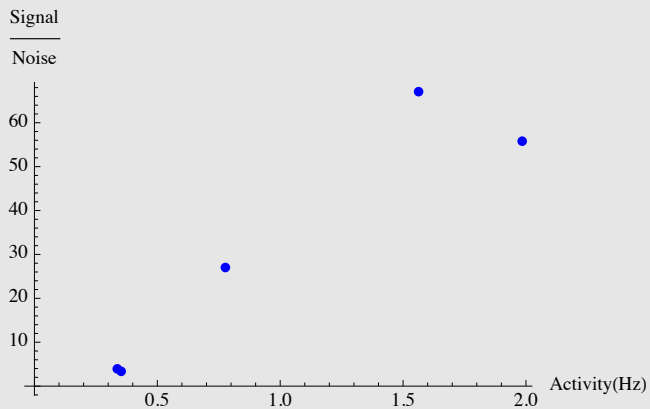
In[1943]=

```

p5 = ListPlot[signalnoise3, AxesOrigin -> {0, 0},
  PlotStyle -> Directive[PointSize[Medium], Blue],
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$ }]
line3 = Fit[signalnoise3, {1, x}, x]
p6 = Plot[{line3}, {x, 0, 2}];
Show[{p5, p6}]

```

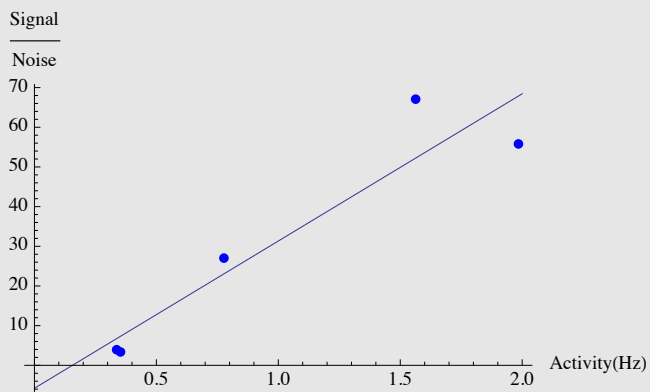
Out[1943]=



Out[1944]=

$$-5.777867273 + 37.10816001 x$$

Out[1946]=

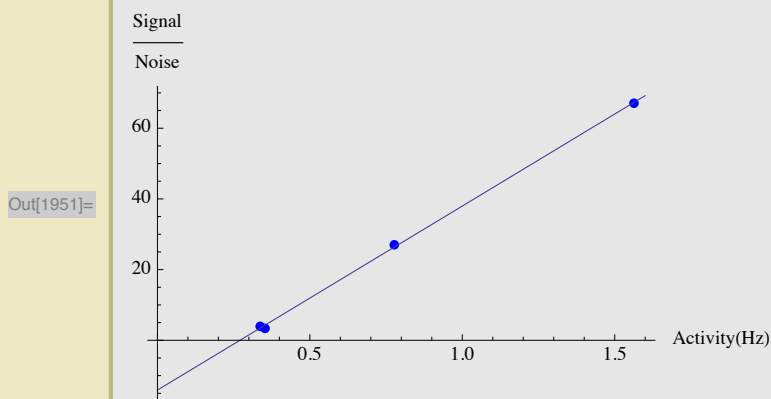


▫ Remove first run (r6978)

```
In[1947]:= sn3 = {{a12, g12 / n13}, {a13, g13 / n15},
               {a14, g14 / n17}, {a15, g15 / n19}} // N
plot5 = ListPlot[sn3, AxesOrigin -> {0, 0},
                 PlotStyle -> Directive[PointSize[Medium], Blue],
                 AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$  }];
l3 = Fit[sn3, {1, x}, x]
plot6 = Plot[{l3}, {x, 0, 1.6}];
Show[{plot5, plot6}]
```

```
Out[1947]:= {{1.563162815, 67.07913902}, {0.7769617276, 27.02167289},
             {0.3529330409, 3.36738978}, {0.3370788783, 3.935708059}}
```

```
Out[1949]:= -14.09729192 + 52.07457796 x
```



■ Coincidence

```
In[1952]:= signalnoise4 = {{a16, g16 / n12}, {a17, g17 / n14},
                            {a18, g18 / n16}, {a19, g19 / n18}, {a20, g20 / n20}} // N
```

```
Out[1952]:= {{0.1158154322, 57.71337555}, {0.03331776196, 36.07407942},
             {0.02305952452, 20.58002726}, {0.01120457398, 9.290046231}, {0.01328492437, 18.94555769}}
```

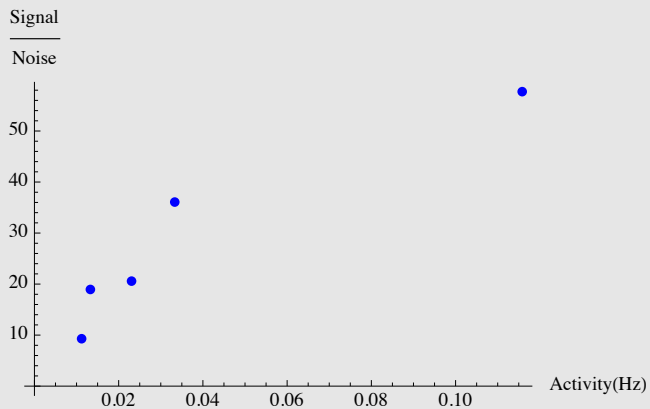
In[1953]:=

```

p7 = ListPlot[signalnoise4, AxesOrigin -> {0, 0},
  PlotStyle -> Directive[PointSize[Medium], Blue],
  AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$ }]
line4 = Fit[signalnoise4, {1, x}, x]
p8 = Plot[{line4}, {x, 0, 0.12}];
Show[{p7, p8}]

```

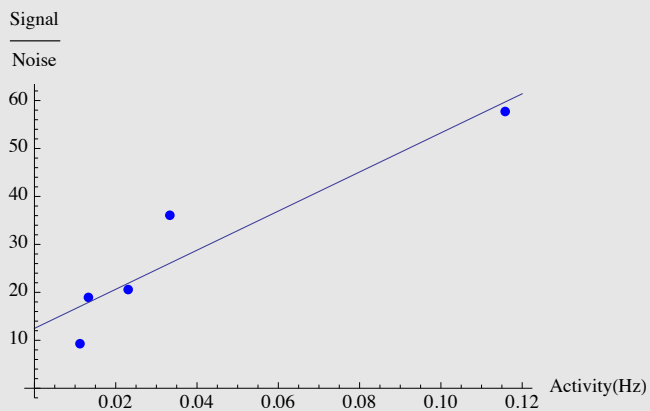
Out[1953]=



Out[1954]=

$$12.48280415 + 407.7087731 x$$

Out[1956]=



▫ Remove first run (r6980)

In[1957]:=

```
sn4 = {{a17, g17 / n14}, {a18, g18 / n16},
       {a19, g19 / n18}, {a20, g20 / n20}} // N
plot7 = ListPlot[sn4, AxesOrigin -> {0, 0},
                 PlotStyle -> Directive[PointSize[Medium], Blue],
                 AxesLabel -> {Activity [Hz],  $\frac{\text{Signal}}{\text{Noise}}$  }];
l4 = Fit[sn4, {1, x}, x]
plot8 = Plot[{l4}, {x, 0, 0.04}];
Show[{plot7, plot8}]
```

Out[1957]=

```
{{0.03331776196, 36.07407942}, {0.02305952452, 20.58002726},
 {0.01120457398, 9.290046231}, {0.01328492437, 18.94555769}}
```

Out[1959]=

```
0.542648767 + 1022.905952 x
```

Out[1961]=

