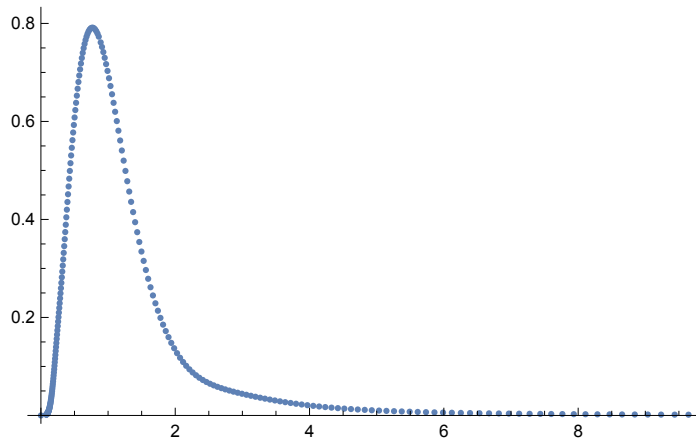


```

fullDat = ReplacePart[Import[
    "~bastian/Desktop/Bichsel_spectrum_Muon_1GeV_5micron.dat"], 1 -> {0, 0, 0}];
e = fullDat[[All, 1]];
(*The first column*)
prob = fullDat[[All, 2]];

ListPlot[Transpose[{e / 1000., prob}]]

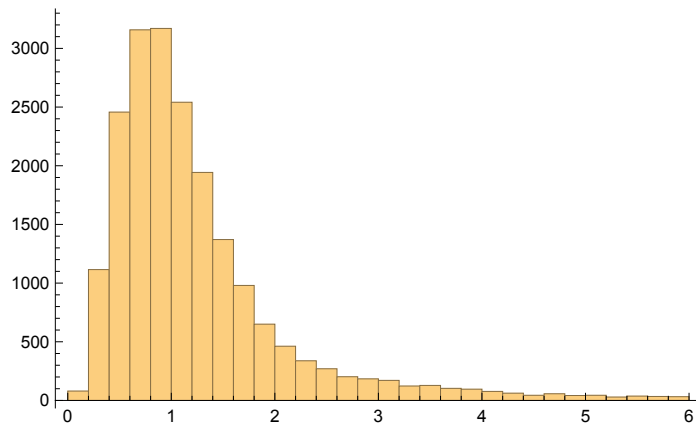
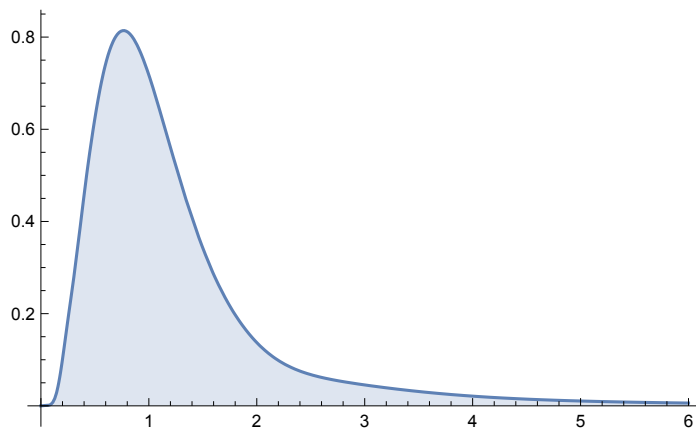
```



```

f = Interpolation[Transpose[{e / 1000., prob}], InterpolationOrder -> 1];
D = ProbabilityDistribution[f[x], {x, 0, 6}, Method -> "Normalize"];
PDF[D, x];
Plot[%, {x, 0, 6}, PlotRange -> All, Filling -> Axis]
RandomVariate[D, 20 000];
Histogram[%, {0, 6, .2}]

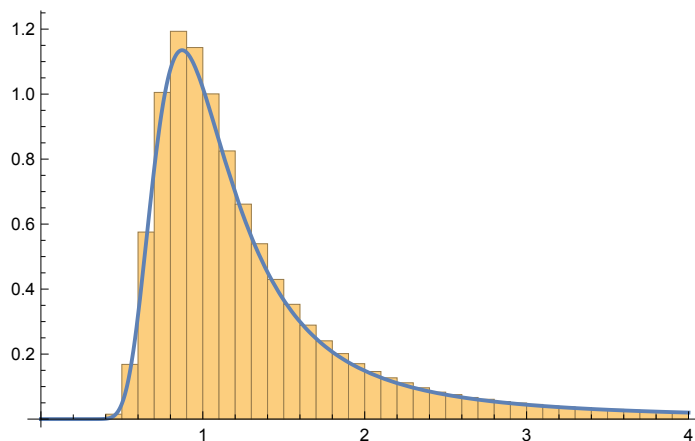
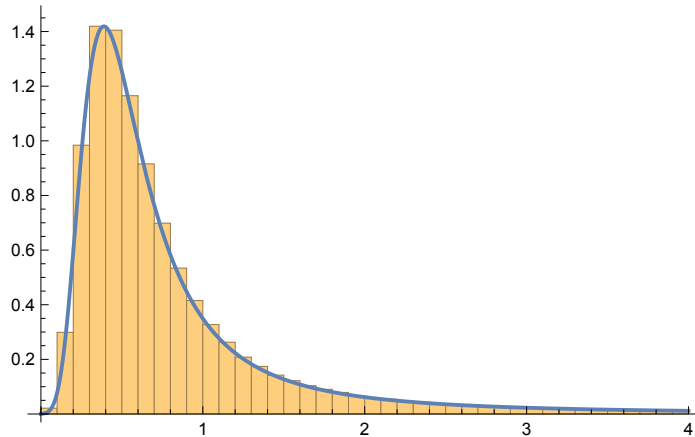
```



```

(*σ=0.08;μ=1.2;*)
(*σ=0.25;μ=1.2;*)
σ = 0.2; μ = 0.68;
data = RandomReal[LandauDistribution[μ, σ], 10^6];
Show[
  Histogram[data, {0.0, 4, 0.1}, "PDF", AxesOrigin → {0.0, 0}],
  Plot[PDF[LandauDistribution[μ, σ], x], {x, 0.0, 4},
    PlotRange → Full, PlotStyle → Thick, ImageSize → Large]]

```



```
Dimensions[edgescan]
```

```
{16, 65}
```

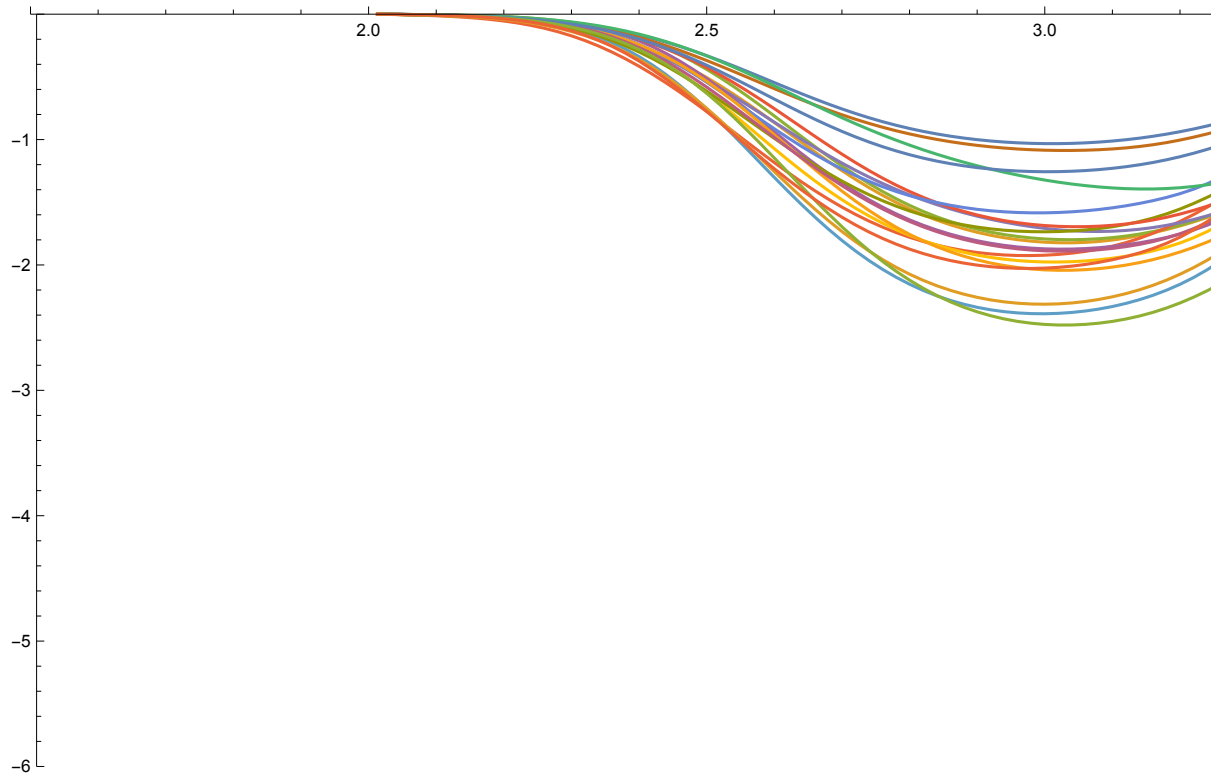
Now generate 100 waveforms with Landau fluctuations introduced.

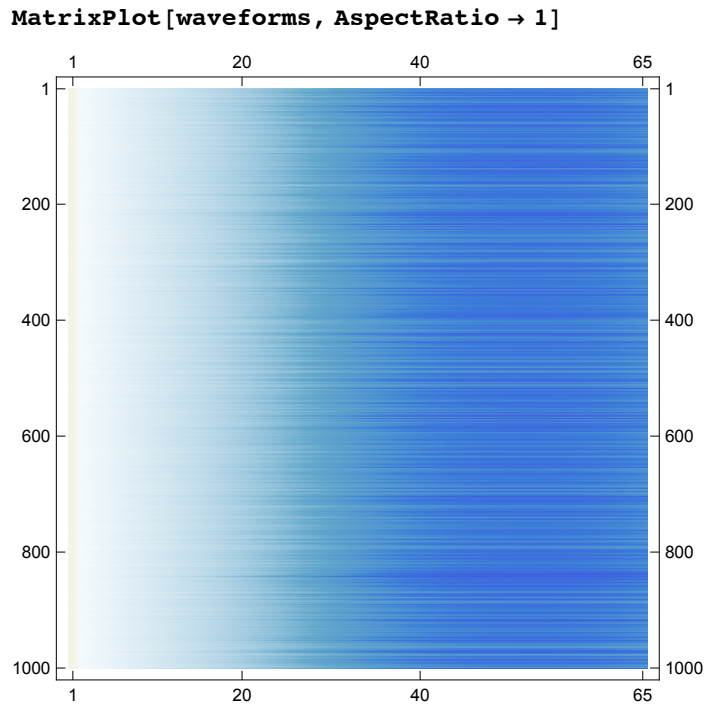
```

waveforms = ConstantArray[0, {1000, 65}];
Do[
  (*clusters=RandomReal[LandauDistribution[μ,σ],16];*)
  clusters = RandomVariate[ $\mathcal{D}$ , 16];
  waveforms[[i]] = clusters.edgescan;
  , {i, 1, 1000}];

```

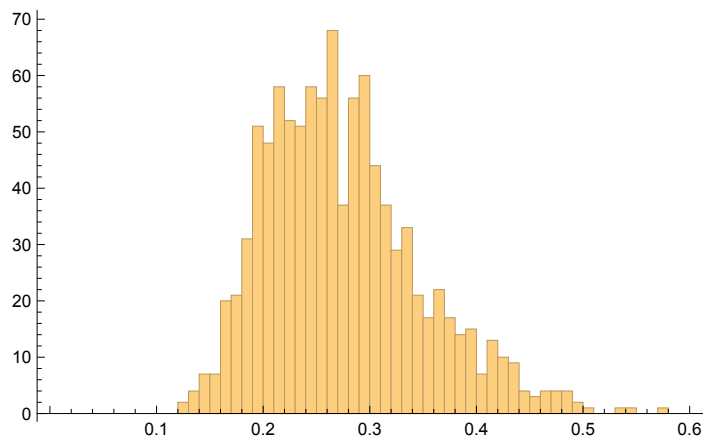
```
ListPlot[{Transpose[{time, waveforms[[1]]}],  
  Transpose[{time, waveforms[[2]]}], Transpose[{time, waveforms[[3]]}],  
  Transpose[{time, waveforms[[4]]}], Transpose[{time, waveforms[[5]]}],  
  Transpose[{time, waveforms[[6]]}], Transpose[{time, waveforms[[7]]}],  
  Transpose[{time, waveforms[[8]]}], Transpose[{time, waveforms[[9]]}],  
  Transpose[{time, waveforms[[10]]}], Transpose[{time, waveforms[[11]]}],  
  Transpose[{time, waveforms[[12]]}], Transpose[{time, waveforms[[13]]}],  
  Transpose[{time, waveforms[[14]]}], Transpose[{time, waveforms[[15]]}],  
  Transpose[{time, waveforms[[16]]}], Transpose[{time, waveforms[[17]]}],  
  Transpose[{time, waveforms[[18]]}], Transpose[{time, waveforms[[19]]}],  
  Joined → True, PlotRange → {{1.5, 3.3}, {15 * (-.4), 0.}}
```





Definitely better with $\sigma = 0.25$!

```
peakvalue = Table[Max[-waveforms[[i]]]/6.5, {i, 1, 1000}];
Histogram[peakvalue, {0, 0.6, 0.010}]
```



```
Export["simlandau2.dat", waveforms, "tsv"];
```

Aug. 3, 2015 PS, 3 HFS detectors, Peak value(V)– compare Meroli et al.

