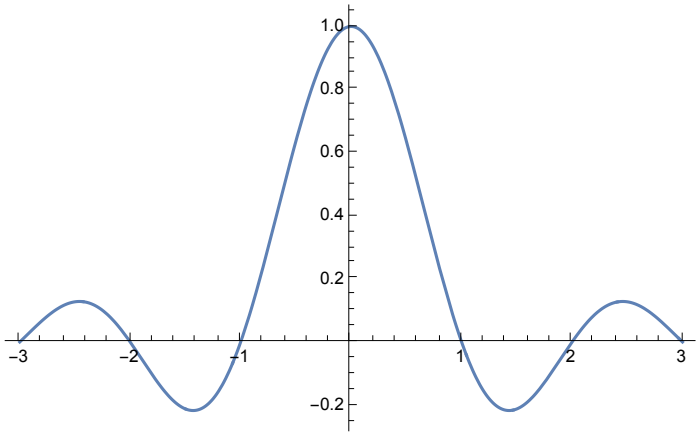
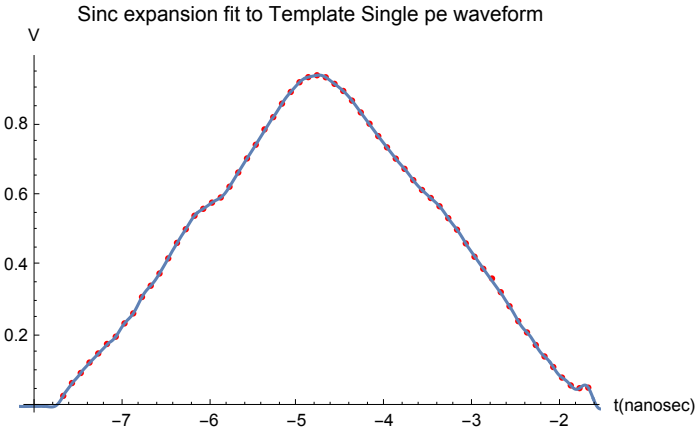
Now try for a fit function that will better scale with amplitude using the Sinc (wavelet) treatment.
This yields stable fits for the amplitude (ie Npe) but the earlier method using normalized waveforms
gives more stable fits for the phase, so I combine these methods.

```
Plot[Sinc[Pi * x], {x, -3, 3}]
```



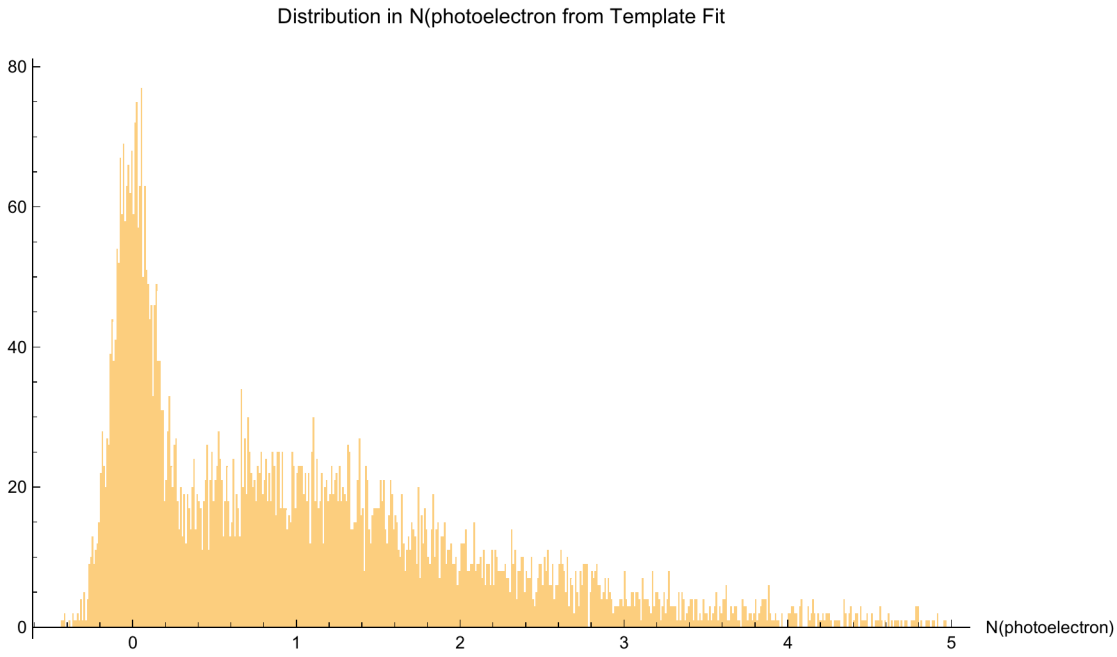

```
avewave = (v01[[5]] + v01[[7]](*+v01[[15]]+v01[[16]]*)) / 2;
templatefit[x_] := Sum[avewave[[i]] * Sinc[Pi * (x - ttt[[i]]) / 0.1], {i, 61}]
```

```
Show[ListPlot[Transpose[{ttt, avewave}], PlotStyle → Red,
  AxesOrigin → {-8, 0}, AxesLabel → {"t(nanosec)", "V"},
  PlotLabel → "Sinc expansion fit to Template Single pe waveform"],
 Plot[templatefit[x], {x, -10, 0}]]
```



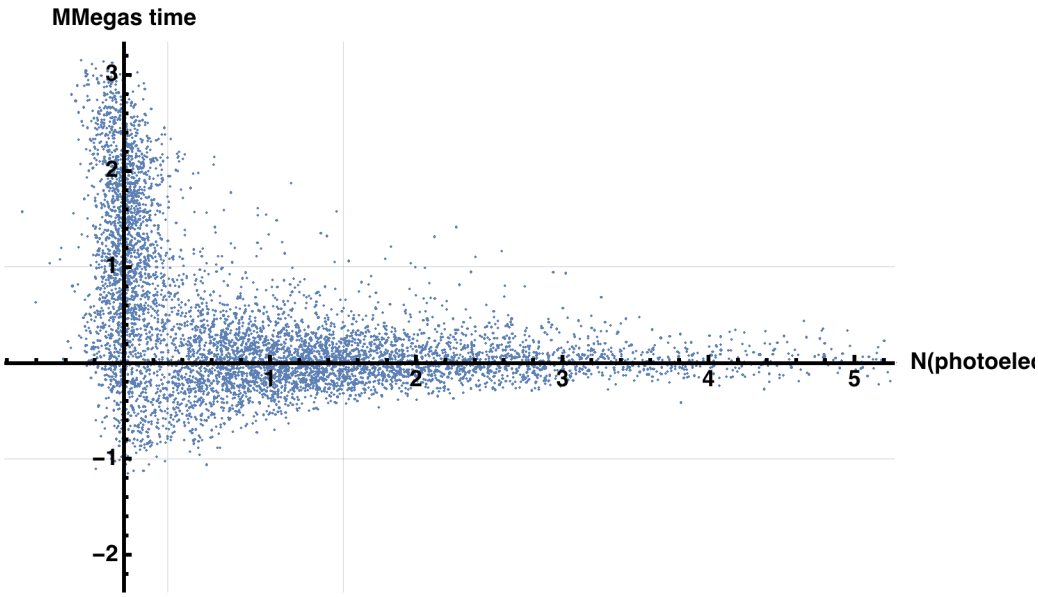

```
npephs = ConstantArray[0, nevents];
tft0s = ConstantArray[0, nevents];
Do[
  fit =
   FindFit[Transpose[{ttt, v01[[i]] * peak[[i]]}], a * templatefit[x], {a}, x];
  npephs[[i]] = a /. fit;
  , {i, nevents}];
```

```
Histogram[npephs / .015, {-.5, 5, .01}, AxesLabel → {"N(photoelectron)", ""},
 PlotLabel → "Distribution in N(photoelectron from Template Fit",
 ImageSize → Large]
```

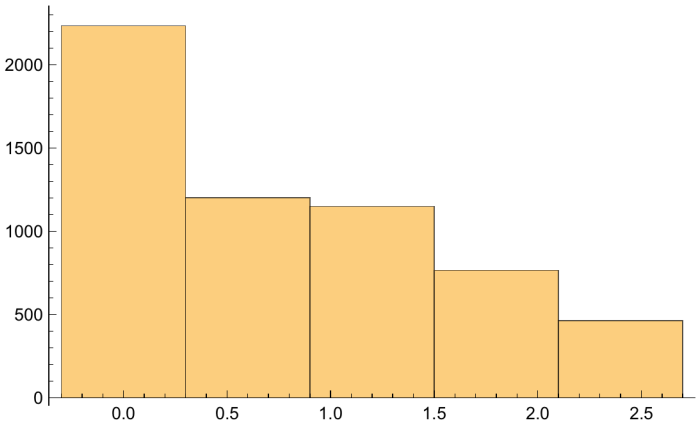


Based on Scatter plot of MMegas time vs. Npe, Npe < 0.3 looks like a safe cut for Zeroes.

```
ListPlot[Transpose[{npephs / .015, tft0}],
 GridLines → {{0.3, 1.5}, {-1, 1}}, AxesStyle → Thick,
 LabelStyle → Directive[Bold, Medium, FontFamily → "Helvetica"],
 AxesLabel → {"N(photoelectrons)", "MMegas time"}, ImageSize → Large]
```



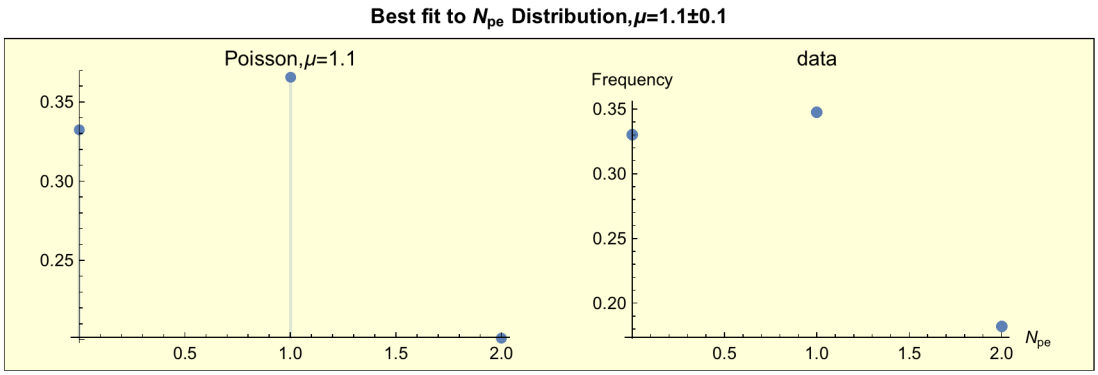
```
Histogram[npephs / .015, {-.3, 3, .6}]
```




```
bincts = BinCounts[npephs / .015, {-.3, 3, .6}]
```

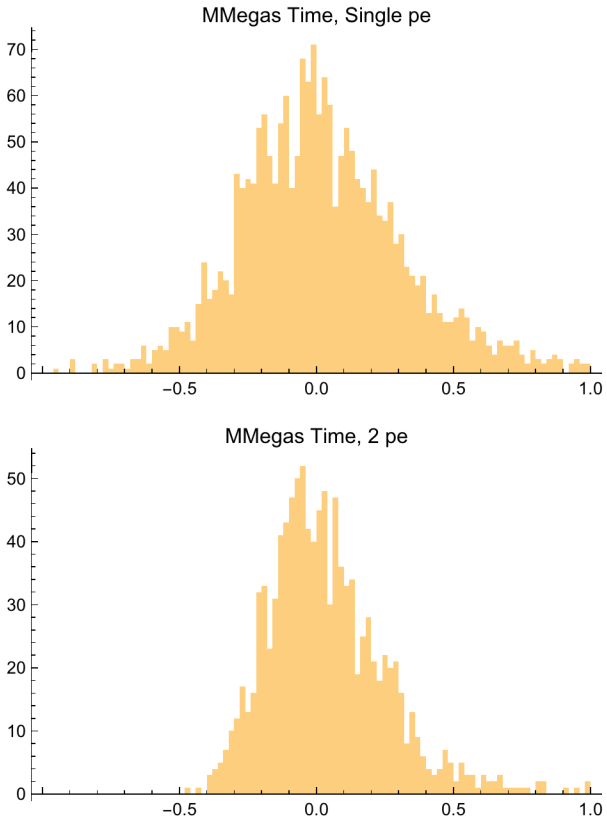
```
{2235, 1202, 1150, 767, 464}
```

```
n0 = bincts[[1]];
n1 = bincts[[2]] + bincts[[3]];
n2 = bincts[[4]] + bincts[[5]];
nphotoel = {n0, n1, n2};
GraphicsRow[
 {DiscretePlot[Evaluate@Table[PDF[PoissonDistribution[λ], k], {λ, {1.1}}], {k, 0,
    2}, PlotRange → All, PlotMarkers → Automatic, PlotLabel → "Poisson,μ=1.1"],
  ListPlot[Transpose[{{0, 1, 2}, nphotoel / 6772}], PlotStyle → PointSize[0.03],
   PlotLabel → "data", AxesLabel → {"Npe", "Frequency"}]},
 ImageSize → Large, Background → LightYellow,
 PlotLabel → "Best fit to Npe Distribution,μ=1.1±0.1",
 LabelStyle → {GrayLevel[0], Bold}, Frame → True]
```



```
Histogram[{npephs / .015,
  Select[Transpose[{npephs / .015, tft0}], (#[[2]] > -0.7 && #[[2]] < .5) &][[
   All, 1]]}, {-1, 5, .3}, PlotLabel → "Loose Time Cut Suppresses zeroes"]
```


```
GraphicsColumn[{Histogram[
    Select[Transpose[{npephs / .015, tft0}], (#[[1]] > 0.5 && #[[1]] < 1.5) &][[
     All, 2]], {-1, 1, .02}, PlotLabel → "MMegas Time, Single pe"], Histogram[
    Select[Transpose[{npephs / .015, tft0}], (#[[1]] > 1.5 && #[[1]] < 2.5) &][[
     All, 2]], {-1, 1, .02}, PlotLabel → "MMegas Time, 2 pe"]}]
```




```
Single pe jitter= 0.349468 nsec,  Double pe jitter= 0.238033 nsec
```