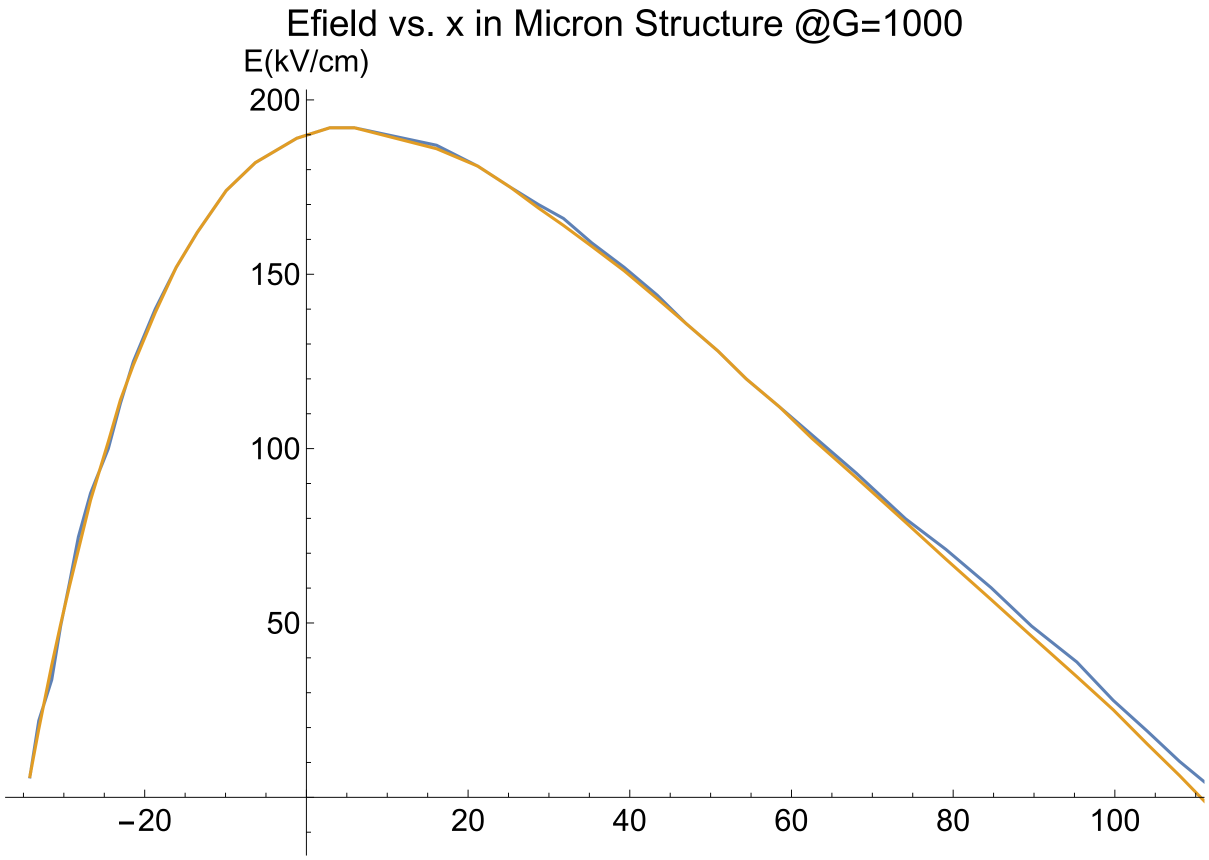
```
SetDirectory["~bastian/Desktop/si_sim"];
Namelist = FileNames[]
Namelist // Length;
nfiles = %;
```

```
{alpha.csv, APD-Efield.csv, Beta.csv, ElectronVelocity.csv,
 fitvel.cdf, fitvel.nb, fitvevh.nb, fitvevh_new.nb, HoleVelocity.csv,
 Redus APD paper.pdf, Simulation_of_RMD_APD_with_VTCAD.pptx}
```

```
filename = Namelist[[2]]
scopedata1 = Import[filename, "csv"];
{xapd, efield, Efit} = Transpose[Drop[scopedata1, 1]];
ListPlot[{Transpose[{xapd, efield}], Transpose[{xapd, Efit}]},
 Joined → True, PlotRange → Full, AxesLabel → {"x(micron)", "E(kV/cm)"},
 PlotLabel → "Efield vs. x in Micron Structure @G=1000",
 LabelStyle → {16, GrayLevel[0]}]
```

```
APD-Efield.csv
```



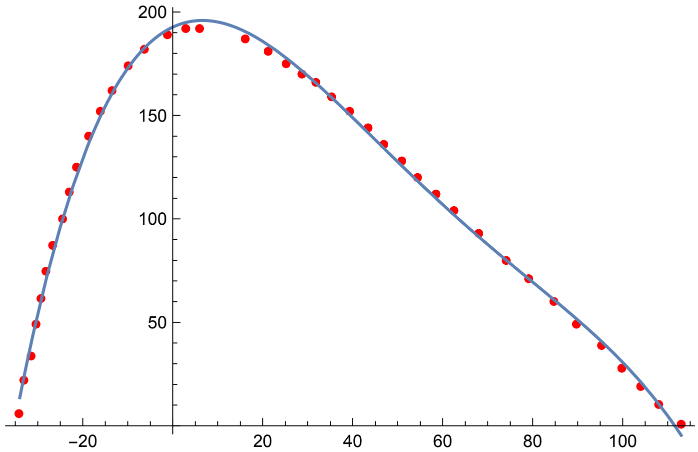

```
evsx = Transpose[{xapd, efield}];
```

```
Clear[x]
fit = FindFormula[evsx, x]
```

$192.691 + x - 0.0863909\, x^2 + 0.00100108\, x^3 - 4.00721 \times 10^{-6}\, x^4$

This formula should be used for calculating efield vs. position in RMD structure. Note that Units are kV/cm vs. position in microns.

```
Efieldfit[x_] := 192.6905555054 + 1.01528085339 x -
   0.08639089958 x^2 + 0.001001084344719 x^3 - 4.0072065437 * 10^-6 x^4
Show[ListPlot[evsx, PlotStyle → Red], Plot[{Efieldfit[x]}, {x, -34, 113}]]
```



We can now use plot from Redus paper to get electron velocity (But it may be better to go to original source).
We convert units from cm/sec vs V/cm to microns/nanosec vc. kV/cm.

```
filename = Namelist[[4]]
scopedata1 = Import[filename, "csv"];
{kvve, ve} = Transpose[scopedata1];
kvve = kvve * 10^-3; ve = ve * 10^-5;
vefit = Transpose[{kvve, ve}];
```

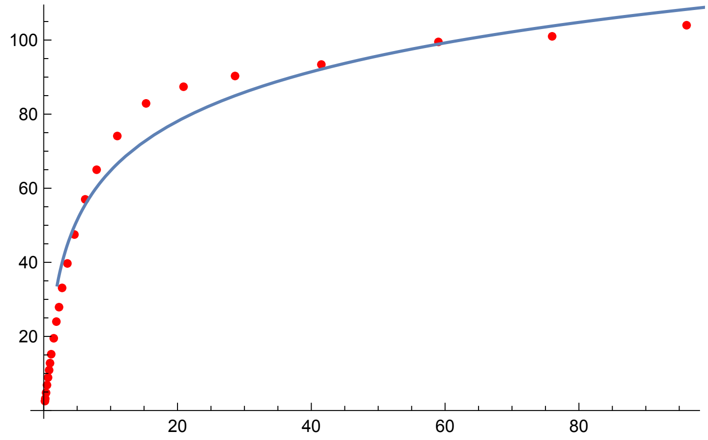
```
ElectronVelocity.csv
```

```
fit = FindFormula[Transpose[{kvve, ve}], x]
```

```
20.4483 + 19.2434 Log[x]
```

Here is the electron velocity fit. Obviously the fit can be improved with some more work.

```
Electronvelocityfit[x_] := 20.4483089 + 19.2434350 * Log[x]
Show[ListPlot[vefit, PlotStyle → Red],
 Plot[Electronvelocityfit[x], {x, 0.18, 100.}]]
```



Now repeat for hole velocity.

```
filename = Namelist[[9]]
scopedata2 = Import[filename, "csv"];
{kvvh, vhole} = Transpose[scopedata2];
kvvh = kvvh * 10^-3; vhole = vhole * 10^-5;
vhfit = Transpose[{kvvh, vhole}];
```

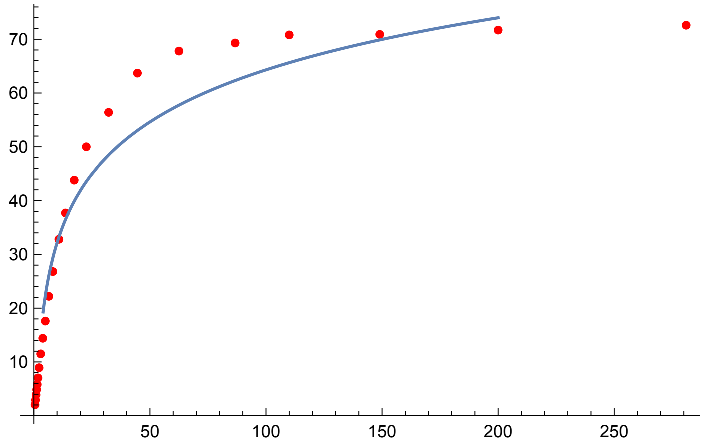
```
HoleVelocity.csv
```

```
fit2 = FindFormula[vhfit, x]
```

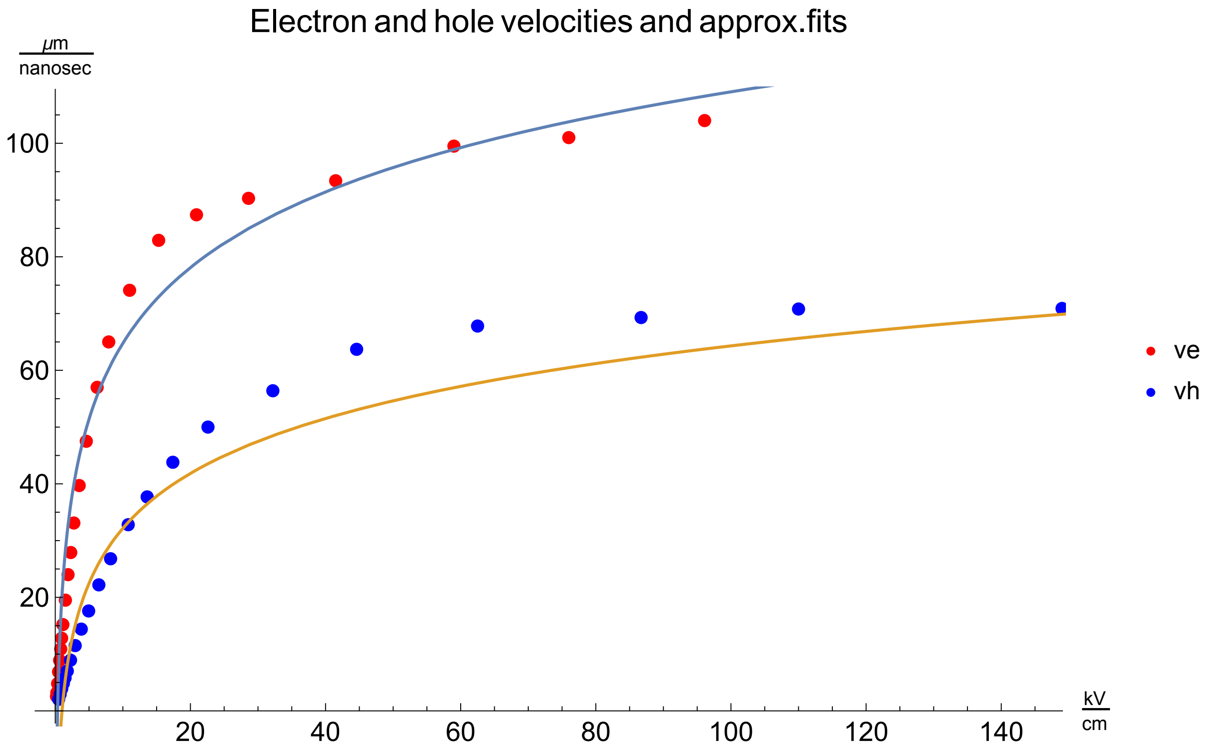
```
2.02897 + 13.9642 Log[x]
```

Here is the hole velocity fit.Obviously the fit can be improved with some more work.

```
Holevelocityfit[x_] := 13.964163242151406 * Log[x]
Show[ListPlot[vhfit, PlotStyle → Red],
 Plot[Holevelocityfit[x], {x, 0.18, 200.}]]
```



```
Show[ListPlot[{vefit, vhfit},
  PlotStyle → {Red, Blue}, PlotLegends → {"ve", "vh"}],
 Plot[{Electronvelocityfit[x], Holevelocityfit[x]}, {x, 0.18, 200.}],
 AxesLabel → {HoldForm[Global`kV / Global`cm], HoldForm[Global`μm / Global`nanosec]},
 PlotLabel → HoldForm[Global`Electron Global`and Global`hole
    Global`velocities Global`and Global`approx.Global`fits],
 LabelStyle → {14, GrayLevel[0]}, ImageSize → Large]
```




```
filename = Namelist[[1]]
scopedata5 = Import[filename, "csv"];
```

alpha.csv

```
{xalpha, alpha} = Transpose[scopedata5];
TableForm[%]
ListPlot[Transpose[{Drop[xalpha, 1], Drop[alpha, 1]}], PlotRange → Full]
```

x(um)	-60.	-20.2	-16.6	-14.5	-13.4	-12.9	-11.8	-10.7	-9
Alpha	0.	0.	40.7	105.	157.	209.	279.	367.	44