

ELEC 4700

Assignment – 1

Monte-Carlo Modeling of Electron Transport

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Part 1 – Electron Modeling

```
V_th =  
  
1.8702e+05  
  
Mean_Free_Path =  
  
3.7404e-08
```

Figure 1: Result for Part 1

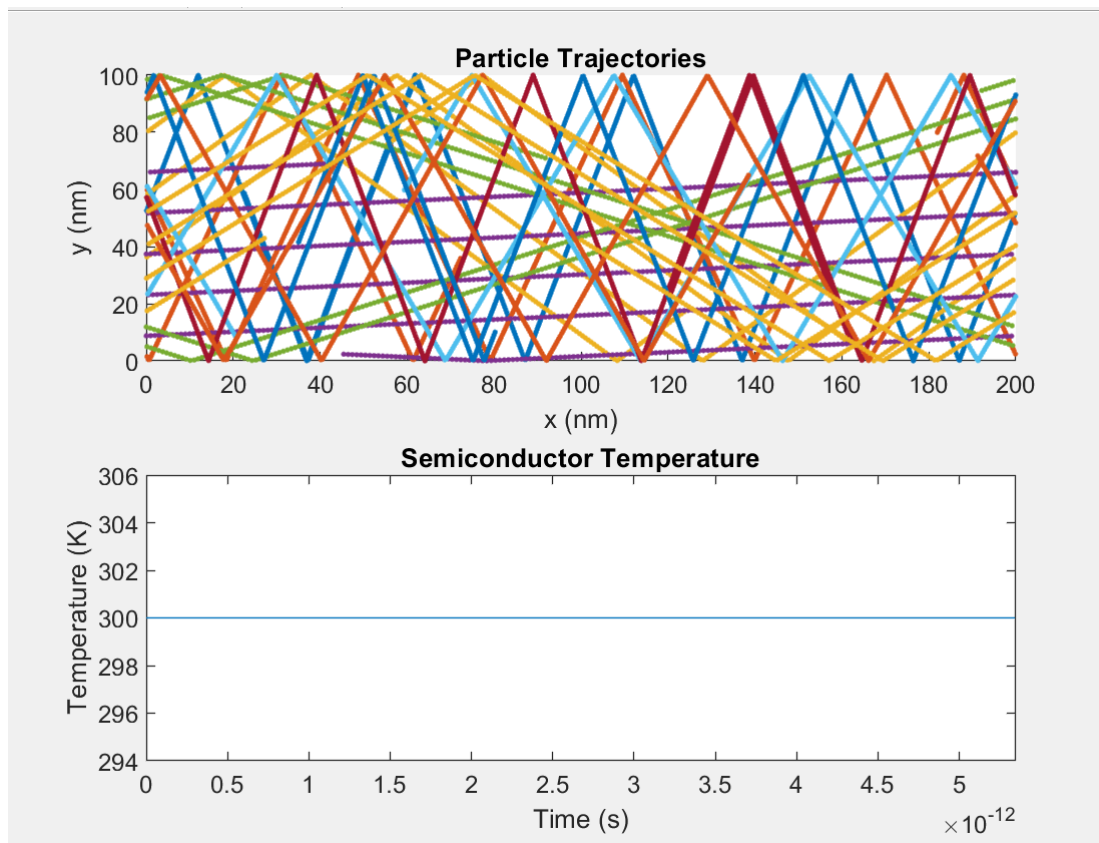


Figure 2: Plot Particle trajectories and semiconductor temperature with time

Part 2 – Collisions with Mean Free Path (MFP)

Pscatt =

0.0264

Average_velocity =

1.8855e+05

Figure 3: Result for part 2

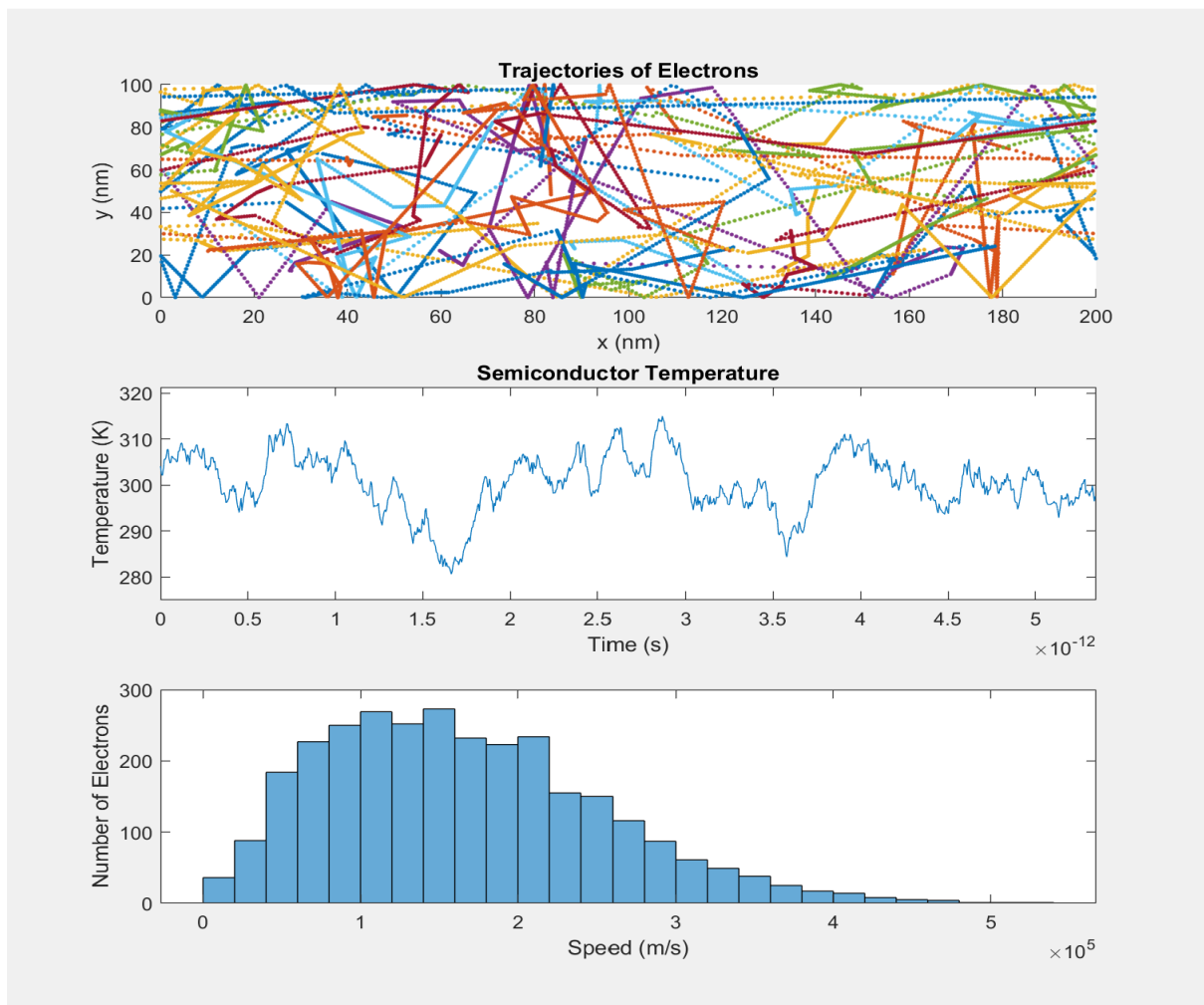


Figure 4: Plot of Trajectories of electrons and temperature

In part 2, average temperature varies over time. The change is caused by scattering. The average remains 300K with time.

Part 3 – Enhancements

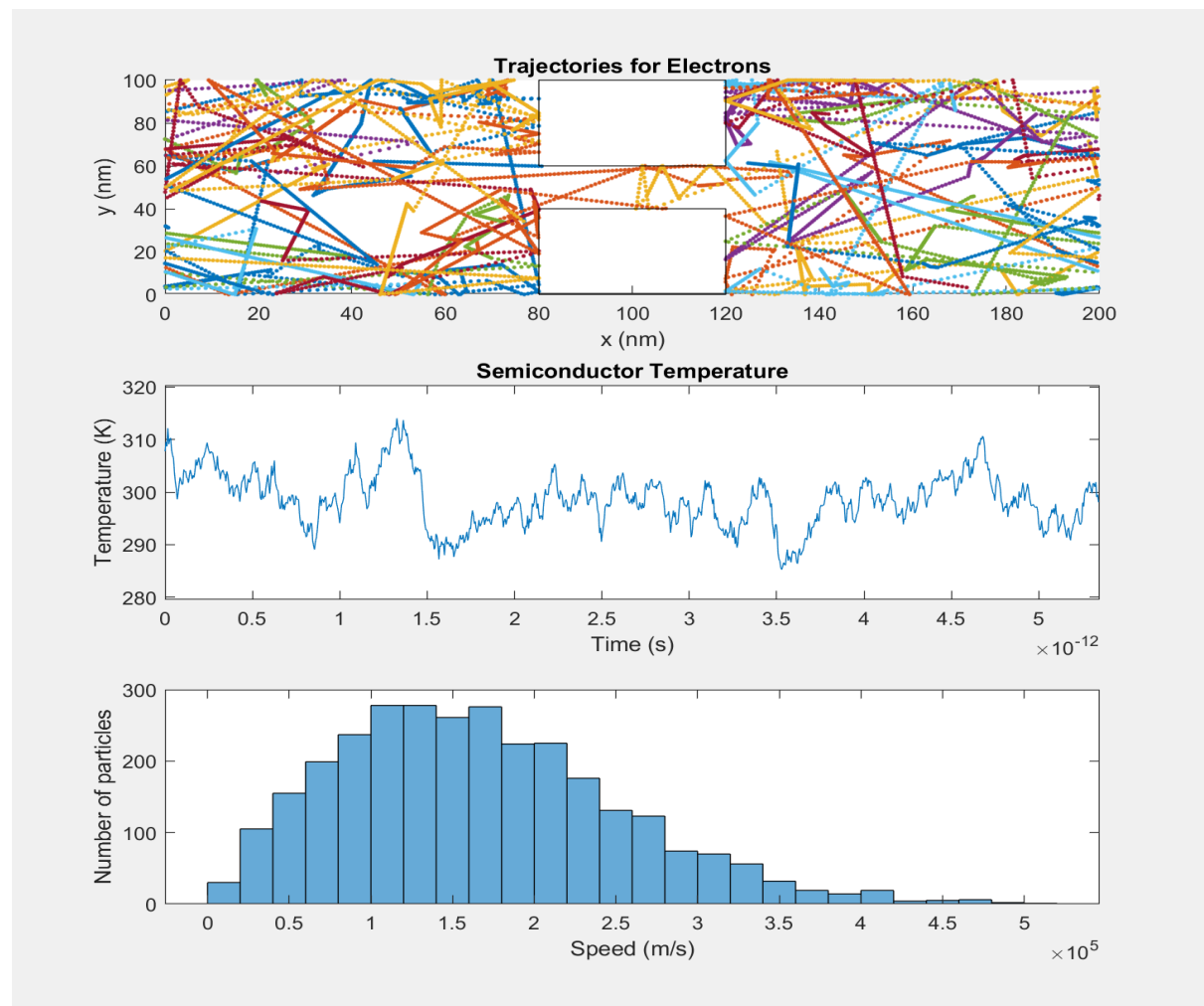


Figure 5: Trajectories of electrons and temperature of electrons plot

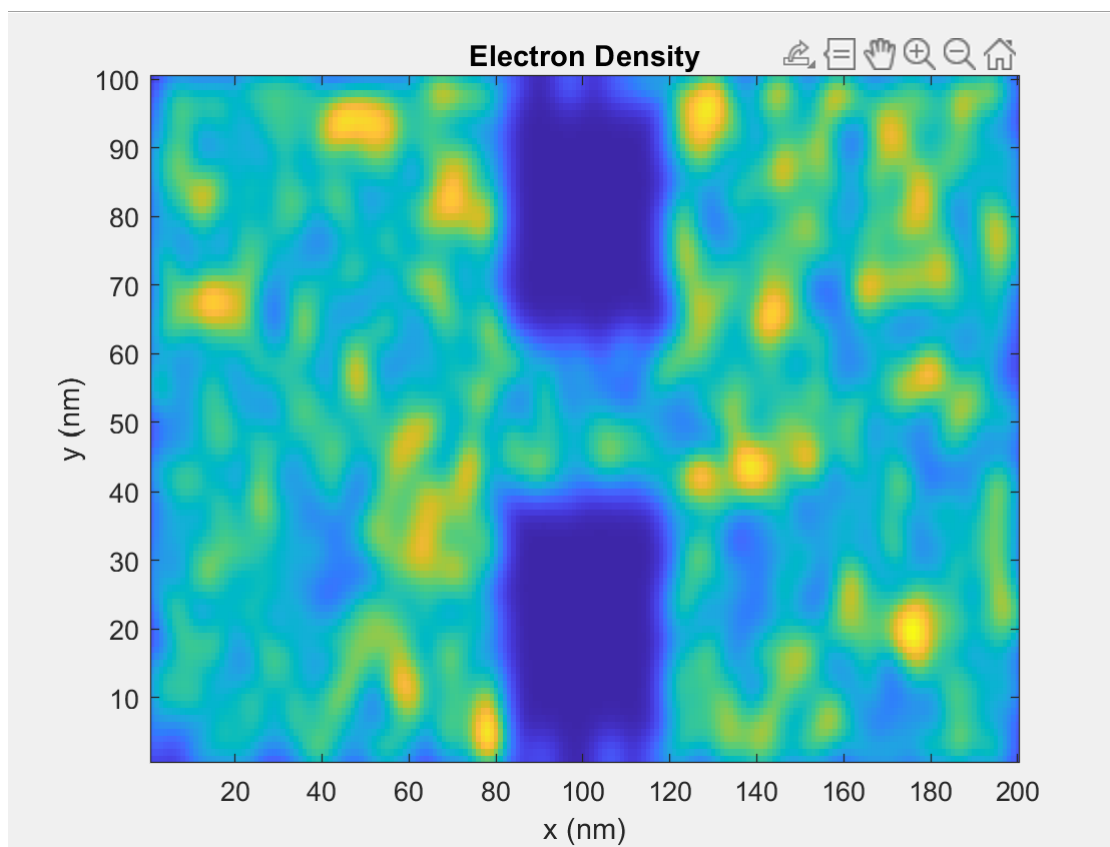


Figure 6: Electron density Map

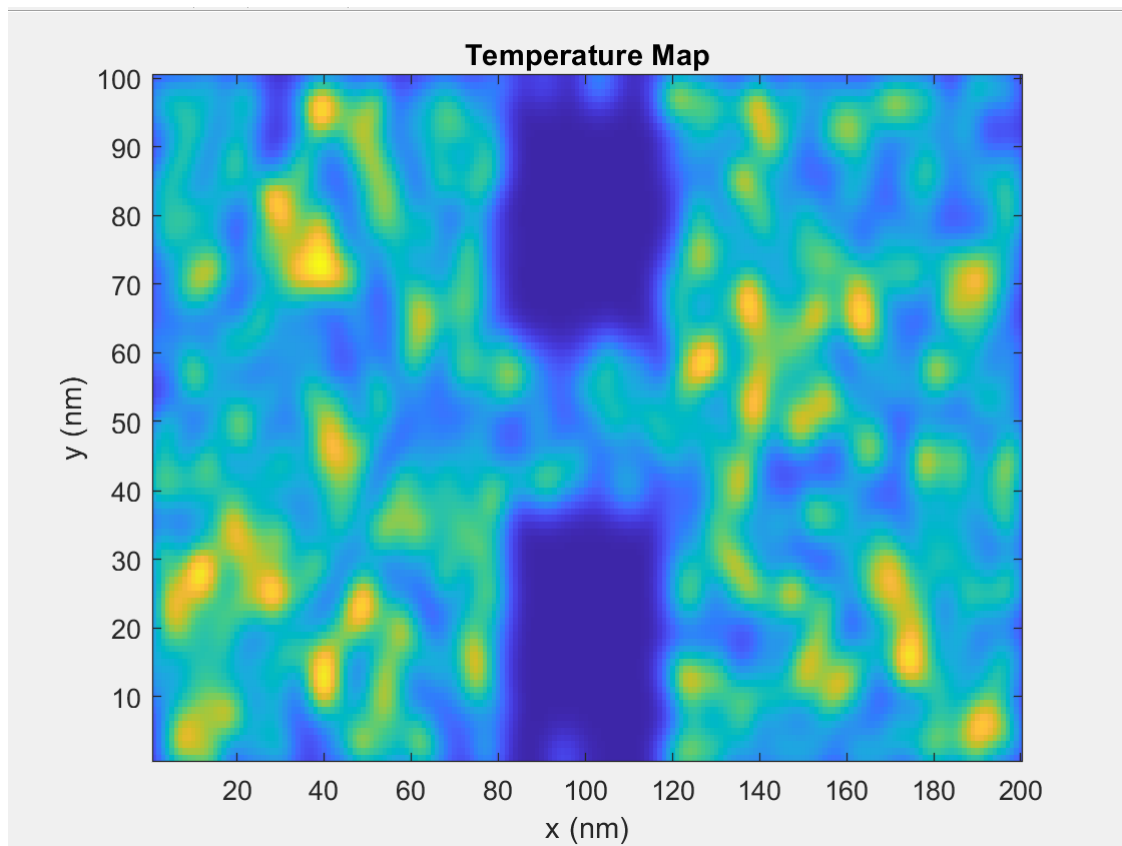


Figure 7: Temperature Map