```
mo = 9.1e-31; %mass in kg
mn = 0.26*mo; %mass of electrons


regionW = [0 200e-9]; %width of region
regionL = [0 100e-9]; %Length of region

T = 300; %in Kelvin
kB = 1.28e-23; %in J/K
vthrms = sqrt((kB*T)/mn); %thermal velocity rms

tmn = 0.2e-12; %mean time between collisions
tstep = 0.01e-12;
mfp = vthrms * tmn; %mean free path

%creating electrons
x = regionW(1,2).*rand(1,1000); %position
y = regionL(1,2).*rand(1,1000);
y(x>80e-9&x<120e-9) = (((60e-9)-(40e-9)).*rand+(40e-9));

%ceating velocity
vx = randn(1,1000) .* vthrms;
vy = randn(1,1000) .* vthrms;
vf = sqrt(vy.^2 + vx.^2);

figure('name','Part3')
%creating box
subplot(2,1,1)
rectangle('Position', [80e-9 0 40e-9 40e-9])
hold on
rectangle('Position',[80e-9 60e-9 40e-9 40e-9])
hold on

%Scattering
pScat = 1 - exp(1)^(-(tstep/tmn)) + zeros(size(vf));


for n = 1:200
    x = x + vx.*tstep;
    y = y + vy.*tstep;

    %when particle hit bottom or top or block
    vy(y <= 0) = -vy(y<=0);
    y(y<=0) = 0;
    vy(y>=100e-9) = -vy(y>=100e-9);
    y(y>=100e-9) = 100e-9;
    vy(y>60e-9&x>80e-9&x<120e-9) = -vy(y>60e-9&x>80e-9&x<120e-9);
    y(y>60e-9&x>80e-9&x<120e-9) = 60e-9;
    vy(y<40e-9&x>80e-9&x<120e-9) = -vy(y<40e-9&x>80e-9&x<120e-9);
    y(y<40e-9&x>80e-9&x<120e-9) = 40e-9;
    %when particle hit sides or block
    x(x<=0) = x(x<=0)+200e-9;
    x(x>=200e-9) = x(x>=200e-9)-200e-9;
    vx(y>60e-9&x>80e-9&x<120e-9)= -vx(y>60e-9&x>80e-9&x<120e-9);
    y(y>60e-9&x>80e-9&x<120e-9&x>100) = 120e-9;
```

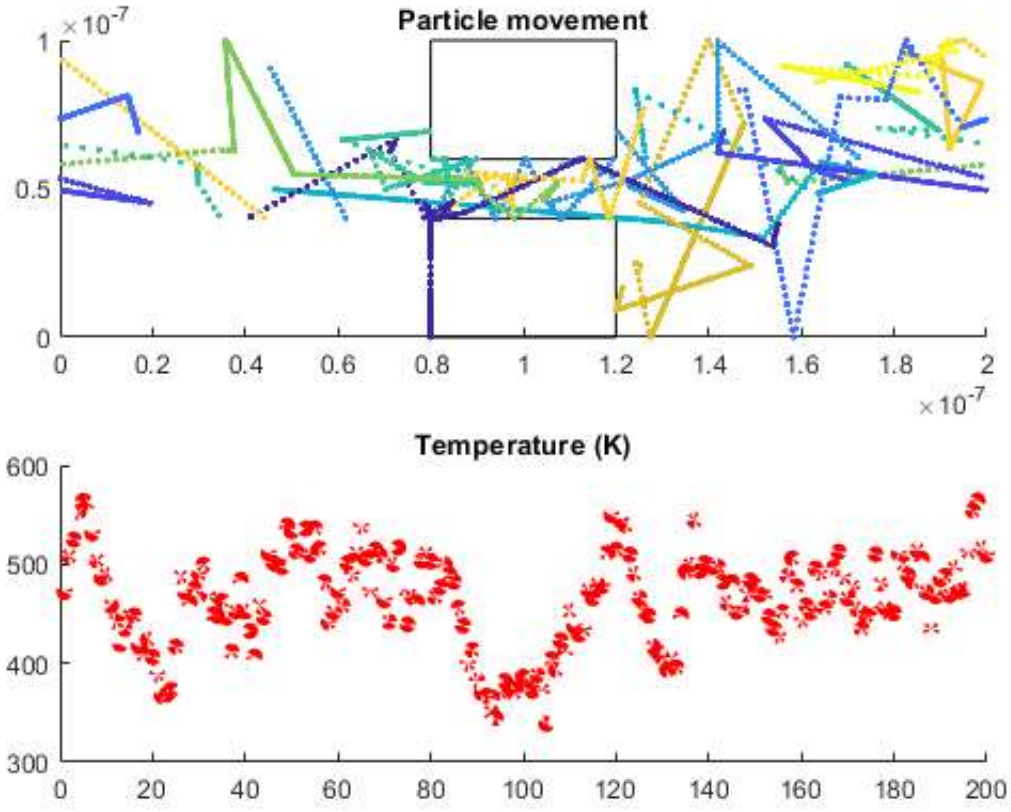
```
    vx(y<40e-9&x>80e-9&x<120e-9)= -vx(y<40e-9&x>80e-9&x<120e-9);
    x(y<40e-9&x<80e-9&x<120e-9&x<100) = 80e-9;

    prob = rand(size(vf)) ;
    vy(pScat > prob) = randn .* vthrms;
    vx(pScat > prob) = randn .* vthrms;
    vf = sqrt(vy.^2 + vx.^2);
    %creating plot area
    subplot(2,1,1)

    %particles to be graphed
    showx = x(1:10);
    showy = y(1:10);

    %plot of particles
    colours = linspace(1,10,length(showx));
    scatter(showx,showy,50,colours,'.')
    xlim(regionW)
    ylim(regionL)
    title('Particle movement')
    pause(0.001)
    hold on

    %plot of tempture
    subplot(2,1,2)
    temp = (mn/kB)*mean(vf)^2;
    scatter(n,temp,400,'r','.')
    title('Temperature (K)')
    hold on
end
```



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